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Ras Drives Malignancy Through Stem Cell Crosstalk with the Microenvironment

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RAS DRIVES MALIGNANCY THROUGH STEM CELL CROSSTALK WITH THE MICROENVIRONMENT

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RAS DRIVES MALIGNANCY THROUGH STEM CELL CROSSTALK WITH THE MICROENVIRONMENT

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Squamous cell carcinomas (SCCs) are triggered by marked elevation of RAS/MAPK signaling and progression from benign papilloma to invasive malignancy. A subset of tumor-initiating basal progenitors, the cancer stem cells, obtain increased resistance to chemo and immunotherapy along this path. However, the distribution and changes in cancer stem cells during progression from a benign state to an invasive SCC remain elusive. Here we show that following $HRAS^{G12V}$ activation, cancer stem cells rewire their gene expression program and trigger self-propelling, aberrant signaling crosstalk with their tissue microenvironment that drives their malignant progression. Surprisingly, the non-genetic, dynamic cascade of crosstalk involves pathways often mutated in advanced metastatic SCCs with a high mutational burden. Coupling our clonal skin $HRAS^{G12V}$ model with single-cell transcriptomics, chromatin-landscaping, lentiviral reporters and lineage-tracing, we show that the aberrant cancer stem cell-microenvironment crosstalk creates conditions ripe for hijacking leptin receptor (LEPR)-signaling, which in turn launches downstream PI3K-AKT-mTOR signaling at the benign-malignant transition. By functionally interrogating each step in this pathway, we unravel how dynamic temporal crosstalk with the microenvironment and orchestrated by the stem cells, profoundly fuels this path to malignancy. This discovery provides new insights into the path to malignancy and suggests broad implications for cancer therapeutics.

To my ever-supportive friends and family

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ACT	adoptive cytotoxic T cell transfer
AML	acute myeloid leukemia
ATAC-seq	Assay for Transposase-Accessible Chromatin with high-throughput sequencing
BCC	basal cell carcinoma
CRISPR	clustered regularly interspaced short palindromic repeats
CSC	cancer stem cell
cSCC	cutaneous squamous cell carcinomas
CTLA4	cytotoxic T lymphocyte antigen-4
DGE	differential gene expression
EdU	5-ethynyl-2'-deoxyuridine
EGFP	enhanced green fluorescent protein
EMT	epithelial-mesenchymal transition
FACS	fluorescence-activated cell sorting
FDA	Food and Drug Administration
FL	full length
GO	gene ontology
HF	hair follicle
HFSC	hair follicle stem cell
HSC	hematopoietic stem cell
IFE	interfollicular epidermis
KEGG	Kyoto Encyclopedia of Genes and Genomes
LEPR	leptin receptor
mTOR	the mammalian target of rapamycin
PI3K	phosphoinositide 3-kinase
RNA-seq	RNA-sequencing
SBE	SMAD binding elements
SCC	squamous cell carcinomas
scRNA-seq	single-cell RNA-sequencing
SMLA	superactive mouse leptin antagonist
TGFβ	transforming growth factor beta
UMAP	Uniform Manifold Approximation and Projection

1. INTRODUCTION

1.1 Squamous cell carcinoma

Squamous cell carcinomas (SCCs) are among the most frequent and life-threatening cancers worldwide [1]. SCCs typically arise in stratified epithelia of the skin, oral cavity, esophagus, lung, and anogenital regions [1-3]. Even for skin SCC where cancers are often caught early, their frequency of occurrence and ever-rising incidences of metastasis pose a significant health concern [4]. A prerequisite to developing new and improved therapeutics for treating these cancers will be to understand the critical molecular steps involved in the transition of epithelial tissue stem cells to a benign and then invasive state, which is the initial stage of the metastatic cascade.

SCC is the second most common nonmelanoma skin cancer after basal cell carcinoma (BCC). The lifetime risk of developing cutaneous SCC (cSCC) is 9-14% for men and 4-9% for women in the US [5] but dramatically increases for patients on immunosuppressive drugs [3]. Every year, there are more than one million newly diagnosed cases in the US [6], and the invasive SCC incidence has been increasing during the past decades [7]. Most cases can be treated by office-based therapies such as standard surgical excision and radiation therapy [8]. However, there are still about 8-10% of cases that ultimately recur, some of which will progress to metastatic disease [8].

While the rate of metastasis in cSCC for non-immunocompromised patients is relatively low, the high occurrence of skin SCC means that skin SCC metastasis still affects a significant number of patients. The recommended treatments are still limited to surgical resection, local radiation, growth factor inhibitors, cisplatin, and symptom management [8]. Very recently, FDA approved immunotherapy for treating advanced cSCC patients who are not candidates for curative surgery or curative radiation [9]. Among immunosuppressed individuals, particularly solid organ transplant recipients, the risk of metastatic cSCC increases by several hundred times because of the dramatically increased risk of both developing SCC and progressing to metastasis [3, 10]. Unfortunately, many of these immunosuppressed patients are not able to tolerate such immune “activation” through the novel immune checkpoint inhibitor therapy. There is currently no treatment to block the benign to malignant transition, which would be especially beneficial for these high-risk patient groups. A current unmet need in fighting these cancers is to develop new markers that distinguish benign tumors from malignant SCCs, as these differences can be exploited to advance cancer therapeutics and prevention strategies.

1.2 TGFβ signaling in cancer

The transforming growth factor-beta (TGFβ) signaling is one of the key pathways in cancer biology. TGFβ has tumor-suppressive functions and modulates cell invasion, metastasis, and immune responses. Malignant cancer cells overcome the tumor-

suppressive effects by either inactivating the TGFβ receptors or alternating the downstream suppressor arm of the pathway [11]. Hence, the TGFβ pathway plays a crucial role in tumor progression, which is the center of the complexity.

“Pre-metastatic cells” change their cell-cell junction and cell-matrix interactions to enable the invasion of the surrounding stroma. This process mimics the biological process known as epithelial-mesenchymal transition (EMT). Signaling pathways, including TGFβ signaling that lead to activation/deactivation of EMT programs during many specific pathologic processes, have been the focus of many studies [12, 13]. Briefly, TGFβ signaling starts from the ligands binding to TGFβrII and activates TGFβrI. Consequently, TGFβrI phosphorylates SMAD2 and SMAD3. The common mediator, Smad4 trimerizes with phosphorylated SMAD2/3 to form a complex and activate downstream gene transcription [14]. The classic EMT-inducing transcription factors include SNAI1/Snail, SNAI2/Slug, ZEB1, ZEB2, TWIST1, and TWIST2 [15-20]. These factors can elaborately regulate each other. Together these transcriptional factors are regulated as a network [21]. In many studies, these factors are shown as TGFβ signaling targets.

However, the role of EMT in metastasis is still controversial [22]. EMT in cancer can be partial, transient, or reversible [23]. This has resulted in conflicting data regarding the contribution of EMT to cancer progression. The TGFβ signaling-enforced EMT process can turn epithelial cells into a stem state and push carcinoma cells into a tumor-initiating phenotype [24]. The heterogeneity of cancer cells within tumors has been studied more and more recently. The tumor-initiating CSC model has been used to

explain this phenomenon. Therefore, understanding the broader regulatory network of TGFβ signaling and CSCs is the key to investigating tumor progression.

1.3 Tumor-initiating cancer stem cells

The term cancer stem cell (CSC) was conceptualized as paralleling the adult stem cells, that a small number of tumor cells can not only self-renew but also fuel the tumor growth. This hierarchy model was initially templated from the hematopoietic stem cells (HSCs) [25]. One of the early studies demonstrated that a tiny subset of cancer cells in acute myeloid leukemia (AML) could be engrafted reliably into immunodeficient mice [26]. In malignant SCCs, our laboratory reported that FACS isolated hair follicle stem cells marker $CD34^{lo}$ and $CD34^{hi}$ tumor basal cells (integrin $\alpha6^{hi}$ and $\beta1^{hi}$) could initiate secondary tumors in the serial limited dilution transplantation assays, where their suprabasal counterparts (integrin $\alpha6^{lo}$ and $\beta1^{lo}$) could not [27]. However, there was no hierarchy of the cancer stemness between the $CD34^{lo}$ and $CD34^{hi}$ tumor basal cells [27]. We concluded that the tumor-initiating cancer stem cells of SCC reside in the basal layer at the tumor-stromal interface.

Furthermore, our previous studies identified a population of SCC cells activated by TGFβ and located at the tumor-stroma interface that not only have increased tumor-initiating capacity but are also resistant to chemotherapy [28] and immunotherapy [29]. Oshimori and colleagues demonstrated TGFβ from vasculature promotes heterogeneity among the tumor CSCs. With a functional lentivirus reporter system, *in vivo* lineage

tracing and genetic ablation of TGFβ signaling experiments showed these TGFβ responding CSCs are slow-cycling, invasive, and chemo-resistant. Interestingly, the molecular mechanism attributed glutathione metabolism activated through P21 and stabilized NRF2 [28]. Miao and colleagues found these TGFβ responding CSCs can also escape the adoptive cytotoxic T cell transfer (ACT)-based immunotherapy. We discovered these cells selectively obtain the expression of surface molecule CD80, which directly interacts with cytotoxic T lymphocyte antigen-4 (CTLA4) and weakens the cytotoxic T cell activity. By blocking TGFβ, CTLA4, or CD80, the tumor relapses after ACT was diminished [29]. Therefore, TGFβ responding CSCs are in the center stage of SCC tumorigenesis and are very important subjects to study during the tumor progression from benign papilloma to invasive SCC.

1.4 Non-genetic mechanism of tumor progression

To date, most of the focus of these cancers has been on their mutational burden. Early chemical carcinogenesis studies on mouse skin revealed that elevated RAS/MAPK signaling, often involving oncogenic mutations in *Hras,* is a critical early driver in the path to benign papillomas and then malignant, invasive SCCs [30-32]. The lengthy delay and sporadic nature of mutagen-mediated SCC cancer progression led researchers to postulate that additional oncogenic mutations were involved [32-35], and the high mutational burden associated with human metastatic SCC cancers [36] has supported this view. Curiously, however, genetically induced SCCs display many fewer mutations than mutagen-driven SCCs [32, 37], and tumors exhibiting a heterogeneous papilloma-

SCC phenotype can be genetically initiated even when a single oncogenic mutant $HRAS^{G12V}$ is induced [28]. These observations raise the possibility that non-genetic alterations could be potent drivers of cancers.

Increasing evidence has highlighted the importance of extrinsic perturbations in the microenvironment, e.g. inflammation, metabolism and wounding, in preconditioning tissues to heightened cancer vulnerabilities [28, 37-42]. Less clear is whether in healthy tissues, an oncogenic mutation in a stem cell can intrinsically-drive environmental changes that may lessen the need for multi-step mutagenesis in cancer, and if so how. Here, we address these key issues using a single $HRAS^{G12V}$ oncogene model that reliably generates homogeneously aggressive invasive SCCs within 8 weeks of clonal activation. By performing deep single-cell RNA sequencing on enriched basal progenitors at the invasive SCC stage, we gained new insights into the cancer stem cell signature. Tracing the temporal origins of this signature and its physiological significance, we show that upon oncogenic RAS initiation, tissue stem cells begin an aberrant molecular dialogue with their normal microenvironment. Their transition from a benign to invasive SCC state is marked by a striking remodeling of the tumor microenvironment that provides fertile ground for TGFβ-mediated induction of leptin receptor (*Lepr*) and vasculature-mediated activation of LEPR signaling within the stem cells. This unexpected hijacking activates downstream PI3K-AKT-mTOR signaling and drives the malignant invasive switch. We demonstrate that each step of the stem cell:microenvironment crosstalk cascade triggered by oncogenic RAS is essential for malignant progression, and involves pathways often mutated in advanced metastatic SCCs with high mutational burden.

2. CANCER STEM CELLS CONTRIBUTE TO TUMOR PROGRESSION THROUGH CROSSTALK WITH MICROENVIRONMENT

2.1 Results

2.1.1 Newfound heterogeneity in cancer stem cells

Lineage tracing has shown that skin stem cells that acquire *Hras* mutations go through a benign papilloma state before progressing to a malignant, invasive SCC state [43, 44]. Serial transplantations have shown that tumor-initiating stem cells from murine SCCs are enriched for elevated α6 and β1 integrins and reside at the tumor-stromal interface [27, 45]. In tumors displaying a mixed benign (papilloma-like) and malignant/invasive (SCC) phenotype, basal progenitors that undergo TGFβ signaling are enriched for tumor-initiating stem cells with increased resistance to chemo and immunotherapy, and loss of TGFβ signaling reverts the tumors to a benign state [28, 29, 42].

To control the tumorigenic process, we took E9.5 FVB mouse embryos harboring a tetracycline-inducible RAS oncogene (*TRE-HRAS*^{G12V}) and applied our powerful *in utero* lentiviral delivery system at low titer to selectively transduce a small number of skin progenitors with a *PGK* promotor driven *rtTA3* transactivator and a TGFβ reporter under the control of pSMAD2/3-SMAD4 complex-Binding Elements (SBE) (Fig. 2.1A). When

doxycycline was administered to *TRE-HRAS*^{G12V} mice, the clonal skin patches of transduced stem cells activated HRAS^{G12V}. After ~4 weeks, benign papillomas formed, typified morphologically by their hyperplastic but well-differentiated epithelium and their smooth undulating epithelial-mesenchymal borders (Fig. 2.1A, top panel). By ~8 weeks, most of the visible papillomas advanced to more homogenous invasive SCCs, typified by the morphological hallmarks of an undifferentiated hyperplastic state, with differentiated keratin pearls limited to small regions of the tumor, and the absence of a clearly demarcated epithelial-stromal border (bottom panel). As judged by immunofluorescence imaging of whole mount and sagittal tissue sections and by fluorescence activated cell sorting (FACS), TGFβ-signaling was rare in papilloma progenitors but rose strikingly in invasive SCC progenitors (Fig. 2.1B and 2.1C). When taken together with our prior analysis linking TGFβ-signaling progenitors to the invasive fronts of mixed papilloma-SCC tumors[28], this result provided an important temporal layer by connecting TGFβ-signaling to the progression of tumor stem cells from the benign state to the malignant state.

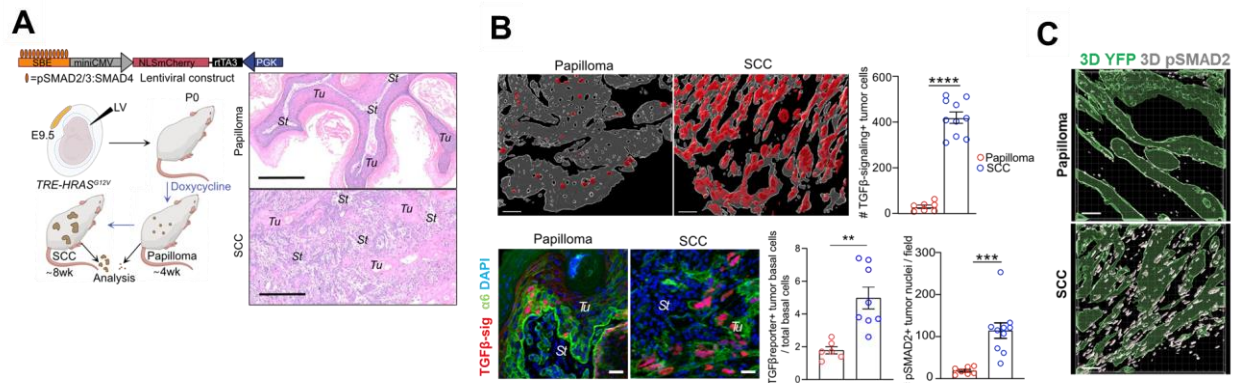

Figure 2.1: Benign papillomas and invasive SCCs demonstrate distinct pathological and molecular signatures

A, Schematic of tumor model. Using our powerful non-invasive *in utero* delivery method, we inject a lentivirus harboring a TGFβ mCherry reporter and a transactivator rtTA3 at low titer into the amniotic sac of E9.5 *TRE-HRAS*^{G12V} mouse embryos and transduce individual skin progenitor cells. By administering doxycycline postnatally, rtTA3 is

activated, inducing *HRAS*^{G12V} in these stem cells. H&E staining reveals temporal emergence of distinct pathologies of benign and malignant SCCs. Tu, tumor; St, stroma. Scale bars = 300µm. **B**, (Top) Collapsed Z-stack rendering of 3D whole-mount immunofluorescence images (scale bars = 50 µm) and quantifications, showing that TGFβ signaling/nuclear pSMAD2 cells are rare at the papilloma stage, but contribute to the SCCs that emerge and which show enriched signaling at the invasive tumor fronts. (Bottom) High magnification images of 10µm sagittal sections along with FACS-quantifications of mCherry-positive α6^{hi} basal progenitors (scale bars = 20 µm), demonstrating specific enrichment of these cells in the SCCs (n >6 tumors analyzed per stage). **C,** Collapsed Z-stack rendering of 3D whole mount immunofluorescence for nuclear pSMAD2/3.

Probing deeper into the physiological relevance of this temporal change, we added a *CreER*^{T2} transgene under the control of the SBE enhancer driven reporter and performed tamoxifen-activated lineage-tracing. From this analysis, we could see that even though the TGFβ-reporter positive cells were rare in the papilloma, they contributed significantly to SCC formation (Fig 2.2).

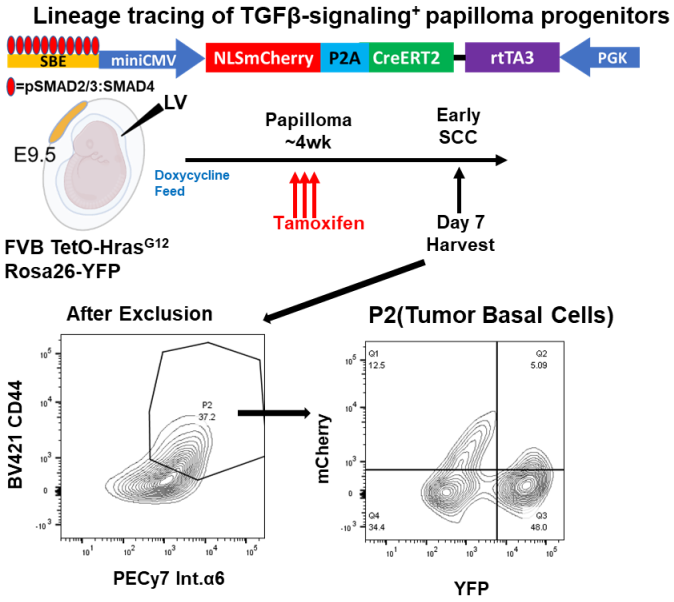

Figure 2.2: Lineage tracing of TGFβ-signaling+ papilloma progenitors
Lineage tracing of TGFβ-signaling tumor cells marked at the papilloma stage, traced to the SCC and analyzed by FACS shows that TGFβ responding papilloma cells contribute significantly to SCC tumor progression.

To further dissect the nature of these differences, we performed SMARTseq2 single-cell RNA-sequencing (scRNA-seq) on histologically pre-validated homogenously invasive SCCs whose progenitors had been enriched by FACS for integrins α6 and β1, and pan-tumor cell marker CD44. For reference, we included a small number of FACS-purified suprabasal tumor cells (integrin low) (Fig. 2.3A). Quality control measures good detection rate, with ~7500 genes/cell and low contamination of mitochondrial genes (Fig. 2.3A).

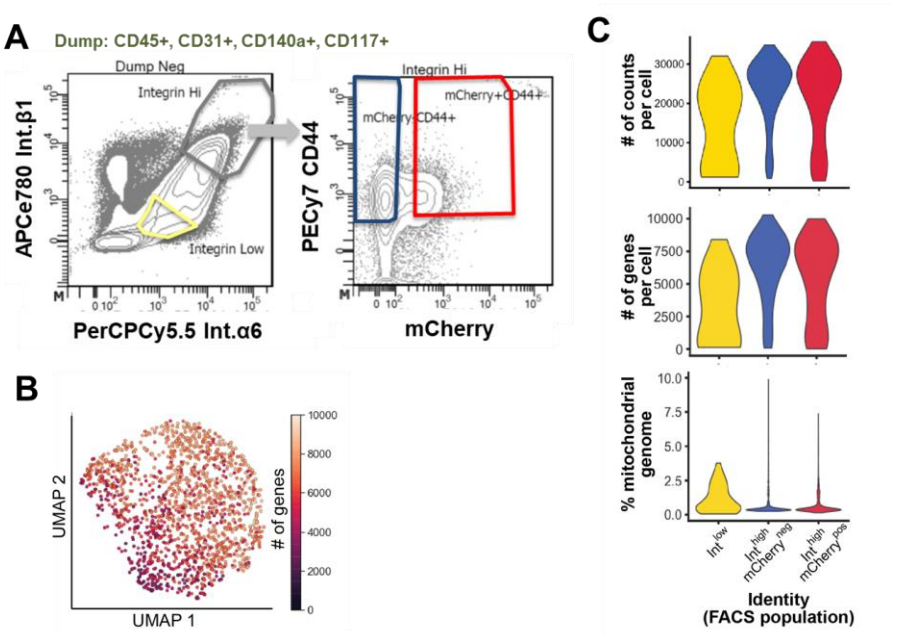

Figure 2.3: FACS strategies and quanlity controls for single-cell transcriptomics in SCC
A, FACS strategies for isolating basal progenitors from papilloma and SCCs, respectively ($\alpha6^{hi}\beta1^{hi}CD44^{+}$) that are either high or negative for TGFβ reporter mCherry. Papillomas and SCCs were analyzed according to timing and prescreened for pathology prior to FACS. **B**, UMAP of the number of genes per cell. **C**, Violin plots showing that the quality of samples (with FACS labelled cell identities) in the scRNAseq was high as judged by the number of counts per cell, the number of genes per cell, and the low percentage of the mitochondrial genome captured.

Transcriptomes fell into 3 clusters: C1, $\alpha6^{lo}\beta1^{lo}CD44^{+}$ suprabasal cells that had been added as reference and displayed differentiation-specific transcripts *Krt1* and *Krt6b,* and

C2 and C3, both of which were $\alpha6^{hi}\beta1^{hi}CD44^{+}$ basal cells (Fig. 2.4). Despite the homogeneity in the pathology of these advanced SCCs, newfound heterogeneity emerged within the SCC basal cell population that had not been appreciated from prior studies on mixed papilloma-SCC tumors. This was exemplified by TGFβ-reporter $(mCherry)^{+}$ cells, which although they defined invasive progenitors [28] in homogeneously invasive SCCs, showed only slight enrichment in C2 vs C3 cells. (Fig. 2.4 dotted box).

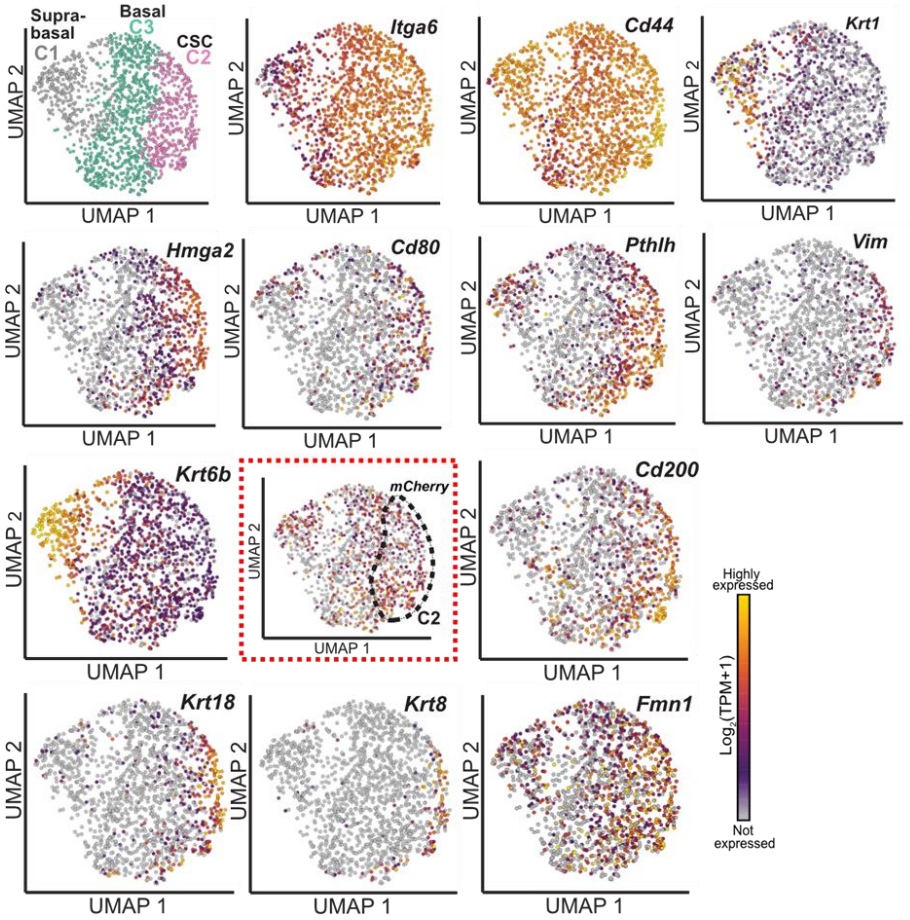

Figure 2.4: scRNAseq of homogeneously invasive SCCs

Figure 2.4: UMAP representations and unsupervised k-NN based clustering of single-cell transcriptomes from SMARTseq2 performed on pooled FACS-isolated integrin-low (spiked; 159 total supra-basal) and integrin-high (bulk, 1346 total basal) cells from invasive SCC tumors expressing pan tumor marker CD44 (n=3 mice). Clusters C2 and C3 were basal tumor progenitors, marked by high expression of *Itga6* and *Cd44* while cluster C1 comprised the spiked supra-basal cells, as marked by differentiation markers *Krt1* and *Krt6b*. Note that *mCherry* (TGFβ reporter, dotted box) was enriched for but not exclusive for C2, while many other transcripts distinguished C2 from C3, including *Cd200,*

Hmga2, *Cd80, Pthlh*, previously found to be enriched in SCC stem cells with enriched tumor-initiating ability. Note also that cells within the C2 cluster were particularly enriched for invasive markers (*Krt8*， *Krt18, Vim, Fmn1*). The UMAP plots show the relative expression level [Log2(TPM+1)] of these genes across single cells.

This finding suggested that additional factors must underlie the molecular heterogeneity within the basal progenitors of invasive SCCs.

2.1.2 Progenitors that progress to SCC are influenced by shifting crosstalk between the stem cells and their microenvironment.

While cluster C2 featured transcripts including *Cd200, Hmga2, Cd80* and *Pthlh,* that had previously been shown to typify basal SCC progenitors enriched for tumor-initiating stem cells [28], it also contained many others that had not been clearly aligned to the SCC-cancer stem cell signature. Overall, of 1894 transcripts enriched in basal SCC cells relative to differentiated tumor cells, 732 of them were specific to the C2 cluster (Fig. 2.4 and Table 1).

To place this high-resolution cancer stem cell signature in the context of tumor progression, we performed bulk RNA-sequencing on basal tumor progenitors purified by FACS from normal skin, and from papillomas and SCCs that had been staged temporally and histologically prior to processing (Fig. 2.5A and 2.5B). Relative to their normal skin counterparts, pan-tumor basal cells upregulated 886 transcripts ≥2 fold (padj ≤0.05) (Table 2), while 562 transcripts scored as being specifically upregulated during the transition from the benign state to the malignant, invasive state (Table 3). Although a

number of C2 transcripts were expressed at the papilloma stage, many were expressed at the benign: malignant transition, and this was corroborated at the immunofluorescence level, e.g. Keratin 8. (Fig. 2.5C and 2.5D).

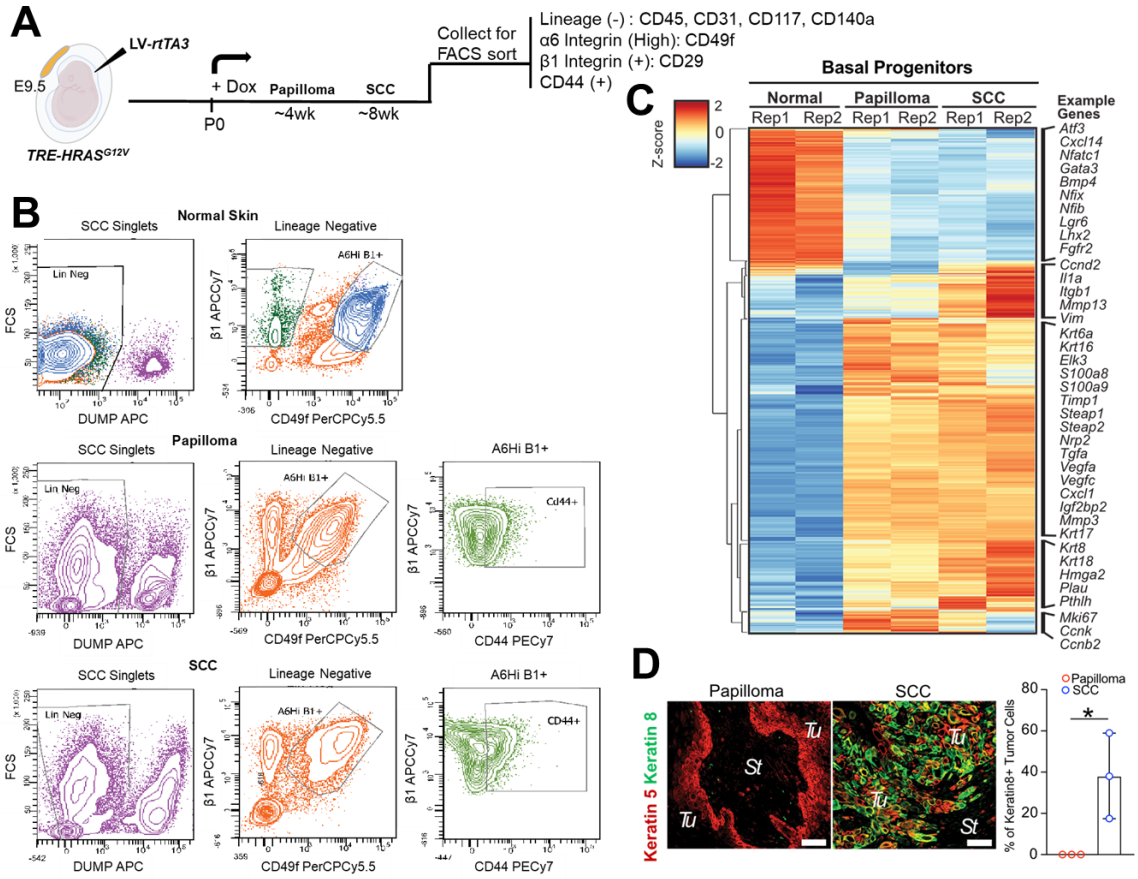

Figure 2.5 :FACS-isolation and transcriptomic analysis of basal progenitors from normal skin, benign papilloma and SCC.

Figure 2.5: FACS-isolation and transcriptomic analysis of basal progenitors from normal skin, benign papilloma and SCC. **A**, Experimental design to use the tumor model as in Fig. 1a and then purify basal progenitors from papillomas and SCCs. Basal cells (n=2 mice per condition) were isolated by FACS using tumor basal cell markers (integrin α6, β1, and CD44) with non-epithelial cell types (CD31, endothelial cells; CD45 pan-immune cells; CD117, melanocytes; CD140a, mesenchymal cells) excluded. **B**, FACS strategies for isolating basal progenitors from (TOP) normal telogen-phase skin ($\alpha6^{hi}\beta1^{+}$), inclusive of interfollicular epidermal stem cells, upper hair follicle and sebaceous gland stem cells and bulge hair follicle stem cells; and from (MIDDLE and BOTTOM) papilloma and SCCs, respectively ($\alpha6^{hi}\beta1^{+}CD44^{+}$). Papillomas and SCCs were analyzed according to timing and prescreened for pathology prior to FACS. For high throughput RNA sequencing, two independent replicates of FACS isolated cells were used for each condition. Note also

that for all other experiments performed on FACS-purified cells, the gating stringency was raised to 5 x 10^3 for CD29 (β1) and CD49f (α6). **C**, Heatmap representation Bulk RNAseq of FACS-isolated basal progenitors from normal skin epithelia, papilloma, and SCC (in replicate) show significant molecular changes and stage-specific signatures during tumor progression. Note: RNAseq of Rep1 SCC displayed mixed SCC-papilloma features. **D**, Immunofluorescence images show that keratin 8 positive tumor cells, as a proxy for the C2 SCC cancer-stem cell signature, are rare in the papilloma stage and much enriched in the invasive SCC stage. (n=3). Tu, tumor; St, stroma. Scale bars = 50μm.

Further insights into the unique features of these tumor-initiating SCC stem cells were obtained upon analyzing the GO-terms of the C2 cluster. 'Angiogenesis' appeared at the top of this list, along with cell migration, wound healing, protein phosphorylation and intracellular signaling (Fig. 2.6A). UMAP plots highlighted the enrichment of angiogenesis genes in this cluster. Many of these genes were upregulated at the benign to malignant, invasive state (Fig. 2.6B) and were specifically enriched in the C2 cluster (Fig. 2.6A). Consistent with the preponderance of secreted angiogenic factors, collapsed Z-stack images of tissue clearing and whole mount immunofluorescence revealed a marked influx in $CD31^+$ vasculature during the transition from benign papilloma to invasive SCC (Fig. 2.6C). Proximity quantifications revealed that relative to papillomas, the SCC vasculature is considerably closer than in papillomas to the tumor:stromal interface where the progenitors reside. Taken together, the temporal emergence of tumor-initiating stem cells, TGFβ-signaling and vasculature at the benign:malignant transition provided compelling evidence that the events occurring in the tumor-initiating stem cells and the microenvironment were not merely correlative but functionally intertwined.

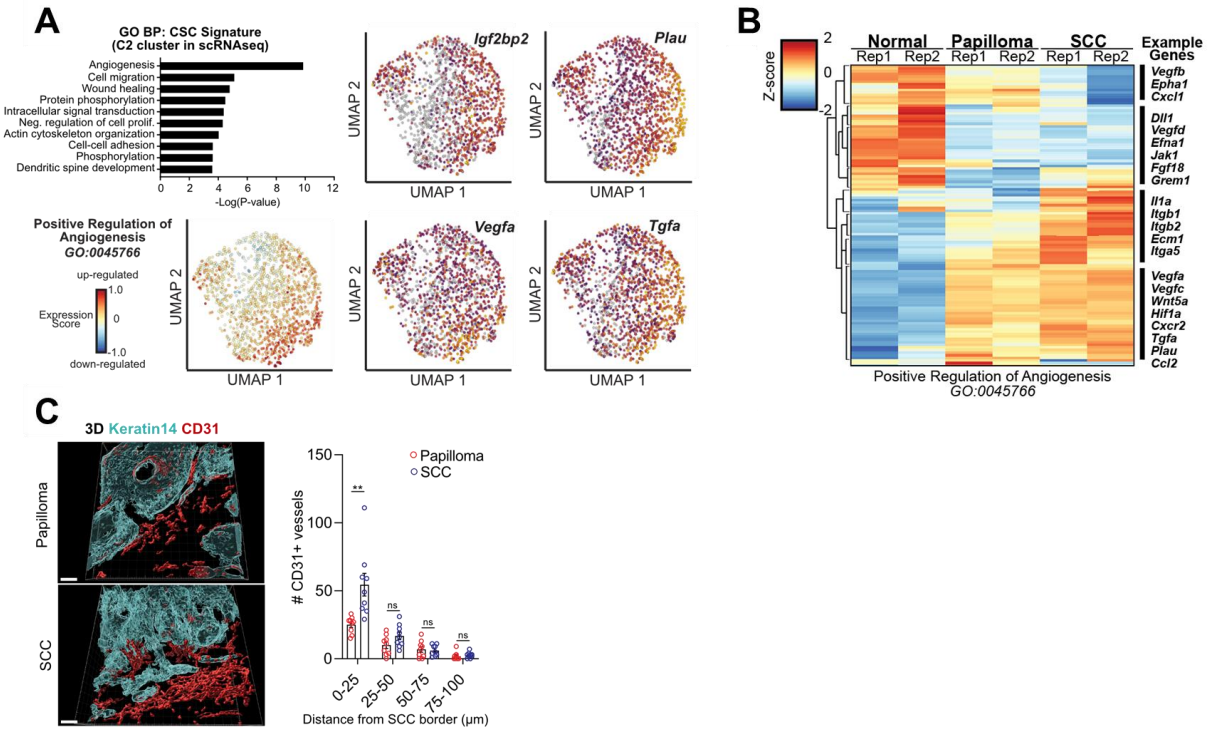

Figure 2.6: The transition from benign to invasive state is accompanied by rewiring angiogenesis into the tumor-initiating cancer stem cell transcriptome
A, 'Angiogenesis' is the top GO-term of cluster C2 'cancer stem cell' (CSC) transcripts. Below is UMAP of the positive regulation of angiogenesis GO-term transcripts and at right are examples of individual angiogenic factors enriched during the transition from the benign to malignant state. **B**, Heat map of the angiogenesis GO-Term from RNAseq in Fig. 2.5C. **C**, Collapsed Z-stack rendering of clearing and whole-mount immunofluorescence of tissue sections (n > 8 tumors per stage). Keratin 14 labels the tumor epithelium; CD31 labels the vasculature. Quantifications are at right. Note that the blood vessel proximity is closer in invasive SCC than papilloma. Scale bars = 40 μm. Degree of statistical significance is denoted by ns (p>=0.05), * (p<0.05), ** (p<0.01), *** (p<0.001), and **** (p<0.0001).

Further support for this notion came from RNA-seq and differential gene expression (DGE) analysis of FACS-purified papilloma versus SCC basal progenitors that we fractionated according to their TGFβ-reporter activity. Despite their temporal lineage relationship, TGFβ-responding basal cells of SCCs differed markedly from those of papillomas (Fig. 2.7A and 2.7B). These data pointed to the view that progenitors that

progress to SCC are influenced by shifting crosstalk between the stem cells and their microenvironment.

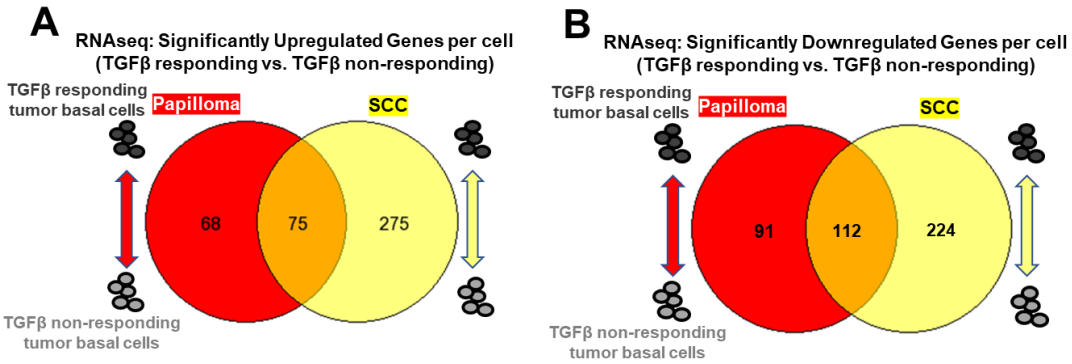

Figure 2.7: Venn diagrams for the differential expression of genes (DEG) analysis of RNAseq data from TGFβ responding tumor basal cells over their non-responding neighbors and compared between papilloma and SCC
A, DEG analysis yielded 68 TGFβ responding upregulated genes unique to the papilloma stage, 275 TGFβ responding upregulated genes unique to the SCC stage, and 75 upregulated genes shared by both stages. **B**, DEG analysis yielded 91 TGFβ responding downregulated genes unique to the papilloma stage, 224 TGFβ responding downregulated genes unique to the SCC stage, and 112 downregulated genes shared by both stages.

While TGFβ-signaling marks basal SCC cells that are enriched for tumor-initiating stem cells [27, 28], not all C2 cells were mCherry reporter positive nor all mCherry^{+} cells were basal SCC cells (Fig. 2.4). When scored according to their upregulation upon TGFβ-signaling, 101 C2 genes were identified (Fig. 2.8; Table 4). In addition to *Cd80*, a key factor for resisting cytotoxic T cell therapy [29], this short-list also included *Ccnd1* and *Ccnd2, Hmga2, Pcolce2, Rgs16, St8sia1*, *Tnfaip2* and *Pthlh* which correlated with cancer stem cell self-renewal/survival, proliferation and/or poor prognosis in SCC cancers. It also included *Anxra, Parvb, Fbln2, Krt8, Krt18, Rapgef3, Plod2, Mmp14* and *Mmp1a*, which have been implicated in basement membrane remodelling, cytoskeletal dynamics,

migration/metastasis and/or cell shape remodelling. Genes encoding angiogenic factors IGFBP2, TGFα and PLAU also remained on this short list (Table 4), consistent with the enrichment of active TGFβ emanating from immune cells near the perivasculature[28, 42].

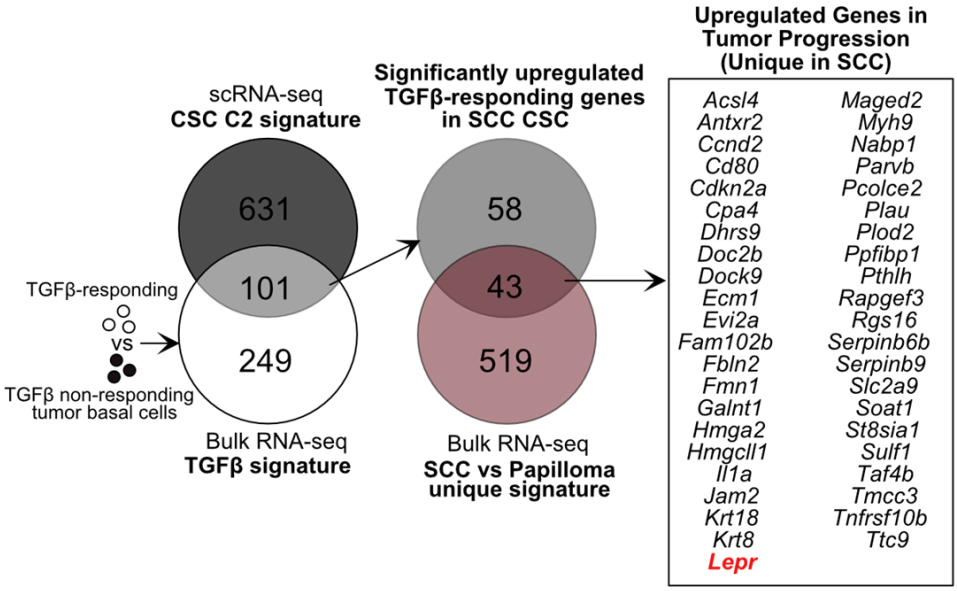

Figure 2.8: A refined cancer stem cell signature
Venn diagram showing that 101 genes constitute a refined cancer stem cell signature that is shared by single-cell C2 and TGFβ-responsive transcriptomes in SCC basal progenitors. Of the 101 genes, 43 (listed at right) overlap are highly upregulated in the transition from papilloma to SCC.

Overall, this molecular signature provided a refined view of the cancer stem cells of SCCs. Interestingly, when basal progenitors transitioned from papilloma to SCC, 43 of the 101 TGFβ-signaling genes in the cancer stem cell signature were specifically induced/highly elevated in SCC (list in Fig. 2.8; Table 5).

2.2 Discussion

For years, researchers have viewed cancer as a process involving the accumulation of a myriad of oncogenic and tumor-suppressor mutations. The notion arose when early skin carcinogenesis studies showed that chemical mutagens induced only a few sporadic benign tumors, which occasionally progressed to squamous cell carcinomas, but only after months. The multistep mutagen hypothesis has gained further hold from the hundreds of genetic mutations found by bulk sequencing of metastatic human cancers. More recent work has shown that genetic models can reach a highly malignant state with far fewer mutations, raising the possibility that at least in early stages of tumorigenesis, non-genetic means might dominate in driving cancer progression.

The importance of microenvironment in shaping tumor behavior has been increasingly appreciated in contexts of obesity, diet and inflammation, namely states in which a perturbed microenvironment is conducive to malignancy. Less clear is whether an oncogenic stem cell in a healthy tissue microenvironment can orchestrate malignant progression and if so, how. To begin to address this issue, we began by drawing upon our prior genetic skin cancer model and findings. We generate clonal tumors by transducing an inducible transactivator and a TGFβ-

reporter in individual skin progenitors in utero, and then activating HRASG12V driven oncogenesis postnatally. In the past, we analyzed heterogeneous skin tumors from these mice which had some benign and some malignant invasive regions. We showed that in these mixed tumors, the TGFβ-reporter positive population is enriched for invasive cells with tumor-initiating potential and increased resistance to chemo- and immunotherapies.

In this study, we instead monitored tumorigenesis temporally after $HRAS^{G12V}$ activation and tracked skin stem cells as they transitioned through benign and then malignant states. By single-cell RNA-seq performed on FACS-purified progenitors from uniformly invasive SCCs, we unearthed further hitherto unappreciated heterogeneity in both TGFβ-signaling and basal progenitors, which yielded a newfound high-quality molecular signature of SCC-initiating stem cells. We then traced this signature back to delineate how it emerges once $HRAS^{G12V}$ is activated. Dissecting the molecular mechanisms and physiological relevance of our findings, we show that if a tissue stem cell acquires a mutation in a tumor-driving gene such as RAS, it can launch a feed-forward communication circuitry with the natural tissue microenvironment that triggers a temporal self-propagating path to malignancy and invasion.

3. LEPTIN RECEPTOR SIGNALING IS ESSENTIAL FOR SCC PROGRESSION

3.1 Result

3.1.1 A high-resolution cancer stem cell signature exposes LEPR as a key sensor of the tumor microenvironment.

The unprecedented resolution and depth of our newfound cancer stem cell signature coupled with knowledge of the temporal appearance of its members during tumor progression enabled us to tackle the functional importance of genes that surfaced unexpectedly on this list, and which were not expressed in normal skin stem cells nor in benign papillomas. In considering encoded proteins that might be able to sense, respond to and exploit the striking changes in the tumor microenvironment at the benign:malignant transition, *Lepr* caught our attention. Traditionally studied in the context of energy balance in the hypothalamus, LEPR signaling occurs through its ligand leptin, which is expressed

by adipocytes but reaches its transmembrane receptor target cells via the vasculature [46].

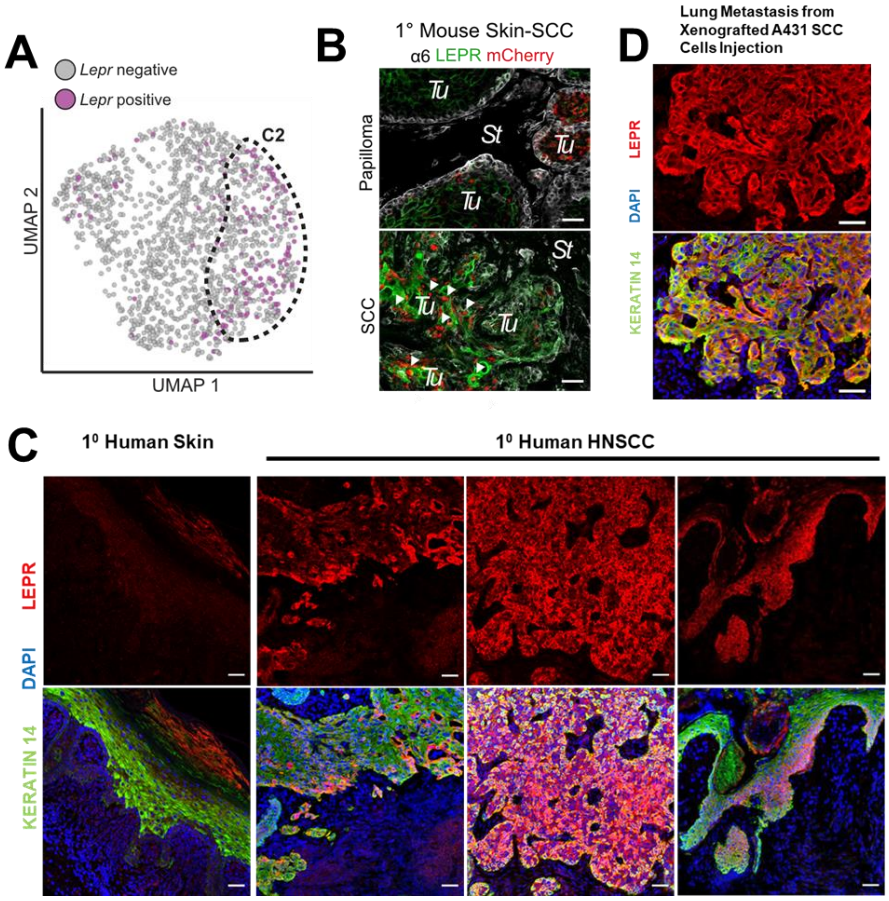

Figure 3.1: Leptin receptor is expressed in tumor-initiating stem cells and localized to invasive fronts of SCCs

A, *Lepr*-expressing cells reside within the C2 basal SCC population. **B**, Immunofluorescence confirms that LEPR is rarely expressed at the papilloma stage but is much enriched in TGFβ reporter positive cells (arrowheads) of SCCs. Scale bars = 50μm. **C**, Immunofluorescence of primary human skin SCC further shows epithelial LEPR at the invasive fronts. Note: LEPR was not detected in normal skin epithelium of human. Scale bars = 50μm. **D**, LEPR immunofluorescence in lung metastases from human SCC A431 epidermal cells following tail-vein injections in the immunocompromised mice. Scale bars = 50μm.

Lepr was induced specifically in invasive, TGFβ-signaling SCC cancer stem cells (Fig. 2.8 and 3.1A). LEPR immunofluorescence corroborated the *Lepr* transcriptional landscape (Fig. 3.1B). By these criteria, LEPR was not expressed in homeostatic skin epithelium and only rarely in papilloma. However, LEPR was highly enriched at the invasive fronts of primary SCCs from mouse and human skin, human head and neck, as well as in metastatic tumors formed from xenografted human epidermal (A431) SCC cells (Fig. 3.1C and 3.1D).

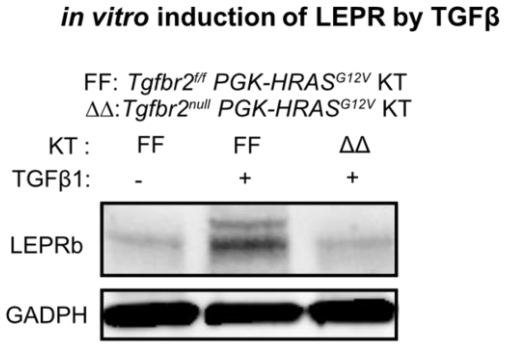

Figure 3.2: in vitro induction of LEPR by TGFβ
LEPR immunoblot showing that cultured HRASG12V keratinocytes (KT) wild type (FF) but not mutant (ΔΔ) for the TGFβ receptor gene Tgfbr2 elevate LEPR expression dramatically in response to active recombinant TGFβ1. GAPDH, loading control. LEPRb is the long isoform that contains full signaling cascade. And the double or smearing bands are due to glycosylation of the extracellular domain.

To interrogate why *Lepr* was so specific to C2 TGFβ-signaling cells (Fig. 2.8 and 3.1A), we first tested LEPR's sensitivity to TGFβ. To this end, we exposed cultured isogenic TGFβ receptor floxed (FF) and null (ΔΔ) oncogenic keratinocytes to recombinant TGFβ1 or vehicle control. Immunoblot analysis revealed that LEPR expression in *HRAS*^{G12V} keratinocytes is dependent upon TGFβ-receptor signaling (Fig. 3.2).

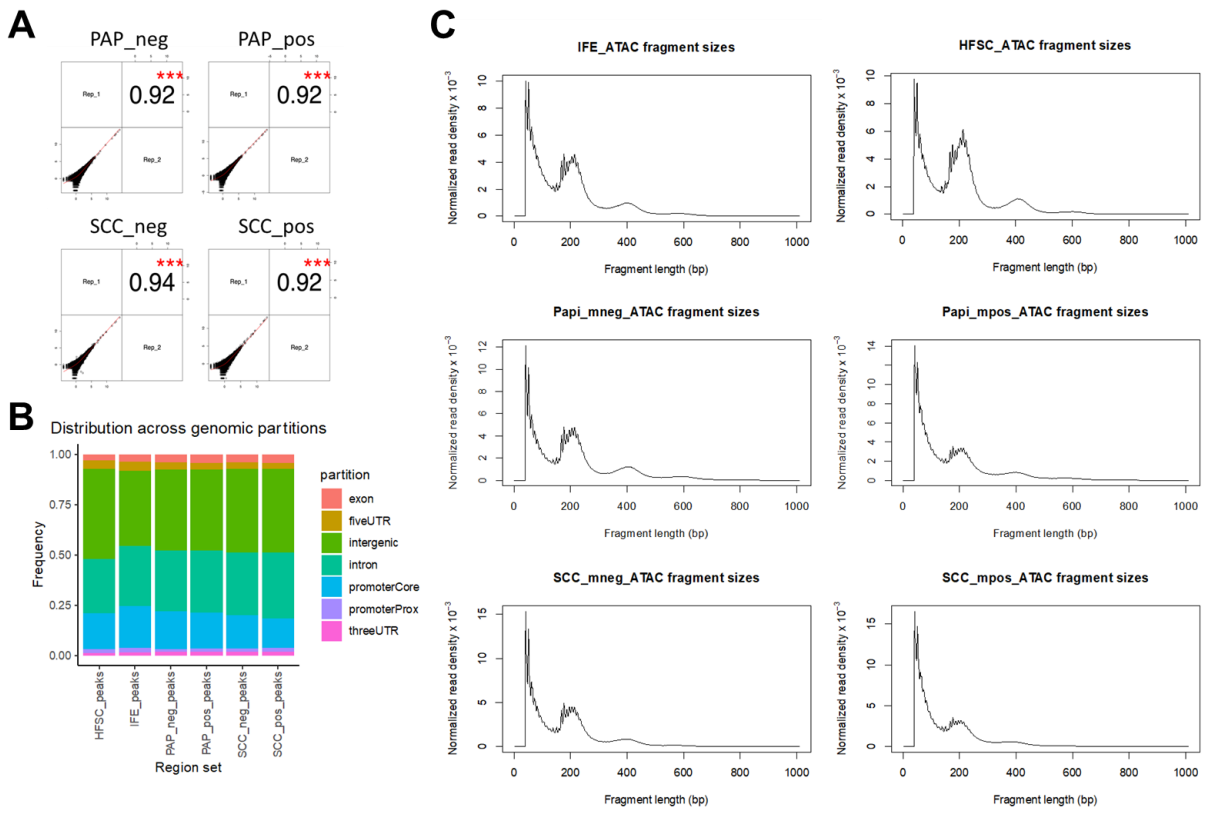

Figure 3.3: Quality control for ATAC sequencing
A, Correlation plot between ATAC replicates of TGFβ-responding and non-responding SCC and Papilloma. All replicates have a correlation score > 0.92. **B**, ATAC peak distribution of all 6 samples according to gene features. All samples display comparable distributions. **C**, Distribution of tagmented fragments in all ATAC-seq samples. Nucleosome laddering is clearly observed in all samples.

To address whether *Lepr* is a direct transcriptional target of TGFβ-receptor signaling *in vivo*, we performed Assay for Transposase-Accessible Chromatin with high-throughput *sequencing* (ATAC-seq) on FACS-purified TGFβ-reporter positive versus negative tumor basal cell populations from papillomas and SCCs (Fig. 3.3A-C). Unsupervised clustering of ATAC profiles of stem cells from purified normal skin (interfollicular epidermis, IFE or hair follicle, HF), papilloma and SCC revealed 7 distinct clusters (Fig. 3.4A). Peaks in proximity of *Lepr* mostly fell into clusters 4 and 6, whose chromatin state showed marked

opening during tumorigenesis, particularly in association with TGFβ-signaling tumorigenic stem cells (Fig. 3.4B and 3.5A).

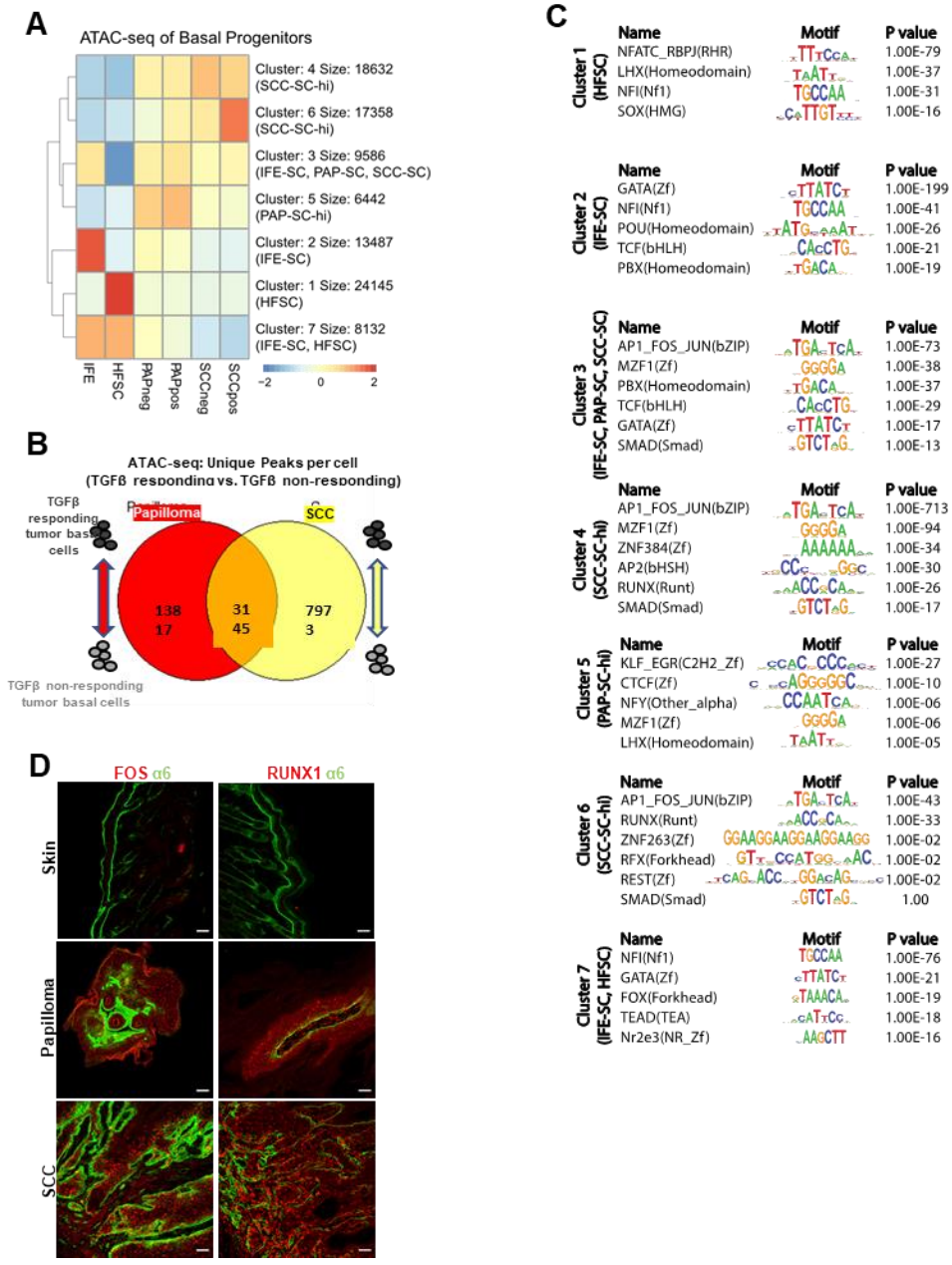

Figure 3.4: Benign papilloma and invasive SCC demonstrate distinct epigenetic signatures

A, ATAC sequencing was performed on FACS-purified $\alpha6^{hi}\beta1^{hi}$ basal populations of interfollicular epidermis (IFE, $Sca1^{+}$), bulge hair follicle stem cells (HFSC, $CD34^{+}$), and tumor cells ($CD44^{+}$) either positive or negative for TGFβ-responsiveness (mCherry). Peaks were clustered according to their openness in each population by k-mean

clustering. **B**, Venn diagram overlapping ATAC peaks from TGFβ responding tumor basal cells and their non-responding neighbours between papilloma and SCC stages (n=2 for each condition, each stage). **C**, Motif enrichment analysis of the 7 ATAC peak clusters. **D**, Immunofluorescence images reveal that transcription factors RUNX1 and FOS are not detected in normal homeostatic skin but are enriched progressively during tumorigenesis. Scale bars = 50μm. See also pSMAD2 immunofluorescence quantifications in Fig. 2.1B.

Motif frequency analyses revealed that AP-1 (FOS-JUN) and RUNX1 were specifically enriched within these two clusters of peaks (Fig. 3.4C). Additionally, canonical SMAD binding motifs were found in 46% of cluster 4 peaks and 39% of cluster 6 peaks and correlated with their more openness in TGFβ-signaling progenitors. Indeed, the *Lepr* gene was among those genes in proximity of ATAC peaks enriched for AP-1, RUNX1 and pSMAD2/3 binding motifs and whose accessibility showed an increase in TGFβ-signaling and the transition from papilloma to SCC (Fig. 3.5A; quantifications at right).

Intriguingly, RUNX1 has been shown to be critical for tumor-initiation[47], while upon elevation, AP1 (FOS) has been shown to drive cells from a less aggressive skin cancer, basal cell carcinoma, to the more aggressive SCC[48]. Like pSMAD2 (Fig. 3.1C), both RUNX1 and FOS showed marked nuclear localization in SCC basal cells at invasive fronts (Fig. 3.4D). Of the three, pSMAD2/3, the essential co-partner of active TGFβ-signaling, best distinguished the invasive SCC state from the papilloma and led us to posit that RUNX1 and AP1 may prime the chromatin peaks in SCC basal cells while TGFβ-signaling drives their activation.

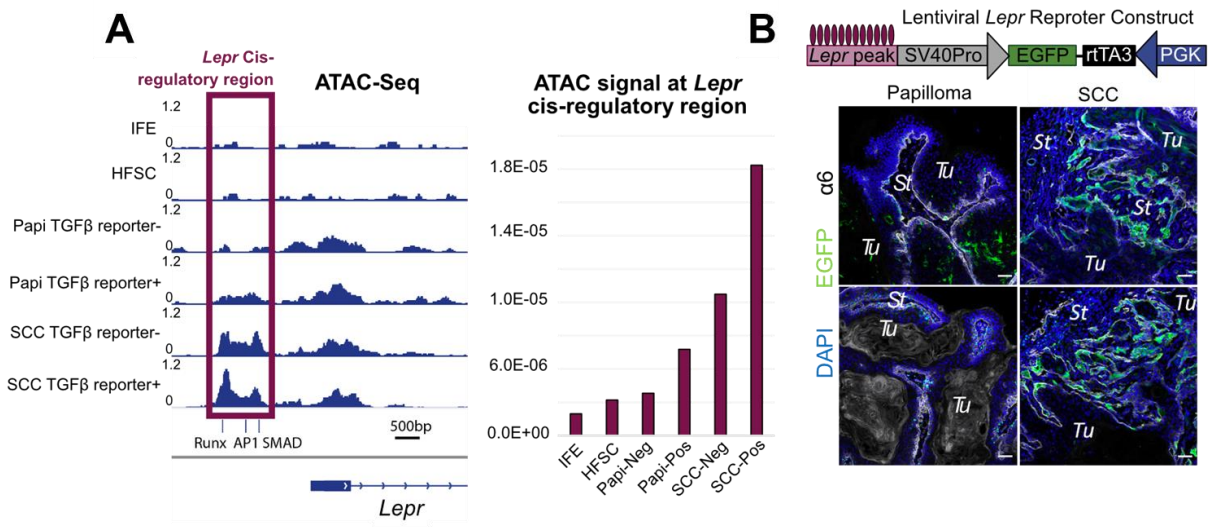

Figure 3.5: *in vivo Lepr* ATAC-peak reporter assay
A, ATAC sequencing was performed on FACS-purified $\alpha6^{hi}\beta1^{hi}$ basal populations of interfollicular epidermis (IFE, $Sca1^{+}$), bulge hair follicle stem cells (HFSC, $CD34^{+}$), and tumor cells ($CD44^{+}$) either positive or negative for TGFβ-responsiveness (mCherry) (Extended Data Fig. 3 and 4). ATAC peaks associated with the *Lepr* locus open during tumorigenesis. The encased cluster 6 peak (harboring RUNX, AP1 and SMAD motifs) opens predominantly during SCC progression (quantified at right). Scale bar = 500bp. **B**, Schematic of our *in vivo Lepr* ATAC-peak reporter assay. EGFP immunofluorescence reveals reporter activity in basal progenitors is greatly enriched at the transition from the benign to invasive SCC state. Scale bars = 50μm.

To directly test whether the tumor stage-specific changes in TGFβ-signaling govern the chromatin accessibility and expression of *Lepr*, we interrogated the ability of the (cluster 6) cis-regulatory element (purple box in Fig. 3.5A) to drive temporal activation of an EGFP reporter during tumorigenesis *in vivo*. As shown in the representative images (Fig. 3.5B), the *Lepr* reporter was highly expressed at invasive SCC fronts and displayed much lower activity in papilloma, further underscoring the physiological relevance of TGFβ-signaling in fueling the epigenetic dynamics that lead to *Lepr* promoter activation during the transition from the benign to the invasive malignant state.

3.1.2 *Lepr* is essential for the benign to malignant transition.

Given the marked association between *Lepr* expression and SCC C2 progenitors (Fig. 3.1A), we next FACS-purified LEPR^{pos} (C2) and LEPR^{neg} (C3) basal cells from invasive SCCs, and then performed colony-forming assays on these populations to test their stemness. LEPR^{pos} basal cells showed nearly a 3-fold higher colony-forming efficiency and formed larger colonies compared to LEPR^{neg} basal cells (Fig. 3.6).

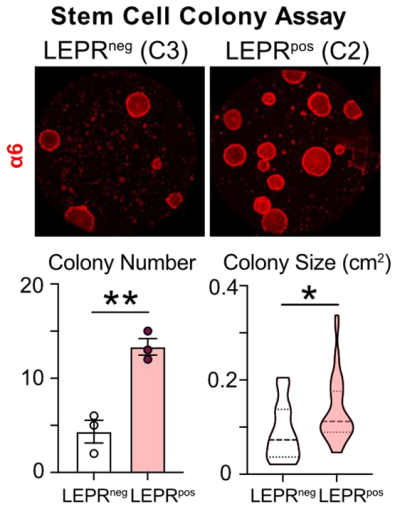

Figure 3.6: Colony-forming assay
When placed in culture, FACS-isolated LEPR-expressing basal SCC cells exhibit higher colony-forming efficiency (n=3) and form larger colonies compared to non-expressing counterparts (n=13 for LEPR^{neg}, n=39 for LEPR^{pos}).

To functionally test the role of LEPR in tumor-initiating capability SCC basal cells *in vivo*, we turned to a highly aggressive murine SCC cell line PDVC57 that harbours mutations in *Hras* and *Trp53* [49] (referred to as PDV here). After verifying the TGFβ-sensitivity of the *Lepr* reporter in these cells (Fig. 3.7A), we then used CRISPR/Cas9 editing to generate a null mutation in the *Lepr* gene (Fig. 3.7B). Serial-dilution orthotopic transplantation assays were performed using intradermal injection into *Nude* mice with

our *Lepr*^{null} and *Lepr*^{ctrl} PDV cells. LEPR-expressing SCC cells showed ~10X higher tumor-initiating capability compared to the LEPR-deficient SCC cells (Fig. 3.7C). Overall, these results suggested that LEPR expression identifies a subpopulation of TGFβ-signaling, oncogenic RAS driven SCC basal cells endowed with heightened stemness and tumor-initiating capacity.

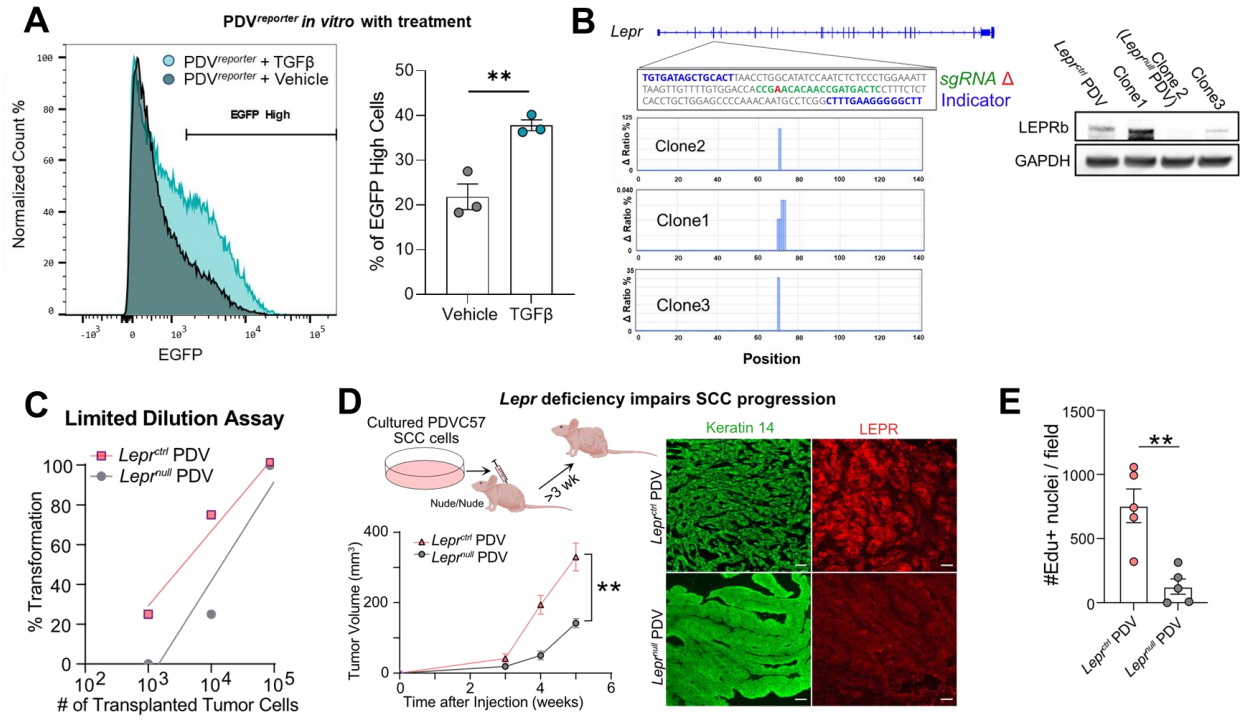

Figure 3.7: Leptin receptor promotes superior tumor-initiating capability and is an essential regulator of SCC progression

A *Lepr* ATAC peak reporter (see Fig. 3.5) was tested for its sensitivity to TGFβ *in vitro,* and then analyzed by flow cytometry. Note that reporter-fluorescence is highly accentuated in the presence of active recombinant TGFβ1. **B**, *Lepr*^{null} PDVC57 SCC cells were generated by targeted CRISPR/CAS9 technology and validated by miSeq. Blue denotes sequence comparison region; green sgRNA; red, *Lepr* frameshift mutation in Clone 2. Immunoblot shows complete loss of LEPR protein in this clone, which was selected for further study. Mi-Seq analysis of *Lepr* targeted Clone 1, which did not alter LEPR expression and Clone 3, which did reduce LEPR expression but not to the extent of Clone 2. **C**, Serial orthotopic transplantation assays reveal that *Lepr*^{ctrl} SCC cells have the higher tumor-initiating capability, compared to *Lepr*^{null} SCC cells (n=4 for 10^5 and 10^4, n=8 for 10^3 cells). **D**, Schematic model of allografted PDV SCC cells by intradermal injection into immunocompromised (*Nude*) mice. *Lepr*^{null} PDV tumors displayed

significantly reduced growth, compared to their control counterparts (n=4 for each condition). Immunofluorescence images reveal papilloma-like morphology in *Lepr*^{null} PDV tumors and SCC morphology in *Lepr*^{ctrl} PDV tumors. Scale bars = 50µm. **E**, Quantifications showing reduced proliferation in *Lepr*^{null} compared to *Lepr*^{Ctrl} PDV tumors, as judged by EdU-labeling 2 hours prior to harvesting.

In addition to their tumor-initiating capacities, we also assessed the kinetics of tumor growth by performing intradermal grafting of *Lepr*^{null} and *Lepr*^{ctrl} PDV cells on immunocompromised (*Nude*) mice. After 3 weeks, *Lepr*^{ctrl} tumors were visible and by 5 weeks, they had reached the maximum allowable size (NIH and AALAC regulations). By contrast, *Lepr*^{null} PDV tumors were considerably smaller (Fig. 3.7D). Moreover, while *Lepr*^{ctrl} tumors at this time displayed characteristic invasive features of SCCs, *Lepr*^{null} PDVC tumors exhibited a papilloma-like morphology (shown). As judged by labeling of S-phase cells with the thymidine analog 5-ethynyl-2'-deoxyuridine (EdU), the loss of *Lepr* reduced, but did not abrogate proliferation within the tumor (Fig. 3.7E).

3.1.3 **Leptin receptor signaling is hijacked and essential for SCC progression in non-obese mice**

While our loss of function study underscored the importance of LEPR in driving SCC tumor progression, it did not address whether an active LEPR-signaling cascade is required. To test this, we asked whether the inhibitory effects of *Lepr* ablation at the benign:malignant juncture could be rescued by a *Lepr* transgene that lacked the cytoplasmic signaling domain of the receptor. After engineering full length (FL) and intracellular signaling-defective (ΔSig) *Lepr* in a doxycycline-inducible form and

transducing PDV *Lepr*^{null} SCC cells, we FACS-selected and verified LEPR status (Fig. 3. 8A and 3.8B). We then proceeded to cell engraftment experiments as outlined in Fig. 3.7D. Interestingly, even though the transduced FL LEPR level was less than control (Fig. 3.8B), its induction restored aggressive SCC tumor growth to PDV *Lepr*^{null} cells, whereas expression of ΔSig had little if any effect (Fig. 3.8A). These results indicated that LEPR signaling, not merely LEPR presence, was critical in driving SCC progression of RAS driven oncogenic stem cells.

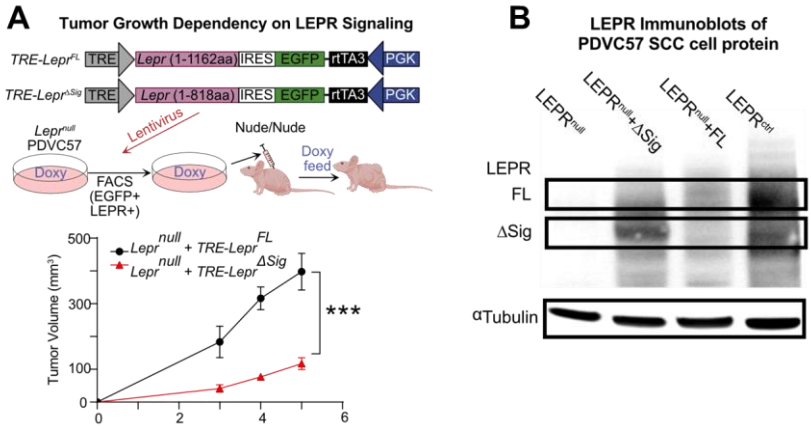

Figure 3.8: Tumor growth dependency on LEPR signaling
A, Schematic of the experiment to test the importance of signaling through LEPR to SCC progression. Lentiviruses harboring doxycycline-inducible versions of either full length (FL) *Lepr* or *Lepr* lacking the intracellular signaling domain (ΔSig) were transduced into *Lepr*^{null} PDV SCC cells expressing rtTA3, required for Doxy-induced activation of the TRE. *Lepr*^{null} PDV tumor growth is robust when FL-*Lepr* is re-introduced into the tumor cells, but not when Δsig-*Lepr* is introduced (n=6 for each condition), underscoring the need for active LEPR signaling, not merely LEPR, in tumor growth. **B**, Transduced cells were validated by pan-LEPR immunoblot analysis. Brackets denote expected sizes of FL and Δsig proteins.

Although blood plasma levels of leptin correlate with girth size in obesity[46], our mice were not obese nor did we detect a noticeable rise in mature adipocytes at the leading front of invasive SCCs (Fig. 3.9A). Consistently, blood plasma levels of leptin showed no

significant difference between normal and tumor-bearing mice (Fig. 3.9B). However, given the rise in local density of vasculature at the benign:malignant state, it seemed plausible that SCC progenitors might nevertheless experience elevated leptin. We therefore examined whether SCC tumor growth was sensitive to leptin levels in the circulation. To this end, we used an osmotic pump to systemically deliver to our tumor-bearing mice different doses of recombinant leptin as well as a “superactive mouse leptin antagonist” (SMLA) that abrogates leptin’s signaling activity even when bound to LEPR [50]. As shown in Fig. 3.9C, LEPR-mediated tumor growth was significantly accelerated by elevating circulating leptin in a dose-dependent fashion, while SMLA had a slightly repressive effect. Taken together, these results support a model whereby increased angiogenesis at the invasive SCC front endows the tumor microenvironment with an ample supply of leptin to activate LEPR signaling in SCC progenitors once TGFβ has induced its expression.

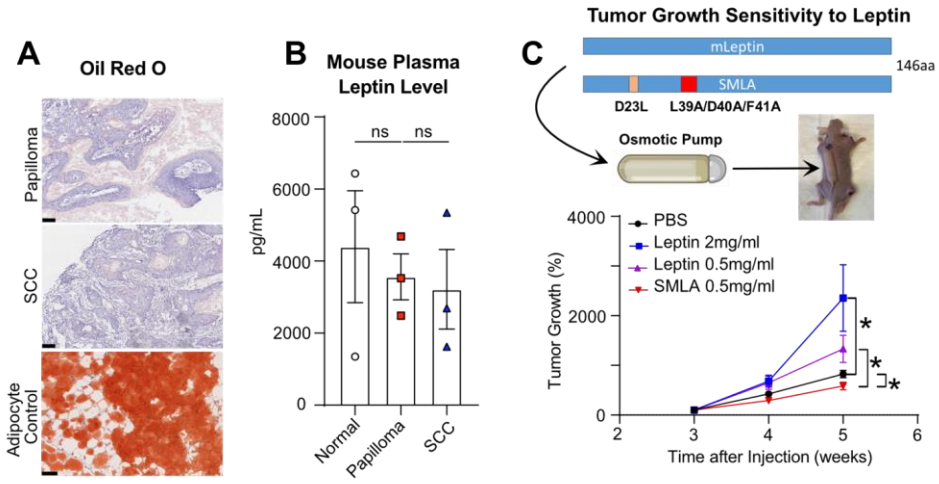

Figure 3.9: Tumor growth sensitivity to leptin
A, Oil red O staining revealed no obvious signs of mature adipocytes within the stroma surrounding skin papillomas and SCCs, pointing to systemic leptin from the vasculature, rather than adipocytes, as the likely source of LEPR signaling in SCCs. Scale bars = 250 µm. **B**, Levels of blood plasma leptin in normal, papilloma and SCC-bearing mice do not significantly differ (n=3 for each condition). **C**, SCC tumor growth is sensitive to plasma levels of leptin. Recombinant leptin protein was delivered to the circulation by an osmotic pump and the effects on PDV SCC tumor growth were monitored over 5 weeks. Leptin (LEP) was administered at two different doses and mutated leptin protein (SMLA, antagonist) was used as a negative control (n=12 for PBS control, n=8 for each LEP or SMLA condition). Note dose-dependent acceleration of SCC growth by LEP. Degree of statistical significance is denoted by ns (p>=0.05), * (p<0.05), ** (p<0.01), *** (p<0.001), and **** (p<0.0001).

3.1.4 **A LEPR-PI3K-AKT-mTOR pathway to malignant progression**

We next turned to address how the LEPR signaling cascade drives cancer progression. LEPR signaling relies upon its association with the Janus-kinase (JAK2), which upon leptin-LEPR binding phosphorylates tyrosine residues in the LEPR intracellular domain. Once phosphorylated, LEPR has been implicated in activating a

myriad of different downstream pathways, including STAT3 and phosphoinositide 3-kinase (PI3K)[51, 52] (Fig. 3.10).

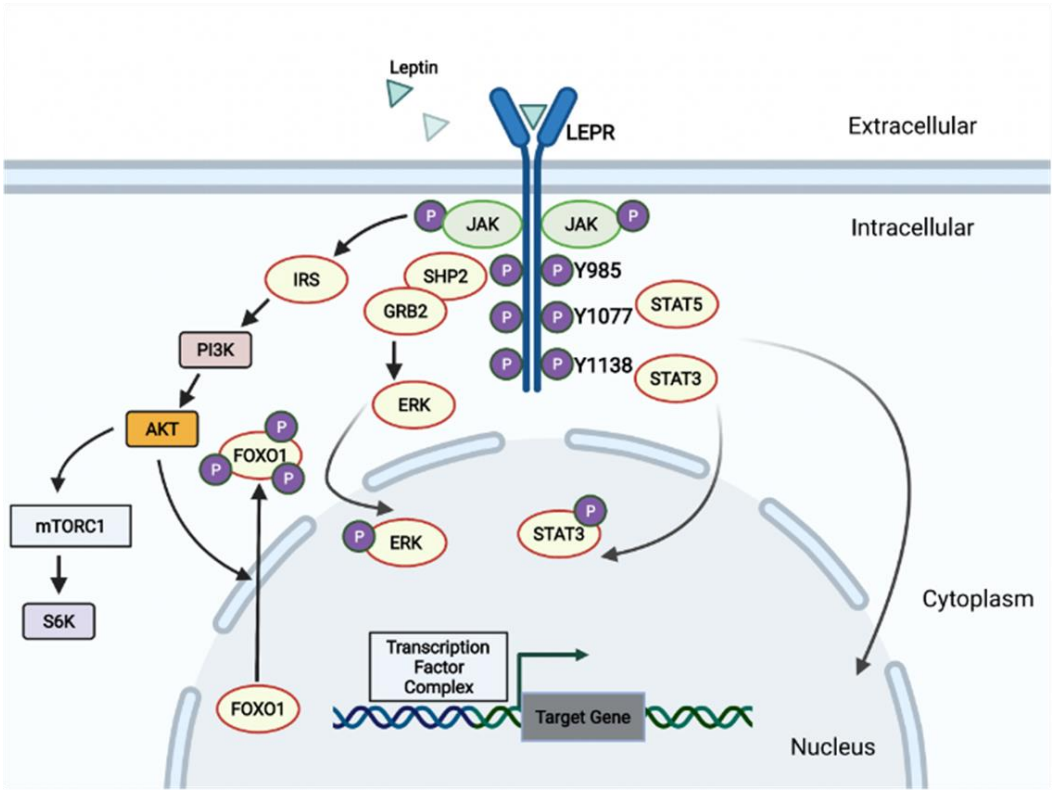

Figure 3.10: Leptin receptor signaling
Schematic illustrating the complexities of leptin receptor signaling, including its ability to activate JAK kinase and trigger additional cancer-associated pathways.

In triple-negative breast cancer, LEPR over-activation and pSTAT3 have been implicated as cancer drivers in this naturally LEPR-expressing fatty tissue [53, 54]. However, in papillomas that naturally show a paucity of LEPR, STAT3 was phosphorylated and nuclear, and although reduced, pSTAT3 was not abolished in *Lepr*^{null} PDV tumors (Fig. 3.11A amd 3.11B). Thus, pSTAT3 seemed unlikely on its own to explain how LEPR signaling drives the transition from the benign to the invasive state in SCCs.

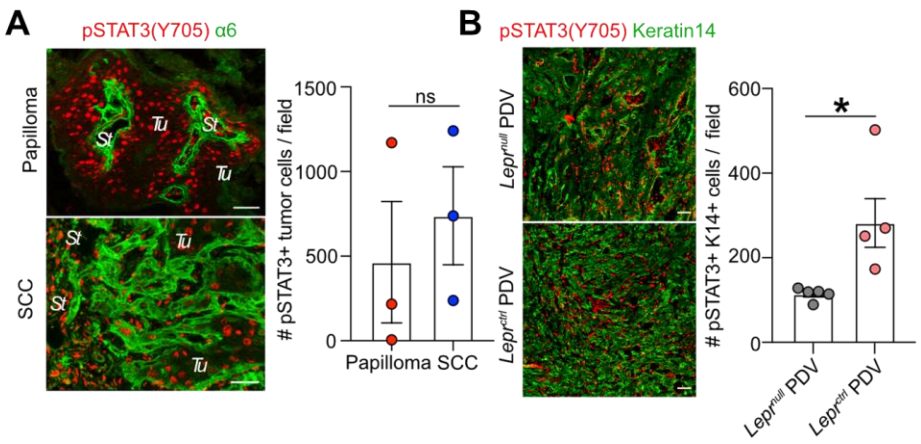

Figure 3.11: pSTAT3 is not the sole effector of LEPR during SCC progression
A, pSTAT3 immunofluorescence shows that although not detected in homeostatic skin, STAT3 is activated similarly in both papilloma and SCC. **B**, pSTAT3 is reduced but not abolished in *Lepr*^{null} compared to *Lepr*^{Ctrl} PDV tumors (right), suggesting that LEPR's main role in SCC tumor progression is not to activate STAT3. Scale bars = 50μm. Quantifications accompany each analysis.

Taking an unbiased approach, we analyzed our transcriptomes of individual SCC basal cells according to their level of *Lepr* expression. By Kyoto Encyclopedia of Genes and Genomes (KEGG) pathway analysis, the top three pathways distinguishing *Lepr*^{pos} versus *Lepr*^{neg} basal SCC cells were 'small cell lung cancer' (oncogenic RAS-associated), 'pathways in cancer' and the PI3K/AKT signaling pathway (Fig. 3.12A, top). Indeed, comprehensive gene signature scores for the AKT signaling pathway showed significant upregulation in C2, whereas the STAT signaling pathway was not enriched in SCC basal cells (Fig. 3.12B).

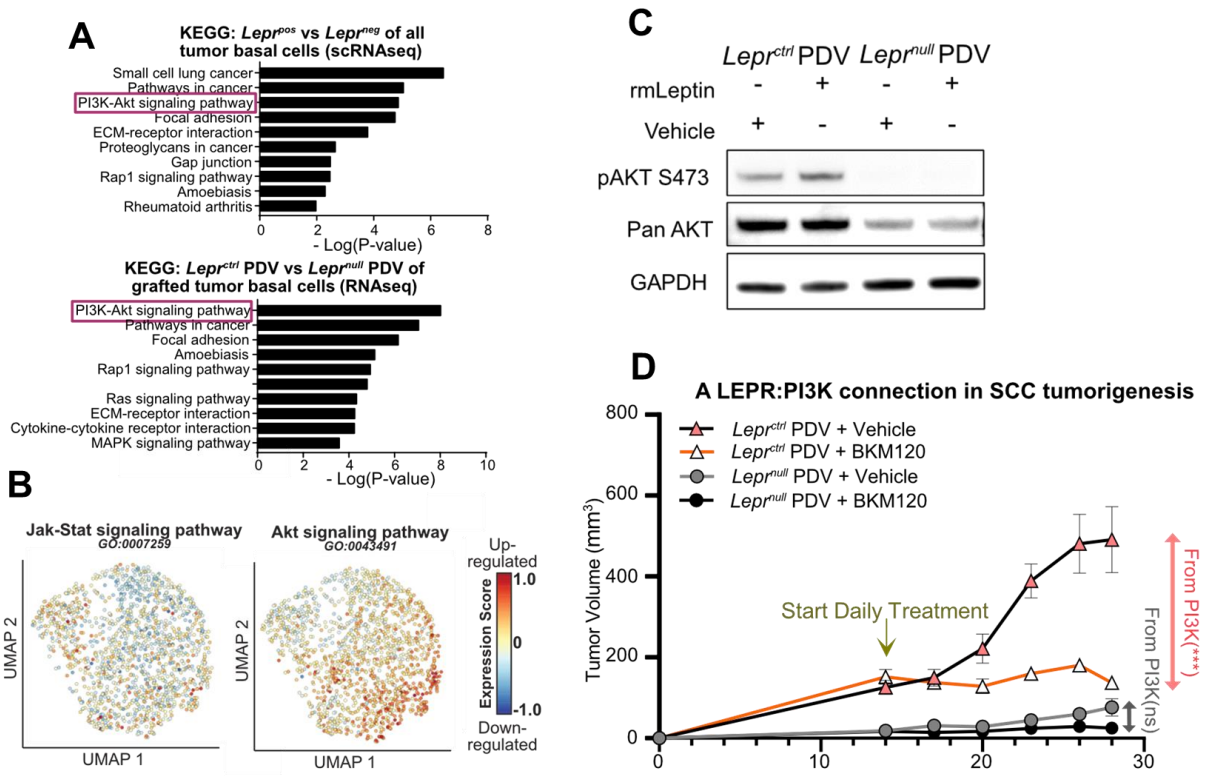

Figure 3.12: LEPR:PI3K connection in SCC tumorigenesis

A, Top ten KEGG pathways of genes significantly upregulated in *Lepr* expressing basal tumor cells of HRAS^{G12V} induced SCCs (data from Fig. 1). Top ten KEGG pathways of genes significantly upregulated in *Lepr*^{ctrl} compared to *Lepr*^{null} PDV SCCs. **B,** The Jak-Stat pathway signature is not enriched in any of scRNAseq clusters. By contrast, *Lepr* downstream signaling Akt pathway gene signature is enriched in C2 cluster of scRNAseq of SCC. These data are consistent with the notion that the PI3K-AKT pathway plays a more specific role in fueling the tumor-initiating stem cells of SCCs. **C**, Immunoblots of proteins isolated from *Lepr*^{null} and *Lepr*^{Ctrl} SCC cells treated with recombinant leptin or vehicle control for 48 hr prior to analyses. Note leptin-dependent activation of pAKT exclusively in LEPR^{+} cells, as well as higher overall levels of AKT. **D**, Immunocompromised (*Nude)* mice, each harboring *Lepr*^{ctrl} and *Lepr*^{null} PDV tumors on left and right sides of their backs, respectively, were administered PI3K inhibitor BKM120 or Vehicle control daily through oral gavage beginning at 14 days post PDVC57 cell injections. As judged by this assay, the majority of tumor growth attributable to PI3K signaling is operating through LEPR (n=6 for each condition).

To probe the PI3K-AKT connection further, we performed bulk RNA-seq on FACS-purified basal cells from tumors that developed from our engrafted *Lepr*^{ctrl} and *Lepr*^{null} PDVC57

cells. In this tightly controlled experiment, KEGG analysis placed the PI3K-AKT signaling pathway at the top of molecular features that distinguished *Lepr*^{ctrl} versus *Lepr*^{null} PDVC57 tumors (Fig. 3.12A, bottom). Taken together, LEPR-PI3K-AKT surfaced as a top candidate for a signaling pathway that could account for the heterogeneity in our basal progenitor population of invasive SCCs.

Pursuing this notion further, we discovered that *in vitro, Lepr*^{ctrl} but not *Lepr*^{null} SCC cells were sensitive to AKT-PI3K signaling in the presence of recombinant leptin. As judged by immunoblot analyses, both AKT stability and activation (phosphorylation) were enhanced upon leptin treatment, but only if SCC cells expressed LEPR (Fig. 3.12C). Moreover, when we blocked PI3K signaling directly *in vivo* by administering the oral PI3K inhibitor BKM120 [55], we observed significantly reduced growth of SCC tumors (Fig. 3.12D). Moreover, since the inhibitor restricted growth very little beyond what *Lepr* ablation achieved, the major effect of PI3K signaling in fueling SCC growth appeared to be driven through LEPR signaling. Considering the many routes by which PI3K-AKT can be activated and Hras^{G12V} activation of PI3K [56], its robust link to LEPR signaling in driving oncogenic RAS tumors to an invasive SCC state was surprising.

Through mechanisms that vary depending upon cellular context, PI3K-AKT signaling can lead to activation of mTOR, a central metabolic mediator in some types of cancers [54, 57, 58]. In agreement, *Lepr*^{ctrl} PDV cells *in vitro* were larger in size compared to *Lepr*^{null} PDV cells, suggesting that LEPR may be important for mTOR activation (Fig. 3.13A). Indeed, in SCC cells, leptin receptor signaling had a significant effect on this

pathway, as judged by phosphorylation of both the serine/threonine kinase p70-S6K and the ribosomal protein S6, a proxy for active p70-S6K and enhanced protein synthesis at the ribosome[59] (Fig. 3.13B).

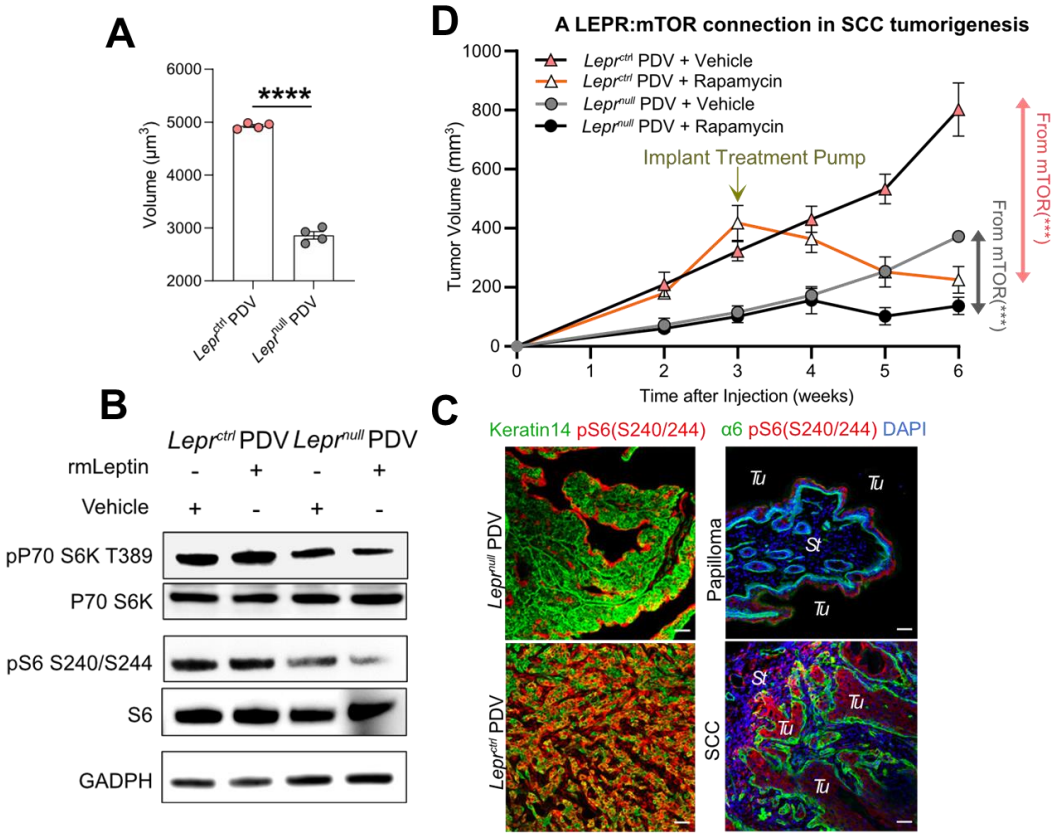

Figure 3.13: LEPR:mTOR connection in SCC tumorigenesis
A, *Lepr*^{ctrl} PDV cells are significantly larger in size compared to *Lepr*^{null} PDV cells (n=4 for each condition). **B**, Immunoblots of S6 and S6-kinase (S6K) proteins and their activated (phosphorylated) forms reveal signs of mTORC1 pathway elevation upon leptin-LEPR signaling *in vitro*. **B**, The importance of leptin-LEPR signaling in activating mTORC1 signaling is accentuated *in vivo*, where the high background from media enriched by other growth factors is eliminated. pS6 immunofluorescence reveals markedly diminished mTORC1 activity in tumors derived from *Lepr*^{null} compared to *Lepr*^{ctrl} PDV engrafted cells. pS6 immunofluorescence also reveals increasing mTORC1 activity in the invading front of HRAS^{G12V} SCC tumor compared to the papilloma counterpart. **D**, Immunocompromised (*Nude)* mice, each harboring *Lepr*^{ctrl} and *Lepr*^{null} PDV tumors on left and right sides of their backs, respectively, were continuously administered Rapamycin or Vehicle control at t=3 weeks and then monitored for tumor progression. As judged by this assay, the majority of tumor growth attributable to mTOR signaling is operating through LEPR (n=6 for each condition).

Notably, the importance of LEPR in regulating the PI3K-AKT-mTOR pathway in SCC stem cells extended to *in vivo* tumors. In this regard, tumors arising from engrafted *Lepr*^{null} PDV cells displayed markedly reduced pS6 immunofluorescence compared to aggressive SCCs derived from *Lepr*^{ctrl} PDV engraftments, and in the HRAS^{G12V} mediated transition from papilloma to SCC, pS6 was elevated at the invasive SCC front (Fig. 3.13C). Moreover, when we administered continuous delivery of the potent mTOR inhibitor, rapamycin, we observed markedly reduced growth of tumors derived from engrafted *Lepr*^{ctrl} PDV cells (Fig. 3.13D). By contrast, rapamycin showed little added effect on *Lepr*^{null} tumors, whose growth was already restricted by LEPR loss of function. Of note, although the GO-terms for LEPR sensitivity pointed to the PI3K-AKT pathway, AKT can also be phosphorylated by mTORC1, leaving open the possibility of feedback mechanisms arising downstream from LEPR signaling.

3.2 Discussion

The top GO-term distinguishing our new and improved cancer stem cell signature from other SCC progenitors is angiogenesis, and its full acquisition occurs at the benign:malignant transition, concomitant with a spike in vasculature and TGFβ in the tumor microenvironment. Interestingly, among the 43 SCC stem cell genes activated at this juncture was membrane receptor, LEPR, whose ligand leptin is produced by adipocytes and carried to target tissues through the vasculature. We show that Lepr is a direct target of TGFβ-signaling, enabling oncogenic RAS's remodeling of the tumor microenvironment to create a perfect storm that leads to LEPR-ligand signaling within the emerging cancer stem cells. In turn, this catalyzes PI3K-AKT-mTOR signaling in the stem cells. Using inhibitors and loss-of function genetics, we show that starting with LEPR, each step of this dynamic stem cell: tumor microenvironment driven cascade is essential in driving the path to malignancy.

It is important to place our findings in the context of what is known about LEPR in tissue biology and cancer. LEPR has been largely studied in the context of the hypothalamus where it controls energy balance. LEPR is overexpressed in cancers of fatty tissue such as the mammary gland, where it is naturally expressed, and it has been linked to increased tumor incidence in obese mouse models where leptin is overexpressed. To date, its role in a non-obese, non-fatty tissue context is completely unexplored. This is important, since obesity is known to increase tumor-susceptibility by non-leptin means. Indeed, the beauty of our system is that we focus on how a single oncogene can elicit

changes in the tumor microenvironment that in turn trigger a cancer driving program. By contrast, most studies in the past have studied how environmental/dietary alterations introduced into the tumor microenvironment by other means can influence a stem cell to affect its oncogenic potential.

4. SUMMARY AND PERSPECTIVES

4.1 Summary and Discussion

Human studies on SCCs have centred largely around invasive metastatic cancers, which often harbour a myriad of oncogenic mutations. Recently however, attention has turned to changes in the tumor microenvironment which can be equally important in driving malignant progression. Most such insights have come from studying how obesity impacts cancer[37, 60, 61]. In the quest to identify obesity-driven tumor susceptibility pathways that might alter energy balance, leptin-LEPR signaling has also been a natural focus of cancers like those of mammary gland epithelia, where LEPR is expressed in the normal tissue and where both normal and cancerous tissues exist in a naturally fatty tissue microenvironment[54, 62, 63].

How alterations in LEPR signaling contribute to tumor progression and metastasis has remained elusive. Mechanistic insights have relied on a diverse array of cultured cancer cell lines, where a plethora of possible pathways and routes have been proposed (Fig. 4a)[54]. Adding fuel to this fire, Chung et al. recently demonstrated that obesity generated by leptin-deficiency in mice can impact KRAS-induced pancreatic cancer progression not through impaired leptin receptor signaling, but rather through an obesity-

specific mechanism involving aberrant endocrine-exocrine signaling in the adapting pancreatic beta cells[37].

In our *in vivo* studies, we did not use an obesity model, nor did we focus on a naturally adipose-rich tissue microenvironment. Rather our goal was to address whether oncogenic $HRAS^{G12V}$, activated clonally in skin stem cells, can intrinsically elicit changes that function as non-genetic drivers of cancer. Using an unbiased approach applied to mice of normal weight, we uncovered a cancer link to the leptin-LEPR signaling pathway that becomes activated *de novo* downstream of an oncogenic $HRAS^{G12V}$ induced change within otherwise normal skin stem cells.

In marked contrast to oncogenic KRAS-induced pancreatic cancers which are influenced heavily by obesity but not leptin[37], malignant progression in HRAS-induced cutaneous cancers requires LEPR signaling but not obesity. The temporal and robust induction in LEPR-signaling during malignant progression appeared to be rooted in two events: first, an influx of vasculature within the tumor microenvironment that increased the density of leptin-carrying blood vessels at the invasive front; and second, the corresponding rise in perivascular TGFβ that enhanced TGFβ signaling and activated *Lepr* gene expression within neighbouring cancer stem cells. Thus, through the ability of oncogenic RAS to remodel the stem cell's microenvironment and the ability of the microenvironment to induce a membrane receptor on the stem cells, cancer stem cells can further exploit this dynamic crosstalk, fueling non-genetic circuitries that drive malignant progression.

In contrast to the mammary gland or pancreas [62, 63], normal skin epithelial stem cells do not express LEPR. Their ability to acquire an oncogenic RAS mutation that creates the perfect crosstalk with their microenvironment to hijack this pathway poses much broader implications for LEPR's role as a driver in cancer. In this regard, the downstream consequences of LEPR signaling, namely sustained activation of the PI3K-AKT-mTOR pathway, become all the more important as among human cancers that harbour a considerable mutational burden, *PI3KCA* is one of the most commonly mutated genes and the target of emerging anti-cancer therapeutics[36, 58]. Our findings raise the tantalizing possibility that *PIK3CA* mutations may not be essential to sustain the PI3K pathway at a level required for the invasive malignant state, even though they may help to bolster it. The ability of an oncogenic RAS mutation to launch an aberrant dialogue with its normal tissue microenvironment and thereby co-opt many of the same signaling pathways achieved by a high mutational burden has profound implications for our understanding of cancer.

4.2 Future Directions

Cancer cells and their surrounding tumor microenvironment (TME) assemble the complex ecosystems within the tumors [64, 65]. Studying these ecosystems reveals how these cells communicate within tumors and fuel the malignancy progression, which led to the development of checkpoint inhibitor immunotherapy and revolutionized the field of oncology [66]. Tumorigenesis relies on the ability of cancer stem cells (CSCs) to initiate

and propagate cancerous tissues [67]. When tissue stem cells acquire oncogenic mutations and become CSCs, they begin to deviate from their original program and acquire the ability to evade immune surveillance and remodel the neighboring TME. In solid tumors, CSCs are chemo and immunotherapy resistant and are strategically located at the tumor-stroma interface, thus being in direct contact with the TME [28, 29]. However, the lack of spatial and temporal unbiased approach that captures, with high resolution, the CSCs-TME interactions has significantly hampered our understanding of CSCs biology and the development of novel therapeutic strategies with less off-target effects. The studies of solid tumors in murine genetic models, especially invasive carcinomas, provide an excellent opportunity to apply synthetic biology tools to investigate and uncover new biology for therapeutic purposes. The future examination of the cell-cell interaction (CCI) between CSCs and the TME with the current state-of-the-art of single-cell omics is crucial for understanding the biology and developing the next generation of therapy development.

5. Materials and Methods

Animals

TRE-HRAS^{G12V} mice have been described before[68]. The original *TRE-HRAS*^{G12V} mice have been backcrossed 10 generations each to a C57Bl/6J background and an FVB/N background. FVB/N *TRE-HRAS*^{G12V} mice were bred to FVB/N *R26-LSL-YFP* mice to create the TGFβ-reporter lineage-tracing model. For tumor transplantation experiments, 7-9 weeks old female Nude/Nude mice from Charles River were used. All other studies used a mix of male and female mice, which for the assays used here, behaved similarly. The animals were maintained and bred under specific-pathogen-free conditions at the Comparative Bioscience Center (CBC) at The Rockefeller University, which is an Association for Assessment and Accreditation of Laboratory Animal Care (AALAC) – accredited facility. And all the procedures were performed with the Institutional Animal Care and Use Committee (IACUC) – approved protocols.

Cell Lines

Mouse cutaneous SCC cell line PDVC57 was cultured with the E low calcium (50mM) medium. Human HNSCC cell line A431 was cultured in the DMEM medium (Gibco) with 10% FCS and 100units/mL streptomycin and 100mg/mL penicillin. 293TN HEK cells for lentiviral production were cultured in DMEM medium with 10% FCS (Gibco) and 1mM sodium pyruvate, 2mM glutamine, 100units/mL streptomycin, and 100mg/mL penicillin.

3T3J2 fibroblast feeder cell line was cultured in DMEM/F12 medium (Thermo Fisher) with 10% CFS (Gibco), 100units/mL streptomycin, and 100mg/mL penicillin, then treated with 10 µg/mL mitomycin C (Sigma) for 2 hours to achieve growth inhibition. Sex of squamous carcinoma cell lines is not available.

Human tumor samples

Human skin and SCC tumor samples were acquired as frozen tissue from Dr. Bhuvanesh Singh at Weill Cornell Medical College. All samples were de-identified as NIH/Federal/State regulatiosn. informed consent was obtained from all human research participants at Weill Cornell Medical College. And in accordance with approved Institutional Review Broad (IRB) protocols from Rockefeller and from Weill Cornell Medical College.

Lentiviral *in utero* transduction

Lentiviral constructs were previously described: SBE-NLSmCherry-P2A-CreERT2 PGK-rtTA3[28] or cloned in Fuchs Lab (SBE-NLSmCherry PGK-rtTA3, *Lepr* peak reporter-EGFP PGK-rtTA3, TRE-*Lepr*-IRES-EGFP, PGK-rtTA3). Concentrated lentiviral solutions were produced as previously described[27, 28]. In order to deliver PGK-rtTA3 containing lentivirus to tetracycline-inducible $HRAS^{G12V}$ mouse skin to drive SCC tumorigenesis, ultrasound-guided *in utero* injection of concentrated lentivirus was performed in the Comparative Biology Center at the Rockefeller University. Briefly, female mice were anaesthetized with isoflurane (Hospira) at embryonic day 9.5, and 500nL to 1µL of lentivirus was injected into the amniotic sacs of the animal to selectively transduce

individual progenitors within the surface ectoderm that will give rise to the skin epithelium[69]. Postnatal induction of tumorigenesis in clonal patches is achieved by doxycycline administration (2mg/g) through the food.

Tumor formation and grafting

To induce spontaneous tumor formation, the *TRE-HRAS^{G12V}* or *TRE-HRAS^{G12V} R26-LSL-YFP* mice injected with lentivirus were continuously fed doxycycline from postnatal day 0-4 to activate rtTA3 transactivator. Papillomas show up in ~ 4 weeks, and progress to SCCs in ~ 8 weeks. To activate the CreER^{T2} in lineage tracing experiments, 100ug tamoxifen (Sigma) was intraperitoneally (i.p.) injected into tumor-bearing mice daily for 3 consecutive days. For tumor allograft studies, 1X10^5 of mouse PDVC57 SCC cells were mixed with growth factor reduced (GFR) Matrigel (Corning) and intradermally injected into Nude/Nude immunocompromised mice. Visible tumors show up after 3 weeks. For metastatic tumor xenograft, 1X10^5 of human SCC A431 cells were resuspended in sterile PBS and tail-vein injected into Nude/Nude immunocompromised mice. Mice lung tissue with metastatic lesions was harvested after 3 weeks.

Immunofluorescence and histology

Tumor tissues for section immunofluorescence and histology were gently fixed in 4%PFA at room temperature for 15min and then washed with PBS three times at 4^{o}C. For histology, samples were dehydrated in 70% ethanol overnight and then send to Histowiz for processing, Oil Red O and H&E staining. For immunofluorescence, following fixation, samples were dehydrated in 30% sucrose in PBS solution overnight at 4^{o}C. The tissues

were then embedded in OCT medium (VWR). Cryosections were blocked, with 0.3% Triton X-100, 2.5% normal donkey serum, 1% BSA, 1% gelatin containing PBS blocking buffer, and stained with primary antibodies: Integrin alpha 6 (Rat, 1:2000, BD) , RFP/mCherry (Guinea Pig,1:5000, Fuchs Lab), K14 (Chicken, 1:1000, Biolegend), CD31 (rat, 1:100, BD), K5 (Guinea Pig, 1:2000, Fuchs Lab), K8 (Rabbit, 1:1000, Fuchs Lab), mLEPR (Goat, 1:200, R&D), hLEPR (Rabbit, 1:100, Sigma), RUNX1 (Rabbit, 1:100, Abcam), FOS (Rabbit, 1:100, Cell Signaling), GFP (Chicken, 1:500, Biolegend), pSTAT3 (Rabbit, 1:100, Cell Signaling), pS6 (Rabbit, 1:100, Cell Signaling). For pSTAT3 staining, the slides were pretreated with ice-cold 100% methanol for 30min before blocking. The slides were then stained with the appropriate Alexa 488, 546, 647 conjugated secondary antibodies (Thermo Fisher) and imaged with Zeiss Axio Observer Z1 with Apotome 2 microscope. Then the images were collected and analyzed with Zeiss Zen software.

For immunofluorescence microscopy of thick tumor sections, all harvested tumors were fixed with 1% v/v paraformaldehyde/PBS for 3 hours at 4ºC and washed overnight with PBS. After a 2-day incubation with 30% w/v sucrose/PBS at 4ºC and embedding in OCT, 100-micron cryosections were washed with PBS and transferred to a 24-well dish. Following overnight permeabilization with 0.3% Triton X-100/PBS at room temperature with rotation, tissue was blocked for 4-6 hours with 5% donkey serum and 1% bovine serum albumin in 0.3% Triton X-100/PBS (blocking buffer). Tissue was then incubated with the following primary antibodies for 2 days at room temperature: mCherry antibody (Abcam, 1:1000), CD31 antibody (Millipore, 1:300), and cytokeratin-14 antibody (Fuchs Lab, 1:200), before several washes with 0.3% Triton X-100/PBS. Tissue sections were incubated with secondary antibodies (Alexa Fluor-RRX chicken at 1:1000 and Alexa

Fluor-488/-647 hamster and rabbit at 1:200) diluted in blocking buffer overnight (16-20 hours) at room temperature and washed with 0.3% Triton X-100/PBS, with several exchanges, before counter-staining nuclei with DAPI overnight. Immuno-labelled tissue sections were then dehydrated with a graded ethanol series, by incubation in 30% ethanol, 50% ethanol and 70% ethanol, each set to pH 9.0, as described[70], for 1 hour per solution, before a 2-hour incubation with 100% ethanol, and cleared to optimize optical sectioning and imaging penetration by overnight incubation with ethyl cinnamate (Sigma-Aldrich). Cleared tumor specimen were imaged in 35mm glass-bottom dishes (Ibidi) with an inverted LSM Zeiss 780 laser-scanning confocal microscope and analyzed with Imaris imaging software suite.

Cell Sorting and Flow cytometry

To sort the target tumor cell populations, tumors were first dissected from the skin and minced in 0.25% of collagenase (Sigma) in HBSS (Gibco) solution. The tissue pieces were incubated at 37ºC for 20 minutes in a shaker. After a wash with ice-cold PBS and samples were further digested into single cell suspension in 0.25% Trypsin/EDTA (Gibco) for 10 min at 37ºC. After neutralization with the FACS buffer (5%FCS, 10mM EDTA, 1mM HEPES in PBS), single-cell suspension was then centrifuged, resuspended, and strained before preparing for staining. A cocktail of Abs for surface markers at the predetermined concentrations (CD31-APC 1:100, Biolegend; CD45-APC 1:200, Biolegend, CD117-APC 1:100, Biolegend; CD140a-APC 1:100, Thermo Fisher; CD29-APCe780, 1:250, Thermo Fisher; CD49f-PerCPCy5.5 1:250, Biolegend; CD44-PECy7 1:100, BD Bioscience) was prepared in the FACS buffer with 100ng/ml DAPI. CD44-BV421 1:100, BD Biosciences;

CD49f-PECy7 1:250, Biolegend; CD29-APCCy7 1:250, Biolegend were also used as interchangible staining in the panels for the same purpose. The samples were stained on ice for 30min and washed with FACS buffer, then to FACS or analysis. To sort the target skin populations, whole back skins were first dissected from the mouse, followed by scraping off the fat tissues from the dermal side, and incubated in 0.25% Trypsin/EDTA (Gibco) for 45 – 60 min at 37ºC. Then epidermal layer and hair follicles were scraped off the epidermal side of the skin, washed with FACS buffer, mechanically separated/strained into single-cell suspension for staining. A cocktail of Abs for surface markers at the predetermined concentrations (CD31-APC 1:100, Biolegend; CD45-APC 1:200, Biolegend, CD117-APC 1:100, Biolegend; CD140a-APC 1:100, Thermo Fisher; CD29-APCe780, 1:250, Thermo Fisher; CD49f-PerCPCy5.5 1:250, Biolegend; CD34-BV421 1:100, BD Bioscience; CD200-PE 1:100, Biolegend; Sca1-PECy7 1:100, Biolegend) was prepared in the FACS buffer with 20ng/ml DAPI when using UV laser. The sorting was performed on BD FACSAria equipped with FACSDiva software. For *in vivo Lepr* reporter SCC cell experiment, after 7 days of TGFβ1 (10ng/mL) with buffer control treatment, reporter PDVC57 cells were stained with 100ng/ml DAPI in FACS buffer and analyzed on BD Aria Fortessa.

RNA-purification and ATAC-seq Library Preparation

For bulk RNA sequencing, targeted cell populations from 2 (SCC) -15 (Papilloma) tumors per population were directly sorted into TRI Reagent (Thermo Fisher) and the total RNA was purified with Direct-zol RNA MiniPrep Kit (Zymo Research) per manufacturer's instructions. Purified RNA integrity was determined using an Agilent 2100 Bioanalyzer.

Library preparation, using the Illumina TrueSeq mRNA sample preparation kit (non-stranded, poly-A selection), and sequencing were performed at the Genomic Core Facility at Weill Cornell Medical College on Illumina HiSeq 4000 with 50-bp single-end setting or NovaSeq with 100-bp paired-end setting.

For accessible chromatin profiling, target cell populations from 2 (SCC) -15 (Papilloma) tumors per population were sorted into FACS buffer, and ATAC-seq sample preparation was performed as described[71]. Briefly, a minimum of 2 X 10^4 cells were lysed with ATAC lysis buffer on ice for 1 minute. Lysed cells were then tagmented with Tn5 transposase (Illumina) at 37ºC for 30min. Cleaned up fragments were PCR amplified (NEB) and size selected with 1.8X SPRI beads (Beckman Coulter). Libraries were sequenced at the Genome Resource Center at The Rockefeller University on Illumina NextSeq with 40-bp paired-end settings.

For single cell RNA sequencing, target cell populations were sorted from 3-5 SCC tumors per mouse, for a total of 3 biological replicates (2 males, 1 female mouse). Single cell libraries were prepared following a slightly modified SMARTSeq2 protocol[72]. Briefly, cells were sorted into 96-well plates containing hypotonic lysis buffer, snap-frozen with liquid nitrogen, and stored at -80ºC until further processing. To semi-quantitively assess technical variation between cells, ERCC spike ins (1:2x10^6 dilution, Thermo Fisher) were added with the lysis buffer. Upon thawing, cells were lysed at 72ºC for 3 min. Released RNA was reverse transcribed using dT30 oligos, template switching oligos and Maxima H- reverse transcriptase. Complementary DNA (cDNA) was amplified via 15 cycles of

whole transcriptome amplification using KAPA HiFi DNA polymerase (Roche) and then size selected using 0.6X AmpPure XP beads (Beckman Coulter). To exclude wells containing multiple cells, as well as low-quality and empty wells, RT-qPCR for *Gapdh* was performed before proceeding. Illumina sequencing libraries were then prepared using the Nextera XT DNA library preparation kit (Illumina) and indexed with unique 5' and 3' barcode combinations. After barcoding, samples were pooled, and size selected with 0.9X AmpPure XP beads. Pooled library integrity was assessed by TapeStation (Agilent) prior to sequencing on 2 lanes of Illumina NovaSeq S1 using 100bp paired end read output (Illumina). For optimal sequencing depth, each sequencing library was sequenced twice, once in each lane of an Illumina NovaSeq. Sequencing reads per cell from each lane were combined during alignment to the reference genome.

CRISPR mediated LEPR Knockout

Lepr^{null} PDVC57 cell line was generated with the Alt-R Crispr-Cas9 system (IDT). Briefly, a recombinant Cas9 protein together with a validated sgRNA (GAGUCAUCGGUUGUGUUCGG) targeting exon 3 of the mouse *Lepr* gene or a negative control sgRNA (IDT), and an ATTO550 conjugated tracer RNA were used to form a ribonucleoprotein (RNP). Then, PDVC57 cells were transfected with RNAiMax reagent (Thermo Fisher) and FACS purified into 96-well plates to produce clonal cell lines. The *Lepr*^{null} PDVC57 cell line was selected after validating by immunoblot of LEPR as well as sequencing of the target region for indel efficiency via MiSeq. The *Lepr*^{null} PDVC57 cell line and *Lepr*^{ctrl} PDVC57 cell lines were intradermally injected into the

immunocompromised *Nude* mice, and the tumors were monitored for growth and progression.

Rescue of LEPR in *Lepr*^{null} PDVC57 cell line

Lepr^{null} PDVC57 cell line was infected with 1:1 ratio of either TRE- *full-length Lepr (FL)*-IRES-EGFP or TRE- *Lepr lack of signaling cascade (ΔSig)*-IRES-EGFP (REF) with PGK-rtTA3 lentiviruses. After culturing in 1ug/ml of doxycycline (Sigma) containing E Low medium (Fuchs Lab), EGFP high cells that express *Lepr* were isolated by FACS and expanded. These two different cell lines were later intradermally injected into immunocompromised nude mice, and subsequent tumor formation was monitored for growth and progression.

Limited Dilution Assay

To compare the tumor-initiating capability between *Lepr*^{null} PDVC57 and *Lepr*^{ctrl} PDVC57 cell lines, a preset number of cells were intradermally injected into nude mice and the tumor growth was observed for 5 weeks to calculate the tumorigenicity of cells. As previously described[27], SCC cells were diluted serially from 10^4 to 10^6 cells per mL and 100µl cell mixtures in 1:1 PBS:Matrigel were injected. Four injections per mouse were performed under the animal facility regulations (for 10^5 and 10^4 per injection, n= 4; for 10^3 per injection, n=8). Photos of mice were recorded, and tumors were counted at the endpoint at 5 weeks after injection.

Osmotic Pump for Compound Delivery

Osmotic pumps (Alzet) were implanted as previously described[73] into the back skin of nude mice to achieve continuous delivery of the compound. Briefly, 3 weeks after the initial intradermal tumor grafts, tumor-bearing nude mice were anaesthetized and sterilized for surgical procedures. A small cut was created with scissors and the osmotic pump containing a predetermined concentration of compounds or vehicle was inserted underneath the back skin and the opening was clipped. For the leptin experiment, 4 week-long delivery pumps were used with 2mg/ml leptin (R&D), 0.5mg/ml leptin, 0.5mg/ml SMLA (BioSources), and PBS vehicle. For the rapamycin experiment, 2 week-long delivery pumps were used with 10mM rapamycin (SelleckChem) in 10% DMSO in PBS solution and respective vehicle control. Then, tumor sizes were monitored for tumor growth and progression.

PI3K Inhibitor Gavage on Tumor Mice

As previously described[55], pan PI3K inhibitor, BKM120 (MedChemExpress) was dissolved 100mg/mL in DMSO. Then a 10%v/v solution was sequentially diluted in 40% PEG300, 5% Tween-80, and 45% PBS. 10% DMSO in such a dilution was used as vehicle control. The course of treatment was daily gavage for 14 days. Tumor-bearing mice were first anaesthetized lightly and 100μL of the solution was delivered to the mouse stomach through a feeding needle (Fisher Scientific). The study was blinded by one experimentalist performing gavage and the other one measuring the tumor sizes every 2-3 days without knowing the treatment or control. The result was finally analyzed at day 15 after the initial treatment.

Colony Forming Assay

After $LPER^{+}$ and $LEPR^{-}$ tumor basal cells ($CD29/CD49f^{hi}$ $CD44^{+}$) were FACS isolated and counted, $5X10^{4}$ cells of each replicate per condition were plated in a 10cm dish with growth inhibited 3T3/J2 feeder layer with the mouse skin stem cell culture media (SY medium) (Fuchs Lab). After 14 days, the cultures were fixed and stained with Alexa647 conjugated CD49f antibody (Biolegend). Then the plates were imaged with LiCor Odyssey Imager and quantified by the numbers and sizes of colonies.

Mouse Skin Stem Cell Culture Media (SY Medium)

The base medium was made with calcium-free DMEM/F12 (3:1) with 1X Glutamax and 1X Pen/Strep. Additives are 15% calcium-free Chelated FBS, 418.5 ng/ml of Hydrocortisone, 9.405 ng/ml of Cholera Toxin, 10μM of Y-27632, 0.0525 mg/ml Insulin, 0.0525 mg/ml Apo-Transferrin, 300mM $CaCl_2$, 36.5mM of $NaHCO_3$, 2.1 X 10^{-8} M of 3,3',5-Triiodo-L-Thyronine.

Immunoblotting

To harvest, cultured cells were washed on the plate in cold 1X PBS, lysed in RIPA Buffer (Millipore) supplemented with protease and phosphatase inhibitors (Roche), and collected by scraping. Cells were lysed for 30 minutes on ice and then centrifuged to collect the supernatant. Protein concentration was determined by BCA Assay (Pierce) against a bovine serum albumin standard curve. 20μg protein of each sample was run on NuPAGE 4-12% Bis-Tris Gels (Invitrogen) for 1 hour at 200V in NuPAGE MES SDS Running Buffer (Invitrogen). Protein was transferred overnight onto Immunoblon FL PVDF membrane (Millipore) at in NuPage Transfer Buffer (Invitrogen) with methanol at 15V at

4ºC. Membranes were blocked in Odyssey TBS Blocking buffer for at least 1 hour at room temperature before incubating with primary antibodies overnight at 4ºC in Odyssey buffer with Tween-20. Membranes were washed several times in 0.1% Tween-20 in PBS before incubating with fluorescent secondary antibody.

The following primary antibodies and dilutions were used: primary antibodies (anti-mLEPR 1:1000, R&D; anti-AKT, 1:1000, Cell Signaling; anti-pAKT(S473), 1:1000, Cell Signaling ; anti-S6, 1:1000, Cell Signaling; anti-pS6(S240/244), 1:1000, Cell Signaling; anti-S6K, 1:1000, R&D Systems; anti-pS6K(T389), 1:1000, Cell Signaling; anti-GAPDH, 1:5000, Thermo Fisher; anti-αTubulin, 1:5000, Sigma), secondary antibodies were used at 1:10,000 (donkey anti-rabbit HRP and donkey anti-mouse Alexa647 (Jackson Immuno)). Membranes were imaged with an GE Amsham AI600 Imager. Due to multiple targeted proteins in each experiments, one set of identifcal samples with the same sample volumes and processing procedure were blotted for GAPDH or αTubulin in one of the gels in the same exeperiment as loading control.

Bulk RNA-seq Analysis

Trimmed fastq files were obtained from the Genomic Core Facility of Weill Cornell Medical College. The analysis was performed by the cluster at the High-performance Computing (HPC) facility. For RNAseq analysis of C57BL/6J TetO-HRasG12V driven papilloma and SCC samples (Fig. 1, Extended Data Fig.1) raw sequencing reads were aligned to the mouse reference genome (UCSC release mm10) using Bowtie2 (v. 2.2.9) [74] with default parameters. The expression values of each gene were quantified as transcript per million

(TPM), as well as raw counts, using RSEM (v. 1.2.30)[75]. Differential gene expression analysis was performed on raw counts using DESeq2 (v. 1.24.0) with a negative binomial distribution and Wald test for significance [76]. Genes with average counts greater than 10, log2(fold-change) >|1|, and p-adjusted value <0.05 were considered to be differentially expressed. Differentially expressed genes were presented as a heatmap with z-score normalized expression values. To examine temporal changes in regulators of angiogenesis as cells transit from normal to benign to invasive states, the expressed genes related to the GO term “Positive Regulation of Angiogenesis” (GO:0045766, AmiGO2) were plotted as a z-score normalized heatmap.

For RNAseq analysis of *TRE-HRAS*^{G12V} driven TGFβ-reporter papilloma and SCC samples, genome indices were generated with the genome sequence (GRCm38.p5) and the comprehensive gene annotation on the primary assembly (GENCODE M16). Raw reads were aligned to the genome indices and gene counts were generated using STAR (v. 2.6)[77] with default parameters. For differential gene expression analysis, lowly expressed genes (minimum average read count <10) were filtered out prior to DESeq2 analysis (v. 1.16.1) in R Studio (v. 3.4.2). Paired mCherry positive and negative samples were identified as batches and disease stages (papilloma versus SCC) as conditions for differential gene expression modelling using a negative binomial distribution and Wald test by DESeq2. Genes were considered as differentially expressed for log2(fold-change) >|1| and p-adjusted value <0.05.

For PDV-WT and LeprKO grafted SCC samples, raw reads were mapped to the decoy-aware mouse genome (UCSC release) mm10) using Salmon (v. 1.4.0)[78]. Expression level of each gene were quantified as transcript per million (TPM), as well as by raw counts, with Tximport (v. 1.12.3)[79] in R (v. 3.6.1). For differential gene expression analysis, lowly expressed genes (minimum average read count <10) were filtered out prior to DESeq2 analysis (v. 1.16.1) in R Studio (v. 3.4.2). Differential gene expression modelling used a negative binomial distribution and Wald test by DESeq2. Genes were considered as differentially expressed for log2(fold-change) >|1| and p-adjusted value <0.05. Go Term analysis was performed with DAVID online tool (NIH).

Bulk ATAC-seq Analysis

Fastq files were obtained from the Genomic Resource Center of The Rockefeller University. The analysis was performed by the cluster at the High-performance Computing (HPC) facility. The raw sequencing reads were aligned with Bowtie2 (v 2.2.9)[74] to the mm10 reference genome (UCSC). The aligned reads were deduplicated with Picard (v. 2.3.0)(Broad Institute, 2019) and shifted to correct for Tn5 insertion bias. Peaks were called with MACS2 (v. 2.1.1) with default settings[80]. Next, we concatenated all peaks from IFE, HFSC, PAPneg, PAPpos, SCCneg and SCCpos to a union peak set and calculated the read coverage of each sample at these peaks with Bedtools (v. 2.25). The R (v. 3.6.1) package “pheatmap” (v. 1.0.12) was then used to generate the heatmap. For motif analysis, we used HOMER findMotifGenome.pl with a customized motif database from JASPAR 2018. We generated the motif input for HOMER (v. 4.11)[81] from JASPAR 2018 vertebrates CORE central motifs using 80% of the maximum log-odds

expectation for each motif as the detection threshold for HOMER. Go Term analysis was performed with GREAT online tool (Stanford University).

Single-cell RNA-seq Analysis

Sequence and transcript coordinates for mouse release M23 (GRCm38.p6) genome and gene models were downloaded from GENCODE. Paired sequencing reads for single cell RNA-seq libraries were aligned to the mouse reference genome, combined with sequences for ERCC spike-ins as artificial chromosomes, using STAR (version 2.5.2a)[77] with default parameters for paired-end reads. Transcript expressions were calculated using the Salmon quantification software (version 0.14.1)[78] and gene expression levels as TPMs and counts were obtained using Tximport (version 1.12.3)[79]. TPMs were transformed to $\log_2$(TPM+1). For downstream analyses, cells with <2500 genes detected per cell and genes expressed in <5% of the cell population were removed. We also excluded cells expressing lower levels of the lineage marker *Krt14* ($\log_2$(TPM+1) <7). After filtering, we had 1504 cells (159 integrin low suprabasal, 500 integrin high, mCherry negative basal, and 845 integrin high, mCherry positive basal cells) (n=3 mice) in our dataset.

Analyses and visualization of data were conducted in a Python environment built on the Numpy, SciPy, matplotlib, scikit-learn package and pandas libraries. To distinguish true biological variability in gene expression from technical noise, we used a statistical model for identifying highly variable genes compared to ERCC spike-ins as described[82]. Briefly, we used a custom script based on the methodology described[82], running in R

version 3.6.1, to identify those genes with higher level of variation (at least 10% above the technical variation) and false discovery rate (FDR) value less than 0.1. To identify cell clusters and visualize the data, we first centred and scaled the highly variable gene dataset and performed PCA on the list of highly variable genes. The first 201 principal components, which captured 50% of the variance in the data set, were used as input for non-linear dimensionality reduction, performed using UMAP implemented in scikit-learn. To identify clusters, we used a graph-based clustering approach based on building a k-nearest neighbors (kNN) graph and clustering with the Louvain algorithm (with k set to $1/5^{th}$ of the data set size, and resolution parameter of 1×10^{-4}). Euclidean distance in PCA space served as input for both UMAP generation and Louvain clustering.

Differential gene expression was used to identify genes specific to each cluster. Briefly, we used raw count matrices for expressed genes and applied them to the DESeq2 package (version 1.24.0)[76] using R. We used a negative binomial fit to model differential gene expression, factored the dataset based on the Louvain cluster assignments, and used a threshold of 0.75 to construct Wald tests of significance. Genes were considered to be differentially expressed if their $\log_2$(fold change) >|1| and p-adjusted value <0.05. Lowly expressed differential genes (baseMean expression <200) were discarded from visualization and further analysis. The expression levels of specific genes of interest were visualized as $\log_2$(TPM+1) values on the corresponding UMAP representation of the data. To generate comprehensive gene set scores based on GO term analyses, for example for angiogenesis or Akt signaling pathways, the corresponding *Mus musculus* gene lists were obtained from AmiGO 2 through the Gene Ontology Consortium. The

“AddModuleScore” function from Seurat (v3.1.1) was used to calculate the average expression levels of each gene set on a single cell level, subtracted by the aggregated expression of control feature sets, as was originally described[83]. The resulting gene set scores for each cell are colour-coded on corresponding UMAP visualizations of the data.

Statistics and study design

For mouse experiment, group sizes were determined by power analysis with preliminary experimental data. All the experimental measurements were taken from distinct samples. The statistics was analyzed with unpaired two-tailed Student’s t test with a 95% confidence interval under the untested assumption of normality on the Graphpad Prism (9.0). All the error bars in the box-plots are mean ± SEM. Degree of statistical significance is denoted by ns ($p>=0.05$), * ($p<0.05$), ** ($p<0.01$), *** ($p<0.001$), and **** ($p<0.0001$).

Schematics

Schematics were prepared using BioRender (www.biorender.com) with publication permissions and Affinity Design (Serif Europe).

6. APPENDIX

COMPLETE GENE LIST TABLES

Table 1: Significantly up-regulated genes in normal versus tumor basal progenitor cells (TPMs per Sample)

Note: Cutoff for enrichment Log2(Fold-change)>1, padj <0.05, minimum BaseMean > 200 (all by DESEQ2; see methods)

	Normal	Normal	Tumor	Tumor	Tumor	Tumor			
Gene	Normal 1	Normal 2	Pap 1	Pap 2	SCC 1	SCC 2	Enriched in	Log2(Fold-Change)	padj
ENSMUSG00000062778_Chia1	0	0	396.12	82.41	0.01	0.15	Tumor	-2.79E+01	2.46E-11
ENSMUSG00000033156_Cst10	0	0	102.47	47.18	0	0.05	Tumor	-2.49E+01	3.54E-07
ENSMUSG00000057417_Dcpp3	0	0	74.49	16.74	0	0	Tumor	-2.25E+01	6.83E-06
ENSMUSG00000098178_Yam1	265.47	156.26	272.19	155.02	182.7	80.33	Tumor	-1.60E+01	4.05E-21
ENSMUSG00000029322_Plac8	0	0	26.13	24.75	76.93	366.26	Tumor	-1.41E+01	4.79E-08
ENSMUSG00000067736_Gm10222	0.15	0	2500.44	0	1712.5	0	Tumor	-1.33E+01	2.77E-02
ENSMUSG00000029280_Smr3a	0	0.36	3936.93	1784.3	0.4	1.76	Tumor	-1.28E+01	1.54E-03
ENSMUSG00000107470_CAAA01093177.1	0	0	56.09	0	59.87	62.27	Tumor	-1.27E+01	1.13E-02
ENSMUSG00000079092_Prl2c2	0	0	39.76	34.47	43.59	34.59	Tumor	-1.26E+01	1.04E-13
ENSMUSG00000085666_Gm9855	0	0	26.09	0	46.31	22.14	Tumor	-1.25E+01	1.36E-02
ENSMUSG00000042459_Bpifa2	0	0.65	5238.06	2473.25	0.62	2.91	Tumor	-1.25E+01	2.51E-03
ENSMUSG00000105888_RP23-423C8.4	0	0	222.48	77.92	0.08	0.16	Tumor	-1.22E+01	1.02E-02
ENSMUSG00000047347_Tdg-ps	0	0	6.74	0.03	12.12	5.22	Tumor	-1.20E+01	2.16E-04
ENSMUSG00000042845_Wfdc12	0	0	83.49	23.58	0.74	0.34	Tumor	-1.19E+01	1.60E-03
ENSMUSG00000015519_2310057J18Rik	0.06	0	320.23	114.86	0.09	0.28	Tumor	-1.18E+01	2.90E-03
ENSMUSG00000029372_Ppbp	0	0	19.53	3.86	21.74	13.82	Tumor	-1.17E+01	4.39E-10
ENSMUSG00000078889_Gm14288	0	0	3.72	2.95	4.32	4.05	Tumor	-1.14E+01	5.26E-11
ENSMUSG00000045475_Lce3c	0	0	20.69	9.47	28.12	44.03	Tumor	-1.14E+01	1.26E-09
ENSMUSG00000020679_Hnf1b	0	0	3.08	7.78	3.43	5.58	Tumor	-1.13E+01	2.67E-10
ENSMUSG00000058499_Pip	0	0.1	356.15	180.44	0	0.34	Tumor	-1.12E+01	3.27E-02
ENSMUSG00000054537_Tmprss11e	0.01	0	6.67	6.43	10.87	9.7	Tumor	-1.12E+01	1.29E-10
ENSMUSG00000029334_Prkg2	0.02	0.02	37.02	45.04	56.97	82.82	Tumor	-1.10E+01	2.00E-45
ENSMUSG00000058523_Mup5	0	0	43.28	3.61	0.03	0.05	Tumor	-1.10E+01	3.00E-02
ENSMUSG00000032387_Rbpms2	0	0	2.51	3.12	4.39	6.62	Tumor	-1.07E+01	5.38E-09
ENSMUSG00000079852_Klra4	0.02	0.04	40.69	40.86	67.95	66.38	Tumor	-1.07E+01	1.39E-25
ENSMUSG00000056071_S100a9	0.26	0.51	766.11	667.91	782.24	216.9	Tumor	-1.05E+01	1.57E-54

ENSMUSG00000022902_Stfa2	0.08	0.07	108.39	109.21	118.2	99.18	Tumor	-1.04E+01	3.39E-17
ENSMUSG00000025328_Padi3	0.04	0.08	45.39	54.94	79.62	113.47	Tumor	-1.02E+01	1.31E-63
ENSMUSG00000094733_Gm5416	0	0.11	59.33	114.51	75.26	56.99	Tumor	-1.02E+01	6.77E-08
ENSMUSG00000042212_Sprr2d	0	0.17	94.06	121.6	85.05	89.26	Tumor	-1.02E+01	1.01E-29
ENSMUSG00000023041_Krt6b	2.11	4.81	4132.84	4735.19	3397.1	2316.7	Tumor	-1.02E+01	1.98E-96
ENSMUSG00000056457_Prl2c3	0	0.19	108.25	101.29	68.08	138.19	Tumor	-1.01E+01	6.57E-37
ENSMUSG00000069049_Eif2s3y	0.17	0.01	53	0.1	54.12	0.12	Tumor	-9.95E+00	2.66E-03
ENSMUSG00000046259_Sprr2h	0.13	0.22	152.86	166.45	157.52	183.02	Tumor	-9.92E+00	1.28E-59
ENSMUSG00000024512_Dynap	0	0.04	9.79	17.12	21.27	33.5	Tumor	-9.90E+00	1.92E-13
ENSMUSG00000096445_Dcpp1	0	0.23	343.34	139.66	0.05	0.11	Tumor	-9.83E+00	3.32E-02
ENSMUSG00000032572_Col6a4	0	0.02	1.51	1.36	1.64	4.41	Tumor	-9.82E+00	1.49E-07
ENSMUSG00000069045_Ddx3y	0.03	0	19.95	0.03	17.92	0.02	Tumor	-9.80E+00	1.90E-02
ENSMUSG00000070990_Foxe1	0.01	0.01	11.24	6.58	7.21	5.75	Tumor	-9.78E+00	2.83E-14
ENSMUSG00000056054_S100a8	0.54	0.42	574.26	542.75	560.47	83.85	Tumor	-9.76E+00	7.43E-35
ENSMUSG00000028972_Car6	0	0.22	280.58	104.46	0.24	0.22	Tumor	-9.73E+00	2.12E-02
ENSMUSG00000079853_Klra1	0.02	0	4.08	4.56	6.57	6.46	Tumor	-9.48E+00	2.16E-07
ENSMUSG00000050866_Clrn3	0	0.01	2.27	2.07	2.03	4.23	Tumor	-9.47E+00	3.02E-07
ENSMUSG00000021803_Cdhr1	0.05	0.03	36.39	32.01	17.74	6.82	Tumor	-9.44E+00	3.82E-31
ENSMUSG00000004791_Pgf	0.04	0.1	15.6	34.78	38.31	78.19	Tumor	-9.32E+00	1.85E-26
ENSMUSG00000054555_Adam12	0.03	0.04	13.49	16.75	29.15	25.26	Tumor	-9.30E+00	3.70E-60
ENSMUSG00000009545_Kcnq1	0.02	0	2.15	3.73	2.4	2.34	Tumor	-9.25E+00	5.18E-07
ENSMUSG00000016524_Il19	0.04	0	6.09	5.01	7.36	11.71	Tumor	-9.24E+00	8.47E-07
ENSMUSG00000026343_Gpr39	0	0.01	2.04	1.89	2.82	4.18	Tumor	-9.21E+00	8.99E-07
ENSMUSG00000045349_Sh2d5	0.28	0.28	135.19	116.42	98.07	92.67	Tumor	-9.19E+00	1.17E-156
ENSMUSG00000079434_Neu2	0	0.14	6.5	6.74	8.12	15.27	Tumor	-9.15E+00	1.15E-11
ENSMUSG00000085569_Gm12602	0	0.08	27.15	31.45	24.39	35.23	Tumor	-9.14E+00	2.45E-12
ENSMUSG00000062380_Tubb3	0.08	0.13	40	35.54	48.22	90.3	Tumor	-9.13E+00	9.64E-46
ENSMUSG00000026536_Mnda	0.03	0	4.2	6.59	7.18	13.3	Tumor	-9.12E+00	3.66E-11
ENSMUSG00000046352_Gjb2	1.7	1.45	813.48	957.68	653.02	560.62	Tumor	-9.09E+00	1.85E-181
ENSMUSG00000021506_Pitx1	0.05	0.1	35.17	34.22	28.1	8.43	Tumor	-9.01E+00	2.10E-25
ENSMUSG00000015652_Steap1	0	0.07	14.19	10.83	20.04	19.31	Tumor	-8.97E+00	7.13E-17
ENSMUSG00000038067_Csf3	0.02	0.02	7.11	3.79	8.96	16.69	Tumor	-8.96E+00	3.14E-10
ENSMUSG00000027562_Car2	0.08	0.09	41.83	31.51	33.56	49.08	Tumor	-8.96E+00	6.67E-54
ENSMUSG00000074264_Amy1	2.81	0.71	1547.27	879.9	0.28	1.16	Tumor	-8.92E+00	1.39E-02
ENSMUSG00000017002_Slpi	0.68	0.76	267.26	278.14	209.29	258.42	Tumor	-8.88E+00	6.53E-104
ENSMUSG00000054342_Kcnn4	0.06	0.12	25.27	31.28	47.76	42.47	Tumor	-8.84E+00	6.72E-49
ENSMUSG00000032348_Gsta4	2.05	1.82	736.74	1157.22	529.11	543.1	Tumor	-8.71E+00	8.07E-84
ENSMUSG00000042808_Gpx2	0.79	0.69	308.54	346.91	238.59	235	Tumor	-8.71E+00	1.41E-126
ENSMUSG00000035472_Slc25a21	0.02	0.01	3.67	1.24	5.44	6.49	Tumor	-8.53E+00	1.62E-08
ENSMUSG00000006490_Prl8a9	0.07	0	1.8	5.12	6.68	28.06	Tumor	-8.52E+00	1.29E-06
ENSMUSG00000008136_Fhl2	0.35	0.35	87.72	99.06	126.79	139.78	Tumor	-8.51E+00	7.70E-99

ENSMUSG00000063975_Slco1a5	0.05	0.03	10.66	10.18	15.64	12.68	Tumor	-8.49E+00	1.17E-31
ENSMUSG00000032327_Stra6	0.5	0.43	150	104.08	178	50.78	Tumor	-8.42E+00	4.48E-51
ENSMUSG00000058354_Krt6a	34.16	34.87	10180.4	11279.9	9757.4	9969.3	Tumor	-8.40E+00	0.00E+00
ENSMUSG00000085183_Gm12603	0	0.24	24.64	31.26	28.37	52.18	Tumor	-8.38E+00	6.99E-16
ENSMUSG00000038295_Atg9b	0.24	0.31	33.34	49.02	59.74	91.24	Tumor	-8.14E+00	2.42E-59
ENSMUSG00000071561_BC100530	19.24	12.78	4413.58	5540.59	4467	2528.7	Tumor	-8.14E+00	1.23E-98
ENSMUSG00000048455_Sprr1b	1.13	4.49	901.1	698.99	908.02	667.85	Tumor	-8.13E+00	4.30E-47
ENSMUSG00000096001_2610528A11Rik	1.76	1.82	526.74	574.27	404.3	206.89	Tumor	-7.97E+00	2.49E-59
ENSMUSG00000044912_Syt16	0.02	0.02	2.49	2.83	4.46	8.02	Tumor	-7.92E+00	2.99E-13
ENSMUSG00000041620_Mmp1b	0	0.09	4.47	5	8.71	22.56	Tumor	-7.80E+00	5.89E-11
ENSMUSG00000052316_Lrrc15	0.01	0.02	2.34	3.01	3.59	0.59	Tumor	-7.72E+00	1.20E-11
ENSMUSG00000027861_Casq2	0.15	0.18	15.01	29.89	18.02	32.98	Tumor	-7.70E+00	1.24E-52
ENSMUSG00000058427_Cxcl2	0.34	0.1	23.17	13.51	26.21	2.19	Tumor	-7.68E+00	2.10E-11
ENSMUSG00000032053_Pou2af1	0	0.03	2.45	5.05	2.27	2.17	Tumor	-7.68E+00	2.00E-10
ENSMUSG00000031722_Hp	0.09	0	10.03	12.97	5.84	1.72	Tumor	-7.67E+00	4.02E-09
ENSMUSG00000029484_Anxa3	1.05	0.69	96.72	118.18	183.86	232.53	Tumor	-7.61E+00	1.91E-56
ENSMUSG00000020407_Upp1	0.61	0.5	63.76	83.51	79.31	123.15	Tumor	-7.61E+00	2.77E-65
ENSMUSG00000025128_Bhlhe22	0.03	0.01	2.93	6.03	0.87	0.99	Tumor	-7.55E+00	1.57E-08
ENSMUSG00000000730_Dnmt3l	0.06	0.07	16.34	18.22	14.63	5.58	Tumor	-7.47E+00	6.90E-13
ENSMUSG00000042286_Stab1	2.18	2.13	145.35	191.85	142.99	159.56	Tumor	-7.47E+00	1.42E-216
ENSMUSG00000020839_Tmigd1	0.27	0.48	38.07	59.03	38.28	51.57	Tumor	-7.45E+00	1.57E-52
ENSMUSG00000006587_Snai3	0.06	0.05	5.43	4.51	7.73	16.07	Tumor	-7.45E+00	3.39E-14
ENSMUSG00000045763_Basp1	0.23	0.19	16.26	25.92	44.38	39.91	Tumor	-7.43E+00	5.00E-36
ENSMUSG00000046203_Sprr2g	0	0.17	14.04	15.04	10.92	21.31	Tumor	-7.43E+00	1.90E-12
ENSMUSG00000044594_Serpinb3a	0.02	0.05	7.41	8.51	4.45	0	Tumor	-7.31E+00	3.23E-02
ENSMUSG00000001131_Timp1	0.41	0.13	25.15	32.79	53.33	29.6	Tumor	-7.21E+00	1.59E-29
ENSMUSG00000071562_Stfa1	5.52	7.5	967.87	1203.75	1107	774.92	Tumor	-7.17E+00	1.87E-67
ENSMUSG00000034362_Csta1	1.35	3.17	120.34	347.79	127.06	269.33	Tumor	-7.14E+00	4.95E-50
ENSMUSG00000039519_Cyp7b1	0.18	0.02	13.23	19.16	10.12	4.27	Tumor	-7.12E+00	1.91E-16
ENSMUSG00000054046_Klk13	0.24	0.29	45.71	37.81	41.49	11.97	Tumor	-7.11E+00	3.29E-23
ENSMUSG00000054136_Adm2	0.03	0.13	9.36	14.68	10.46	7.22	Tumor	-7.08E+00	1.50E-15
ENSMUSG00000042115_Klhdc8a	0.02	0.02	1.76	2.13	2.97	3.04	Tumor	-6.96E+00	2.82E-18
ENSMUSG00000042759_Apobr	0.02	0.09	3.78	1.16	4.53	1.19	Tumor	-6.93E+00	1.09E-09
ENSMUSG00000026712_Mrc1	0.01	0.02	2.16	1.17	1.77	1.03	Tumor	-6.92E+00	4.58E-12
ENSMUSG00000050063_Klk6	0.11	0.15	8.15	12.45	18.03	17	Tumor	-6.90E+00	7.57E-20
ENSMUSG00000029371_Cxcl5	0.11	0	6.78	7.39	5.83	1.16	Tumor	-6.86E+00	2.59E-08
ENSMUSG00000095304_Plac9a	0.09	0.42	19.29	29.19	32.21	46.9	Tumor	-6.85E+00	2.94E-14
ENSMUSG00000029761_Cald1	2.85	2.1	179.39	189.64	242.45	304.26	Tumor	-6.81E+00	6.52E-91
ENSMUSG00000020614_Fam20a	0.11	0.07	8.71	8.21	10.53	9.71	Tumor	-6.77E+00	3.06E-34
ENSMUSG00000033350_Chst2	0.14	0.03	6.4	9.12	6.98	6.99	Tumor	-6.74E+00	6.51E-46
ENSMUSG00000039252_Lgi2	0.1	0.13	9.52	12.73	7.75	11.99	Tumor	-6.74E+00	2.81E-65

ENSMUSG00000036887_C1qa	0	0.18	13.76	5.96	17.96	2.09	Tumor	-6.72E+00	2.04E-07
ENSMUSG00000024529_Lox	0.03	0.04	3.07	3.4	3.74	0.24	Tumor	-6.70E+00	4.74E-08
ENSMUSG00000033998_Kcnk1	0.58	0.21	25.22	19.25	35.26	51.94	Tumor	-6.64E+00	1.86E-31
ENSMUSG00000028003_Lrat	0.1	0.07	9.3	11.07	7.24	1.16	Tumor	-6.62E+00	1.75E-13
ENSMUSG00000021281_Tnfaip2	0.39	0.26	29.91	27.5	30.48	26.02	Tumor	-6.61E+00	1.68E-90
ENSMUSG00000006219_Fblim1	0.63	0.69	35.64	44.88	54.91	47.74	Tumor	-6.49E+00	3.96E-87
ENSMUSG00000063296_Tmem117	0.09	0.01	2.59	4.34	3.07	3.82	Tumor	-6.45E+00	1.42E-17
ENSMUSG00000031803_B3gnt3	0.65	0.4	20.77	35.28	50.95	49.38	Tumor	-6.45E+00	5.22E-37
ENSMUSG00000037613_Tnfrsf23	0.4	0.78	26.14	38.43	49.5	86.32	Tumor	-6.42E+00	1.06E-25
ENSMUSG00000053797_Krt16	44.06	106.23	5784.32	6555.75	5711.7	4890.2	Tumor	-6.35E+00	3.55E-39
ENSMUSG00000024665_Fads2	0.26	0.2	11.99	15.82	16.18	18	Tumor	-6.25E+00	4.79E-38
ENSMUSG00000001497_Pax9	0.07	0.05	4.67	4.47	3.38	1.82	Tumor	-6.22E+00	1.63E-18
ENSMUSG00000058806_Col13a1	0.05	0.05	2.62	1.36	4.18	4.51	Tumor	-6.21E+00	7.61E-11
ENSMUSG00000021953_Tdh	0.11	0.42	18.02	22.12	11.57	8.83	Tumor	-6.20E+00	1.05E-15
ENSMUSG00000027420_Bfsp1	0.27	0.22	14.06	15.49	13.78	18.69	Tumor	-6.19E+00	2.96E-58
ENSMUSG00000012519_Mlkl	0.69	0.72	29.9	33.39	42.74	61.83	Tumor	-6.18E+00	2.69E-38
ENSMUSG00000095620_2010005H15Rik	0.7	0.22	24.51	48.23	40.35	50.9	Tumor	-6.16E+00	9.70E-17
ENSMUSG00000029581_Fscn1	3.23	3.92	237.15	259.47	293.27	209.74	Tumor	-6.14E+00	8.32E-97
ENSMUSG00000001473_Tubb6	4.17	4.98	239.51	267.42	290.65	354.22	Tumor	-6.13E+00	5.11E-86
ENSMUSG00000029669_Tspan12	0.15	0.11	5.65	6.07	5.97	9.78	Tumor	-6.00E+00	1.90E-29
ENSMUSG00000027533_Fabp5	95.95	142.19	9620.59	10412.9	7966.2	4739	Tumor	-5.99E+00	5.70E-39
ENSMUSG00000024331_Dsc2	1.19	1.45	67.63	82.49	71.34	50.23	Tumor	-5.99E+00	6.24E-62
ENSMUSG00000022468_Endou	1.16	2.24	78.9	82.41	98.61	128.95	Tumor	-5.97E+00	4.83E-39
ENSMUSG00000026437_Cdk18	0.18	0.5	12.59	11.98	12.88	12.12	Tumor	-5.96E+00	3.13E-65
ENSMUSG00000087659_Gm12606	0.15	0.16	4.65	6.83	7.57	13.8	Tumor	-5.91E+00	4.28E-12
ENSMUSG00000021614_Vcan	0.1	0.13	6.87	6.33	8.24	7.22	Tumor	-5.88E+00	2.64E-34
ENSMUSG00000050211_Pla2g4e	0.39	0.28	18.62	16.91	20.64	15.81	Tumor	-5.86E+00	1.03E-79
ENSMUSG00000041324_Inhba	0.12	0.11	6.45	6.35	5.92	6.07	Tumor	-5.85E+00	1.66E-23
ENSMUSG00000020676_Ccl11	0.31	0.23	23.53	22.37	9.33	0.53	Tumor	-5.83E+00	3.51E-03
ENSMUSG00000040663_Clcf1	1.26	1.03	50.21	32.09	55.78	78.36	Tumor	-5.80E+00	9.15E-43
ENSMUSG00000079330_Lemd1	0.08	0.04	1.08	3.01	4.28	5	Tumor	-5.79E+00	1.15E-11
ENSMUSG00000032537_Ephb1	0.09	0.06	3.3	3.65	4.28	2.89	Tumor	-5.77E+00	9.04E-30
ENSMUSG00000000693_Loxl3	0.07	0.06	2.02	2.24	3.34	1.55	Tumor	-5.72E+00	8.30E-12
ENSMUSG00000018604_Tbx3	0.28	0.02	2.39	3.44	1.08	0.2	Tumor	-5.69E+00	1.58E-05
ENSMUSG00000033581_Igf2bp2	1.04	0.99	40.55	48.17	48.4	48.94	Tumor	-5.69E+00	4.52E-101
ENSMUSG00000046402_Rbp1	1.58	1.97	80.89	106.08	79.08	53.54	Tumor	-5.67E+00	5.03E-42
ENSMUSG00000019987_Arg1	0.6	0.99	17.47	59.55	36.67	28.72	Tumor	-5.62E+00	2.04E-17
ENSMUSG00000009185_Ccl8	0.7	0.51	34.18	15.56	46.11	28.18	Tumor	-5.61E+00	1.84E-18
ENSMUSG00000037280_Galnt6	1.7	1.94	55.62	53.1	87.07	116.3	Tumor	-5.61E+00	1.50E-34
ENSMUSG00000090356_Teddm3	1.95	4.14	137.08	164.69	145.94	100.76	Tumor	-5.59E+00	7.18E-30
ENSMUSG00000014786_Slc9a5	0.11	0.15	6.09	4.87	5.14	5.74	Tumor	-5.59E+00	6.85E-47

ENSMUSG00000022218_Tgm1	0.58	0.87	30.24	30.65	33.85	28.4	Tumor	-5.57E+00	8.31E-57
ENSMUSG00000004885_Crabp2	6.75	12.62	405.96	495.52	437.87	415.13	Tumor	-5.56E+00	5.11E-39
ENSMUSG00000001506_Col1a1	1.51	1.29	63.49	66.29	84.58	8.5	Tumor	-5.56E+00	2.76E-05
ENSMUSG00000029304_Spp1	2.22	0.61	49.01	86.77	42.31	14.15	Tumor	-5.55E+00	4.22E-12
ENSMUSG00000028583_Pdpn	2.22	4.66	61.09	81.39	148.4	259.43	Tumor	-5.52E+00	1.34E-12
ENSMUSG00000015134_Aldh1a3	0.54	0.45	13.51	6.75	12.27	7.41	Tumor	-5.51E+00	2.37E-25
ENSMUSG00000029377_Ereg	0.09	0.3	5.32	4.94	8.48	13.81	Tumor	-5.51E+00	1.07E-13
ENSMUSG00000060568_Fam78b	0.31	0.17	11.6	11.5	7.29	17.18	Tumor	-5.50E+00	2.04E-27
ENSMUSG00000062991_Nrg1	0.7	0.89	17.5	25.21	28.65	58.41	Tumor	-5.50E+00	1.58E-19
ENSMUSG00000047810_Ccdc88b	0.16	0.13	7.24	4.41	5.15	5.29	Tumor	-5.48E+00	4.04E-36
ENSMUSG00000054793_Cadm4	1.31	0.64	26.24	22.43	45.45	51.23	Tumor	-5.45E+00	3.14E-25
ENSMUSG00000054905_Stfa3	22.21	34.69	1358.08	1749.86	1810.9	630.55	Tumor	-5.44E+00	5.43E-22
ENSMUSG00000042228_Lyn	0.73	0.5	5.47	5.94	8.07	13.89	Tumor	-5.36E+00	4.64E-20
ENSMUSG00000035783_Acta2	1.75	2.56	71.31	74.19	100.12	73.95	Tumor	-5.36E+00	3.30E-44
ENSMUSG00000039497_Dse	0.77	0.49	17.71	18.9	25.25	25.47	Tumor	-5.36E+00	2.84E-56
ENSMUSG00000026678_Rgs5	0.29	0.06	3.71	1.5	7.42	5.29	Tumor	-5.35E+00	1.31E-09
ENSMUSG00000027408_Cpxm1	0.36	0.3	15.13	15.55	20.76	0.95	Tumor	-5.35E+00	2.84E-06
ENSMUSG00000022440_C1qtnf6	0.11	0.22	3.4	3.38	9.05	2.11	Tumor	-5.35E+00	7.51E-12
ENSMUSG00000037161_Mgarp	0.44	0.79	15.55	27.7	22.71	20.8	Tumor	-5.32E+00	1.32E-23
ENSMUSG00000079451_Tmprss11g	1.06	0.77	34.05	42.43	27.39	7.42	Tumor	-5.30E+00	1.05E-12
ENSMUSG00000008398_Elk3	2.01	0.96	33.94	46.01	41.64	62.45	Tumor	-5.29E+00	1.81E-50
ENSMUSG00000021493_Pdlim7	2.27	1.73	72.24	89.33	94.7	85.56	Tumor	-5.27E+00	2.51E-76
ENSMUSG00000009418_Nav1	1.09	0.33	12.82	11.12	13.97	13.52	Tumor	-5.26E+00	8.69E-36
ENSMUSG00000052305_Hbb-bs	0.31	3.31	142.74	56.16	42.56	15.29	Tumor	-5.25E+00	6.70E-03
ENSMUSG00000069516_Lyz2	0.36	0.66	22.59	14.34	33.68	2.28	Tumor	-5.24E+00	2.07E-06
ENSMUSG00000029321_Slc10a6	0.24	0.26	8.91	10.77	7.25	5.48	Tumor	-5.18E+00	1.18E-21
ENSMUSG00000073489_Ifi204	0.98	0.36	13.68	14.08	10.99	23.02	Tumor	-5.18E+00	1.00E-22
ENSMUSG00000049511_Htr1b	0.36	0.13	6.31	6.75	6.19	10.43	Tumor	-5.17E+00	3.67E-27
ENSMUSG00000026725_Tnn	0.07	0.05	2.7	2.57	1.96	0.27	Tumor	-5.15E+00	1.92E-06
ENSMUSG00000032334_Loxl1	0.11	0.07	2.74	3.19	4.22	0.45	Tumor	-5.14E+00	2.40E-06
ENSMUSG00000039911_Spsb1	0.69	0.26	7.52	12.36	13.3	16.04	Tumor	-5.10E+00	9.01E-26
ENSMUSG00000024620_Pdgfrb	0.09	0.03	1.65	1.34	3.18	0.54	Tumor	-5.09E+00	5.58E-07
ENSMUSG00000026288_Inpp5d	0.64	0.14	3.7	0.96	6.46	6.2	Tumor	-5.09E+00	1.75E-08
ENSMUSG00000017897_Eya2	1.49	0.52	23.27	27.96	20.86	8.75	Tumor	-5.07E+00	1.82E-16
ENSMUSG00000045027_Prss22	0.34	1.73	19.53	21.56	36.88	56.71	Tumor	-5.07E+00	7.14E-09
ENSMUSG00000048826_Dact2	0.16	0.35	5.82	13.29	7.54	3.45	Tumor	-5.03E+00	3.19E-10
ENSMUSG00000032369_Plscr1	0.64	0.39	10.37	14.65	15.09	15.73	Tumor	-5.02E+00	4.01E-32
ENSMUSG00000054720_Lrrc8c	0.34	0.25	5.23	5.36	10.83	14	Tumor	-5.00E+00	2.76E-21
ENSMUSG00000029380_Cxcl1	2.08	3.15	53.07	44.09	79.41	80.18	Tumor	-4.95E+00	6.60E-24
ENSMUSG00000004891_Nes	0.2	0.04	1.97	1.62	2.78	2.71	Tumor	-4.95E+00	1.94E-07
ENSMUSG00000011632_Pinlyp	1.09	1.22	27.23	25.41	39.85	43.26	Tumor	-4.94E+00	2.75E-23

ENSMUSG00000024770_Lipn	0.24	0.2	8.43	6.88	8.2	6.87	Tumor	-4.94E+00	5.07E-22
ENSMUSG00000038642_Ctss	0.32	0.3	12.24	4.69	15.81	1.47	Tumor	-4.94E+00	1.45E-05
ENSMUSG00000021298_Gpr132	0.27	0.23	6.01	5.23	6.47	8.86	Tumor	-4.92E+00	3.14E-25
ENSMUSG00000017929_B4galt5	0.18	0.03	1.08	0.9	2.65	2.76	Tumor	-4.92E+00	2.19E-07
ENSMUSG00000053931_Cnn3	5.24	3.67	63.19	85.49	120.3	167.83	Tumor	-4.89E+00	1.40E-24
ENSMUSG00000032014_Oaf	1.79	2.28	39.45	51.24	49.89	75.51	Tumor	-4.89E+00	1.03E-31
ENSMUSG00000028128_F3	1.01	1.47	21.94	25.64	30.56	38.7	Tumor	-4.88E+00	7.75E-26
ENSMUSG00000008734_Gprc5b	1.25	0.7	25	26.3	26.97	16.53	Tumor	-4.86E+00	3.48E-34
ENSMUSG00000010760_Phlda2	0.92	1.33	34.39	20.01	41.3	31.79	Tumor	-4.85E+00	5.43E-22
ENSMUSG00000030256_Bhlhe41	0.3	0.22	6	12.65	4.89	2.82	Tumor	-4.83E+00	2.14E-10
ENSMUSG00000056515_Rab31	2.85	3.92	69.42	87.71	78.29	98.73	Tumor	-4.80E+00	8.71E-43
ENSMUSG00000051225_Fam83a	3	2.84	57.2	80.82	59.93	58.06	Tumor	-4.79E+00	4.25E-66
ENSMUSG00000028364_Tnc	2.12	1.96	33.68	40.28	70.67	47.46	Tumor	-4.78E+00	6.72E-27
ENSMUSG00000031375_Bgn	2.28	1.68	41.17	58.24	73.46	14.54	Tumor	-4.78E+00	1.87E-10
ENSMUSG00000004952_Rasa4	2.17	0.69	26.13	29.07	41.57	54.9	Tumor	-4.78E+00	1.09E-17
ENSMUSG00000064023_Klk8	11.52	12.97	224.07	274.01	288.54	433.53	Tumor	-4.78E+00	5.48E-31
ENSMUSG00000063651_Cnfn	2.1	2.62	69.94	47.16	61.56	80.28	Tumor	-4.76E+00	7.67E-27
ENSMUSG00000018417_Myo1b	3.26	2.31	38.96	43.28	50.79	67.14	Tumor	-4.76E+00	6.68E-46
ENSMUSG00000023000_Dhh	0.33	0.1	2.61	2.48	4.48	10.13	Tumor	-4.76E+00	4.45E-07
ENSMUSG00000076441_Ass1	17.26	17.84	275.55	379.99	475.69	543	Tumor	-4.74E+00	1.63E-31
ENSMUSG00000022180_Slc7a8	0.5	0.28	10.14	6.73	12.02	5.67	Tumor	-4.74E+00	5.10E-18
ENSMUSG00000035861_Tmprss11b	1.26	0.62	22.56	26.25	24.86	7.03	Tumor	-4.70E+00	1.10E-11
ENSMUSG00000029231_Pdgfra	0.06	0.04	0.97	0.96	2.18	0.84	Tumor	-4.68E+00	2.86E-09
ENSMUSG00000013846_St3gal1	0.47	0.51	11.01	12.45	11.12	8.7	Tumor	-4.68E+00	1.84E-40
ENSMUSG00000038059_Smim3	2.42	2.06	53.18	45.54	47.22	53.94	Tumor	-4.67E+00	5.05E-90
ENSMUSG00000024084_Qpct	0.3	0.21	3.6	5.26	4.52	9.1	Tumor	-4.66E+00	2.87E-12
ENSMUSG00000046733_Gprc5a	0.57	0.73	10.01	10.75	17.97	19.28	Tumor	-4.64E+00	4.52E-18
ENSMUSG00000026043_Col3a1	3.68	2.28	65.32	72.11	88.75	15.13	Tumor	-4.64E+00	3.50E-10
ENSMUSG00000040624_Plekhg1	0.36	0.18	3.99	3.95	4.11	7.42	Tumor	-4.63E+00	3.89E-25
ENSMUSG00000020723_Cacng4	0.29	0.26	3.86	3.79	2.52	3.57	Tumor	-4.62E+00	7.49E-21
ENSMUSG00000000732_Icosl	0.83	1.09	28	28.71	17.31	7.62	Tumor	-4.59E+00	1.22E-10
ENSMUSG00000040675_Mthfd1l	1.2	1.53	29.1	28.09	31.11	26.69	Tumor	-4.58E+00	6.51E-44
ENSMUSG00000037239_Spred3	0.52	0.26	5.98	4.81	7.18	9.43	Tumor	-4.58E+00	2.56E-19
ENSMUSG00000000126_Wnt9a	0.42	0.14	3.7	4.38	7.87	5.97	Tumor	-4.57E+00	1.57E-12
ENSMUSG00000027500_Stmn2	0.32	0.2	2.43	6.24	8.43	5.94	Tumor	-4.56E+00	8.02E-10
ENSMUSG00000025429_Pstpip2	0.5	0.74	11.35	13.57	13	15.29	Tumor	-4.55E+00	1.34E-24
ENSMUSG00000056481_Cd248	0.16	0.14	2.5	2.84	5.46	1.02	Tumor	-4.53E+00	3.68E-06
ENSMUSG00000075027_4631405J19Rik	0.24	0.23	5.41	7.44	1.91	1.3	Tumor	-4.52E+00	9.90E-05
ENSMUSG00000031097_Tnni2	0.67	0.78	17.51	14.49	13.02	18.68	Tumor	-4.51E+00	1.16E-18
ENSMUSG00000026837_Col5a1	0.52	0.24	7.23	9.43	11.21	1.77	Tumor	-4.50E+00	4.88E-07
ENSMUSG00000031659_Adcy7	0.85	0.54	8.22	9.96	14.19	20.94	Tumor	-4.50E+00	4.30E-18

ENSMUSG00000045362_Tnfrsf26	0.35	0.18	2.36	5.53	3.14	9.72	Tumor	-4.49E+00	3.55E-08
ENSMUSG00000040055_Gjb6	2.48	2.03	39.6	52.57	44.5	41.84	Tumor	-4.48E+00	1.31E-63
ENSMUSG00000040990_Sh3kbp1	1.93	1.55	38.84	44.3	55.36	80.61	Tumor	-4.45E+00	3.24E-25
ENSMUSG00000031372_Trex2	1.4	2.19	32.74	32.66	32.35	49.04	Tumor	-4.44E+00	3.30E-20
ENSMUSG00000025885_Myo5b	0.46	0.83	12.72	10.55	11.17	12.68	Tumor	-4.42E+00	8.49E-28
ENSMUSG00000032860_P2ry2	0.64	0.37	10.36	8.26	8.07	8.74	Tumor	-4.42E+00	3.75E-36
ENSMUSG00000046818_Ddit4l	0.24	0.13	2.28	5.81	4.94	6.93	Tumor	-4.41E+00	1.83E-09
ENSMUSG00000028111_Ctsk	0.28	0.36	6.86	7.46	9.24	0.98	Tumor	-4.41E+00	1.12E-04
ENSMUSG00000034205_Loxl2	0.26	0.09	2.61	2.88	4.75	1.59	Tumor	-4.40E+00	5.98E-09
ENSMUSG00000020674_Pxdn	1.81	1.02	20.39	22.5	28.86	14.56	Tumor	-4.40E+00	4.20E-22
ENSMUSG00000097636_5830416P10Rik	0.28	0.2	4.95	3.66	5.82	10.3	Tumor	-4.40E+00	9.98E-13
ENSMUSG00000041734_Kirrel	1.23	0.41	10.72	11.75	17.21	16.34	Tumor	-4.39E+00	4.77E-17
ENSMUSG00000031098_Syt8	3.88	3.09	49.8	57.44	57.98	69.06	Tumor	-4.38E+00	5.20E-30
ENSMUSG00000021185_9030617O03Rik	0.72	0.67	8.25	10.86	12.22	17.07	Tumor	-4.38E+00	4.62E-24
ENSMUSG00000027978_Prss12	1.65	1.99	27.43	34.59	39.85	28.97	Tumor	-4.35E+00	4.64E-30
ENSMUSG00000042215_Bag2	2.04	2.41	35.97	41.96	38.32	36.08	Tumor	-4.33E+00	2.60E-49
ENSMUSG00000038807_Rap1gap2	0.29	0.12	3.51	1.72	3.67	4.66	Tumor	-4.33E+00	2.17E-11
ENSMUSG00000055538_Zcchc24	0.59	0.36	6.41	6.83	8.06	11.26	Tumor	-4.32E+00	5.62E-25
ENSMUSG00000029762_Akr1b8	7.76	9.39	119.89	135.61	157.74	212.47	Tumor	-4.32E+00	2.08E-25
ENSMUSG00000020205_Phlda1	6.14	3.92	59.23	76.16	106.88	106.73	Tumor	-4.32E+00	9.39E-24
ENSMUSG00000058914_C1qtnf3	0.29	0.1	3.11	5.23	3.91	0.69	Tumor	-4.32E+00	1.38E-04
ENSMUSG00000030787_Lyve1	0.33	0.26	3.21	4.19	7.43	5.37	Tumor	-4.31E+00	2.77E-12
ENSMUSG00000000031_H19	1.16	1.46	25.16	30.28	12.39	10.45	Tumor	-4.31E+00	1.51E-10
ENSMUSG00000031616_Ednra	1.27	0.57	14.37	23.15	17.1	5.28	Tumor	-4.31E+00	1.08E-08
ENSMUSG00000052353_Cemip	0.16	0.19	1.84	1.68	3.06	2.76	Tumor	-4.31E+00	4.17E-14
ENSMUSG00000032766_Gng11	0.61	0.6	7.26	6.55	19.87	10.98	Tumor	-4.30E+00	5.59E-08
ENSMUSG00000029661_Col1a2	3.95	1.92	48.9	52.7	67.77	12.04	Tumor	-4.30E+00	1.90E-07
ENSMUSG00000020181_Nav3	0.12	0.09	0.7	0.94	1.14	3.79	Tumor	-4.29E+00	6.22E-05
ENSMUSG00000036053_Fmnl2	1.69	0.8	19.37	17.09	21.01	33.08	Tumor	-4.29E+00	1.43E-25
ENSMUSG00000005397_Nid1	0.58	0.26	7.17	6.22	8.95	4.31	Tumor	-4.28E+00	7.17E-15
ENSMUSG00000027134_Lpcat4	1.47	1.15	20.82	16.88	22.22	25.51	Tumor	-4.28E+00	3.16E-30
ENSMUSG00000044456_Rin3	0.49	0.38	6.2	6.64	6.41	5.08	Tumor	-4.27E+00	3.81E-25
ENSMUSG00000053158_Fes	0.43	0.19	4.33	3.43	6.14	6.22	Tumor	-4.25E+00	2.22E-13
ENSMUSG00000051022_Hs3st1	0.47	0.12	5.8	2.35	5.48	5.52	Tumor	-4.24E+00	1.74E-07
ENSMUSG00000040613_Apobec1	0.98	0.81	14.6	17.06	16.04	8.74	Tumor	-4.23E+00	2.20E-24
ENSMUSG00000056888_Glipr1	1.77	1.18	4.66	8.44	13.26	15.69	Tumor	-4.21E+00	1.29E-07
ENSMUSG00000025068_Gsto1	87.51	54.99	1346.23	1168.69	1004.9	909.24	Tumor	-4.16E+00	4.52E-43
ENSMUSG00000047443_Fam132b	0.15	0.26	2.68	3.56	4.4	3.46	Tumor	-4.16E+00	2.33E-13
ENSMUSG00000039747_Orai2	2.87	1.87	31.37	29.45	37.81	46.22	Tumor	-4.16E+00	1.53E-34
ENSMUSG00000097634_Gm26827	0.43	0.1	1.12	2.2	3.04	9.6	Tumor	-4.16E+00	1.60E-03
ENSMUSG00000032454_Rbp2	6.16	9.95	161.24	180.76	131.13	69.51	Tumor	-4.16E+00	1.09E-11

ENSMUSG00000021608_Lpcat1	2.43	1.7	29.92	23.79	28.07	29.79	Tumor	-4.15E+00	2.25E-56
ENSMUSG00000046731_Kctd11	3.27	3.83	39.26	68.98	50.88	61.16	Tumor	-4.14E+00	2.69E-25
ENSMUSG00000034394_Lif	0.46	0.53	6.3	6.65	7.92	9.25	Tumor	-4.13E+00	2.89E-37
ENSMUSG00000071547_Nt5dc2	15.68	17.35	264.43	281.12	223.9	278.43	Tumor	-4.13E+00	1.74E-45
ENSMUSG00000044338_Aplnr	0.33	0.16	2.64	1.95	4.73	3.93	Tumor	-4.13E+00	3.71E-06
ENSMUSG00000050530_Fam171a1	0.49	0.21	3.57	3.3	4.98	7.2	Tumor	-4.12E+00	1.98E-11
ENSMUSG00000028251_Tstd3	0.57	0.34	4.81	4.49	5.51	12.91	Tumor	-4.11E+00	1.60E-07
ENSMUSG00000025888_Casp1	4.86	4.16	55.57	80.01	61.14	78.17	Tumor	-4.10E+00	2.64E-34
ENSMUSG00000052180_Serpinb6c	0.32	0.44	5.65	6.7	6.71	4.71	Tumor	-4.07E+00	2.68E-12
ENSMUSG00000034675_Dbn1	0.4	0.24	2.32	3.53	6.66	4.84	Tumor	-4.07E+00	3.26E-08
ENSMUSG00000036523_Greb1	0.6	0.04	1.56	1.81	2.98	2.5	Tumor	-4.04E+00	2.16E-05
ENSMUSG00000038463_Olfml2b	0.19	0.17	1.83	1.62	3.17	3.72	Tumor	-4.03E+00	2.20E-08
ENSMUSG00000028464_Tpm2	27.19	42.32	444.36	495.4	525.24	689.13	Tumor	-4.02E+00	4.21E-20
ENSMUSG00000022048_Dpysl2	0.18	0.09	1.33	1.22	1.47	3.23	Tumor	-4.01E+00	2.69E-07
ENSMUSG00000030605_Mfge8	6.94	4.29	45.91	86.3	81.63	89.3	Tumor	-4.01E+00	2.48E-19
ENSMUSG00000027204_Fbn1	0.36	0.13	2.96	3.39	4.41	1.72	Tumor	-4.00E+00	4.91E-09
ENSMUSG00000025203_Scd2	11.57	9.05	149.55	161.19	120.58	129.26	Tumor	-3.99E+00	2.43E-55
ENSMUSG00000046794_Ppp1r3b	0.28	0.29	2.11	5.27	3.22	5.37	Tumor	-3.99E+00	3.03E-10
ENSMUSG00000072620_Slfn2	0.41	0.31	5.54	4.46	6.26	3.99	Tumor	-3.99E+00	7.11E-13
ENSMUSG00000056671_Prelid2	1.57	2.6	21.71	36.33	28.93	39.91	Tumor	-3.97E+00	3.23E-10
ENSMUSG00000027200_Sema6d	0.76	0.23	5.06	5.82	5.77	6.85	Tumor	-3.97E+00	1.46E-11
ENSMUSG00000029379_Cxcl3	0.09	0.19	96.28	58.3	62.25	31.08	Tumor	-3.97E+00	6.61E-08
ENSMUSG00000027858_Tspan2	0.29	0.27	2.18	3.19	4.27	4.21	Tumor	-3.96E+00	4.09E-13
ENSMUSG00000002068_Ccne1	1.48	1.91	23.53	17.25	25.23	28.44	Tumor	-3.95E+00	7.65E-21
ENSMUSG00000045838_A430105I19Rik	2.92	1.71	29.47	27.96	28.8	28.81	Tumor	-3.95E+00	4.29E-58
ENSMUSG00000015143_Actn1	27.47	20.16	275.05	307.41	343.89	341.31	Tumor	-3.95E+00	1.48E-59
ENSMUSG00000038400_Pmepa1	8.81	5.07	52.29	90.76	93.58	130.89	Tumor	-3.93E+00	1.22E-15
ENSMUSG00000030587_2200002D01Rik	3.41	4.56	45.46	53.64	81.25	112.73	Tumor	-3.92E+00	5.74E-11
ENSMUSG00000039934_Gsap	0.64	0.34	5	6.26	5.91	6.9	Tumor	-3.92E+00	5.36E-28
ENSMUSG00000028073_Pear1	0.68	0.24	3.57	2.74	6.96	7.41	Tumor	-3.92E+00	1.96E-07
ENSMUSG00000069919_Hba-a1	2.77	3.62	98.64	24	28.36	10.7	Tumor	-3.91E+00	1.57E-03
ENSMUSG00000068758_Il3ra	0.85	0.91	8.44	13.9	11.86	13.52	Tumor	-3.91E+00	4.57E-15
ENSMUSG00000038156_Spon1	0.14	0.08	1.26	1.62	2.33	0.43	Tumor	-3.90E+00	1.12E-04
ENSMUSG00000056069_Fam105a	0.22	0.23	3.48	2.26	3.67	2.24	Tumor	-3.90E+00	4.40E-10
ENSMUSG00000006519_Cyba	1.04	0.81	9.85	8.76	19.99	13.7	Tumor	-3.90E+00	6.95E-09
ENSMUSG00000030693_Klk10	11.63	11.03	159.6	138.78	166.24	139.1	Tumor	-3.89E+00	7.44E-55
ENSMUSG00000000555_Itga5	2.08	1.7	18.67	22.34	32.26	21.74	Tumor	-3.88E+00	2.04E-21
ENSMUSG00000035246_Pcyt1b	0.26	0.7	2.94	2.94	5.34	4.96	Tumor	-3.87E+00	1.55E-11
ENSMUSG00000003051_Elf3	1	1.18	15.59	17.12	18.17	6.34	Tumor	-3.87E+00	6.08E-09
ENSMUSG00000021556_Golm1	0.75	0.51	7.87	5.8	8.04	9.9	Tumor	-3.86E+00	8.48E-21
ENSMUSG00000028076_Cd1d1	0.95	0.3	5.89	7.59	6.54	4.39	Tumor	-3.86E+00	2.23E-08

ENSMUSG00000021070_Bdkrb2	0.38	0.4	4.37	5.57	4.43	5.8	Tumor	-3.86E+00	7.77E-14
ENSMUSG00000001985_Grik3	0.14	0.07	1.35	0.85	1.49	1.14	Tumor	-3.85E+00	1.52E-10
ENSMUSG00000002250_Ppard	11.71	10.59	137.74	144.79	125.77	140.81	Tumor	-3.84E+00	7.06E-55
ENSMUSG00000036446_Lum	0.42	0.3	5.48	4.86	6.83	0.42	Tumor	-3.83E+00	6.03E-03
ENSMUSG00000026822_Lcn2	0.48	0.85	14.69	7.69	13.5	1.06	Tumor	-3.83E+00	6.52E-03
ENSMUSG00000026509_Capn2	9.14	10.23	91.15	96.59	128.79	166.87	Tumor	-3.83E+00	8.41E-19
ENSMUSG00000022885_St6gal1	1.11	0.48	5.66	7.51	11.41	13.68	Tumor	-3.81E+00	1.68E-11
ENSMUSG00000040543_Pitpnm3	3.66	1.27	27.33	27.31	16.88	15.04	Tumor	-3.81E+00	2.07E-13
ENSMUSG00000072941_Sod3	0.14	0.18	1.69	2.23	3.28	0.52	Tumor	-3.80E+00	6.86E-04
ENSMUSG00000021591_Glrx	7.73	10.81	117.6	153.45	107.98	91.56	Tumor	-3.79E+00	1.65E-16
ENSMUSG00000031586_Rbpms	2.67	2.56	29.19	31.77	38.93	49.27	Tumor	-3.77E+00	8.44E-30
ENSMUSG00000034271_Jdp2	0.65	0.81	7.05	6.79	10.52	11.88	Tumor	-3.77E+00	3.00E-11
ENSMUSG00000029309_Sparcl1	4.06	2.3	36.79	31.48	43.18	33.1	Tumor	-3.76E+00	8.29E-24
ENSMUSG00000024621_Csf1r	0.12	0.2	2.54	1.04	3.24	0.51	Tumor	-3.76E+00	2.27E-03
ENSMUSG00000021263_Degs2	0.37	0.35	5.51	6.92	8.29	9.26	Tumor	-3.76E+00	1.18E-15
ENSMUSG00000035385_Ccl2	3.12	3.71	67.86	61.95	35.39	10.2	Tumor	-3.74E+00	1.35E-04
ENSMUSG00000029314_Agpat9	0.66	0.16	2.19	2.57	4.73	8.49	Tumor	-3.74E+00	5.41E-05
ENSMUSG00000028179_Cth	2.02	2.24	19.9	18.06	19.07	29.16	Tumor	-3.73E+00	6.45E-20
ENSMUSG00000034112_Atp2c2	1.36	1.48	18.54	18.7	16.62	11.95	Tumor	-3.73E+00	4.49E-19
ENSMUSG00000051439_Cd14	0.77	0.81	8.47	6.66	15.55	6.57	Tumor	-3.72E+00	8.05E-08
ENSMUSG00000028937_Acot7	3.64	4.8	34.33	34.93	59.04	70.83	Tumor	-3.69E+00	4.66E-10
ENSMUSG00000043004_Gng2	0.9	0.35	11.26	10.99	19.18	29.22	Tumor	-3.69E+00	2.84E-06
ENSMUSG00000021733_Slc4a7	1.59	1.1	17.06	13.15	13.39	14.76	Tumor	-3.69E+00	2.03E-36
ENSMUSG00000075284_Wipf1	0.31	0.12	1.95	2.41	3.38	1.66	Tumor	-3.69E+00	9.91E-08
ENSMUSG00000049580_Tsku	0.74	0.9	8.09	7.24	11.11	9.93	Tumor	-3.68E+00	7.87E-16
ENSMUSG00000090124_Ugt1a7c	1.89	1.11	13.8	17	13.49	3.69	Tumor	-3.67E+00	7.52E-06
ENSMUSG00000032643_Fhl3	3.34	4.92	51.54	50.2	44	47.71	Tumor	-3.67E+00	2.50E-20
ENSMUSG00000032038_St3gal4	3.46	4.24	35.26	46.38	41.68	51.62	Tumor	-3.66E+00	5.57E-22
ENSMUSG00000024909_Efemp2	1.75	1.1	13.52	19.07	16.54	15.28	Tumor	-3.66E+00	7.01E-17
ENSMUSG00000031827_Cotl1	47.72	49.22	426.7	445.2	564.61	737.44	Tumor	-3.66E+00	1.07E-19
ENSMUSG00000062937_Mtap	9.11	9.38	85.86	90.61	113.59	116.06	Tumor	-3.66E+00	3.42E-28
ENSMUSG00000024349_Tmem173	0.64	0.27	4.28	4.34	5.74	4.92	Tumor	-3.65E+00	8.75E-12
ENSMUSG00000025383_Il23a	0.56	1.08	9.34	8.03	9.99	10.81	Tumor	-3.64E+00	1.44E-10
ENSMUSG00000028444_Cntfr	0.76	5.98	25.01	18.2	18.29	5.92	Tumor	-3.64E+00	1.87E-04
ENSMUSG00000026042_Col5a2	1.64	0.58	8.29	9.46	16.93	8.67	Tumor	-3.64E+00	3.34E-08
ENSMUSG00000026656_Fcgr2b	0.38	0.34	6.5	2.39	9.24	2.59	Tumor	-3.63E+00	2.95E-04
ENSMUSG00000051343_Rab11fip5	3.82	3.51	26.88	35.94	39.36	41.97	Tumor	-3.63E+00	5.36E-28
ENSMUSG00000029999_Tgfa	5.23	3.68	26.73	35.02	34.69	61.65	Tumor	-3.62E+00	5.84E-14
ENSMUSG00000074813_Gm14005	1.51	1.46	13.49	17.2	19.32	21.68	Tumor	-3.61E+00	9.35E-08
ENSMUSG00000028463_Car9	1.83	3	13.19	24.8	19.26	30.33	Tumor	-3.60E+00	2.13E-06
ENSMUSG00000038578_Susd1	0.79	0.96	7.37	7.67	9.66	13.1	Tumor	-3.60E+00	2.35E-14

ENSMUSG00000038560_Sp6	0.44	0.86	6.67	6.42	8.53	6.56	Tumor	-3.59E+00	1.71E-10
ENSMUSG00000090958_Lrrc32	1.13	0.81	11.15	17	9.87	1.36	Tumor	-3.59E+00	2.67E-03
ENSMUSG00000025969_Nrp2	2.5	1.33	16.52	16.27	22.26	21.38	Tumor	-3.58E+00	8.26E-20
ENSMUSG00000029675_Eln	0.72	0.56	7.98	7.9	7.51	1.9	Tumor	-3.57E+00	2.32E-05
ENSMUSG00000010663_Fads1	1.33	0.93	10.12	12.04	12.93	10.74	Tumor	-3.57E+00	8.69E-27
ENSMUSG00000052105_Mtcl1	0.34	0.38	1.79	1.84	2.46	4.12	Tumor	-3.57E+00	1.03E-07
ENSMUSG00000030560_Ctsc	26.75	28.61	301.29	299.18	339.06	217.72	Tumor	-3.56E+00	1.50E-23
ENSMUSG00000038264_Sema7a	0.36	0.29	2.81	2.01	4.95	3.43	Tumor	-3.56E+00	2.35E-07
ENSMUSG00000024065_Ehd3	0.42	0.17	3.24	1.97	3.62	2.7	Tumor	-3.56E+00	4.06E-08
ENSMUSG00000004098_Col5a3	0.81	0.22	4.11	4.24	8.86	1.87	Tumor	-3.55E+00	5.36E-04
ENSMUSG00000041895_Wipi1	6.95	4.91	44.08	44.7	62.01	73.5	Tumor	-3.54E+00	1.02E-17
ENSMUSG00000055172_C1ra	0.87	0.42	7.42	7.72	7.52	2.25	Tumor	-3.53E+00	3.00E-05
ENSMUSG00000068335_Dok1	0.99	1.4	8.14	13	14.7	14.73	Tumor	-3.53E+00	1.83E-10
ENSMUSG00000032714_Syde1	0.6	0.44	4.24	4.21	5.89	6.32	Tumor	-3.53E+00	2.28E-14
ENSMUSG00000028613_Lrp8	1.07	0.9	10.77	6.57	8.56	11.04	Tumor	-3.52E+00	3.45E-16
ENSMUSG00000026207_Speg	2.42	1.93	11.98	10.62	13.89	26.57	Tumor	-3.52E+00	3.85E-13
ENSMUSG00000028664_Ephb2	0.71	1.31	11.03	12.05	13.08	14.37	Tumor	-3.51E+00	3.56E-20
ENSMUSG00000069917_Hba-a2	4.98	7.82	166.72	77.36	49.15	20.65	Tumor	-3.51E+00	1.02E-03
ENSMUSG00000030088_Aldh1l1	2.61	2.97	17.08	28.58	22.16	24.92	Tumor	-3.49E+00	1.57E-20
ENSMUSG00000018339_Gpx3	0.76	1	7.82	7.96	11.75	8.22	Tumor	-3.49E+00	6.18E-11
ENSMUSG00000031886_Ces2e	0.77	0.88	4.49	6.8	8.08	14.65	Tumor	-3.48E+00	3.09E-06
ENSMUSG00000074183_Gsta1	6.85	2.54	35.18	24.2	59.71	63.62	Tumor	-3.48E+00	3.52E-06
ENSMUSG00000024533_Spire1	0.92	0.41	5.89	6.54	6.05	6.54	Tumor	-3.48E+00	4.75E-18
ENSMUSG00000033530_Ttc7b	0.69	0.47	4.52	4.56	5.81	6.83	Tumor	-3.46E+00	4.41E-15
ENSMUSG00000058656_Samd12	1.89	1.06	8.27	11.17	14.09	14.58	Tumor	-3.45E+00	1.80E-09
ENSMUSG00000003617_Cp	0.45	0.4	3.48	12.5	4.3	2.48	Tumor	-3.43E+00	6.03E-03
ENSMUSG00000022587_Ly6e	147.97	193.54	1599.72	1623.16	1846	1931.7	Tumor	-3.43E+00	5.85E-19
ENSMUSG00000020649_Rrm2	8.21	14.19	112.9	87.83	101.5	126.74	Tumor	-3.41E+00	7.33E-12
ENSMUSG00000031877_Ces2g	12.67	9.67	102.9	124.67	89.12	90.86	Tumor	-3.40E+00	1.81E-28
ENSMUSG00000021559_Dapk1	1.23	0.94	9.06	8.85	10.09	10.29	Tumor	-3.38E+00	1.02E-33
ENSMUSG00000038155_Gstp2	1.87	0.76	11.74	12.11	10.69	15.25	Tumor	-3.38E+00	8.39E-08
ENSMUSG00000024451_Arap3	0.27	0.11	1.21	0.66	2.62	1.95	Tumor	-3.37E+00	1.16E-03
ENSMUSG00000040669_Phc1	0.91	0.5	6.95	7.77	5.98	4.83	Tumor	-3.37E+00	3.26E-12
ENSMUSG00000041287_Sox15	11.55	7.16	77.52	84.45	82.36	108.03	Tumor	-3.37E+00	4.91E-18
ENSMUSG00000027597_Ahcy	10.93	14.13	161.33	163.02	63.61	67.92	Tumor	-3.37E+00	4.85E-06
ENSMUSG00000021806_Nid2	0.42	0.13	2.08	1.27	3.85	1.94	Tumor	-3.36E+00	3.61E-04
ENSMUSG00000016526_Dyrk3	0.96	0.72	4.18	4.71	6.17	6.12	Tumor	-3.34E+00	4.96E-14
ENSMUSG00000068748_Ptprz1	7.48	3.91	47.16	36.51	43.23	57.16	Tumor	-3.34E+00	1.04E-17
ENSMUSG00000067780_Pi15	2.81	1.95	23.53	22.68	13.87	21.35	Tumor	-3.33E+00	2.64E-18
ENSMUSG00000032807_Alox12b	0.28	0.86	5.28	3.29	5.95	6.6	Tumor	-3.32E+00	1.41E-04
ENSMUSG00000015653_Steap2	1.32	1.05	11.24	10.01	13.23	13.5	Tumor	-3.32E+00	3.25E-25

ENSMUSG00000039153_Runx2	1.09	0.54	8.99	6.63	8.39	3.88	Tumor	-3.32E+00	2.55E-10
ENSMUSG00000021294_Kif26a	1.79	0.9	11.01	14.14	11.45	17.27	Tumor	-3.31E+00	9.62E-18
ENSMUSG00000022464_Slc38a4	5.24	3.23	32.96	32.55	53.46	57.57	Tumor	-3.31E+00	2.46E-11
ENSMUSG00000046179_E2f8	2.6	3.31	28.96	24.32	23.86	22.72	Tumor	-3.31E+00	1.57E-15
ENSMUSG00000031169_Porcn	10.86	6.4	72.4	66.18	80.21	65.27	Tumor	-3.31E+00	3.28E-25
ENSMUSG00000033256_Shf	7.49	5.52	51.87	77.34	56.1	61.84	Tumor	-3.29E+00	1.10E-18
ENSMUSG00000032902_Slc16a1	4	5.32	42.69	42.38	38.21	37.13	Tumor	-3.29E+00	5.95E-18
ENSMUSG00000026414_Tnnt2	8.54	3.06	41.63	58.59	73.61	126.76	Tumor	-3.29E+00	1.53E-05
ENSMUSG00000011034_Slc5a1	0.14	0.37	2.24	3.27	2.8	0.69	Tumor	-3.29E+00	7.06E-03
ENSMUSG00000022995_Enah	24.33	13.02	157.6	132.42	155.37	201.5	Tumor	-3.28E+00	3.09E-17
ENSMUSG00000024381_Bin1	2.14	1.8	10.41	13.54	19.46	24	Tumor	-3.27E+00	1.88E-08
ENSMUSG00000037860_Aim2	1.13	0.65	6.19	8.44	12.56	7.5	Tumor	-3.27E+00	8.21E-06
ENSMUSG00000033788_Dysf	0.39	0.09	2.8	1.69	5.14	2.72	Tumor	-3.27E+00	7.30E-04
ENSMUSG00000005413_Hmox1	3.18	4.12	20.22	29.7	36.92	43.41	Tumor	-3.27E+00	2.08E-08
ENSMUSG00000041737_Tmem45b	1.24	0.96	10.87	9.17	10.1	7.17	Tumor	-3.26E+00	9.53E-13
ENSMUSG00000032420_Nt5e	8.82	5.65	31.35	51.35	68.62	81.72	Tumor	-3.26E+00	2.29E-08
ENSMUSG00000028435_Aqp3	134.11	144.99	1240.49	1077.5	1189.4	1102.6	Tumor	-3.26E+00	2.01E-28
ENSMUSG00000057666_Gapdh	407.9	576.61	3317.14	2950.56	3608.7	2872.3	Tumor	-3.25E+00	1.63E-10
ENSMUSG00000034485_Uaca	2.52	2.42	15.13	14.47	21.53	29.57	Tumor	-3.23E+00	4.73E-10
ENSMUSG00000028581_Laptm5	0.47	0.35	3.66	1.97	5.16	1.09	Tumor	-3.23E+00	3.48E-02
ENSMUSG00000074063_Osgin1	2.12	2.18	18.12	16.12	21.84	18.45	Tumor	-3.23E+00	5.37E-22
ENSMUSG00000032192_Gnb5	1.92	1.84	16.37	14.82	16.73	15.62	Tumor	-3.22E+00	4.42E-21
ENSMUSG00000015766_Eps8	2.01	0.94	10.39	10.92	10.74	11.03	Tumor	-3.21E+00	3.74E-19
ENSMUSG00000038521_C1s1	2.55	1.12	24.26	14.61	14.74	8.94	Tumor	-3.21E+00	4.87E-07
ENSMUSG00000026669_Mcm10	1.09	2.2	17.18	13.09	11.03	11.28	Tumor	-3.21E+00	2.96E-07
ENSMUSG00000027201_Myef2	2.61	1.32	12.9	10.39	16.54	21.82	Tumor	-3.21E+00	1.34E-08
ENSMUSG00000045136_Tubb2b	3.02	4.32	21.35	31.91	34.76	32.97	Tumor	-3.19E+00	7.88E-10
ENSMUSG00000026271_Gpr35	2.12	1.16	5.57	10.75	4.75	8.84	Tumor	-3.19E+00	2.57E-08
ENSMUSG00000042688_Mapk6	39.58	31.68	254.78	221.64	257.74	249.12	Tumor	-3.17E+00	3.07E-45
ENSMUSG00000024691_Fam111a	3.27	3.75	30.03	29.95	23.69	27.58	Tumor	-3.17E+00	3.03E-20
ENSMUSG00000020303_Stc2	0.31	0.61	2.49	3.74	2.17	0.48	Tumor	-3.17E+00	1.25E-02
ENSMUSG00000020473_Aebp1	1.43	1.49	11.98	16.55	15.67	3.31	Tumor	-3.17E+00	1.52E-03
ENSMUSG00000027074_Slc43a3	0.38	0.38	3.13	1.47	5.13	3.14	Tumor	-3.16E+00	7.21E-04
ENSMUSG00000025020_Slit1	0.23	0.76	2.32	4.76	2.35	2.9	Tumor	-3.16E+00	2.16E-04
ENSMUSG00000078664_Sprr2a1	0.37	0.94	6.15	4.97	6.02	4.34	Tumor	-3.16E+00	2.27E-05
ENSMUSG00000028347_Tmeff1	1.41	0.82	9.45	8.46	10.83	10.9	Tumor	-3.16E+00	1.24E-13
ENSMUSG00000028587_Orc1	0.49	0.73	7.42	4.4	5.07	3.42	Tumor	-3.16E+00	3.33E-06
ENSMUSG00000032324_Tspan3	25.36	26.26	196.33	185.52	203.14	240.15	Tumor	-3.16E+00	2.46E-25
ENSMUSG00000049971_Glt1d1	3.55	0.2	10.95	12.55	9.51	14.98	Tumor	-3.16E+00	1.26E-02
ENSMUSG00000028337_Coro2a	1.68	1.54	11.09	10.2	10.16	13.17	Tumor	-3.16E+00	1.15E-25
ENSMUSG00000040430_Pitpnc1	2.2	1.42	11.31	8.01	11.5	11.04	Tumor	-3.15E+00	1.04E-16

ENSMUSG00000020774_Aspa	0.71	0.23	5.8	6.92	4.47	4.38	Tumor	-3.15E+00	1.33E-05
ENSMUSG00000068893_Sprr2a2	61.24	204.95	1192	1015.57	1613.6	1024	Tumor	-3.12E+00	1.37E-04
ENSMUSG00000032802_Srxn1	4.35	5.57	33.57	30.5	35.17	44.67	Tumor	-3.11E+00	1.73E-15
ENSMUSG00000023008_Fmnl3	1.12	1.28	8.1	8.83	8.56	6.85	Tumor	-3.09E+00	8.45E-11
ENSMUSG00000072674_Plac9b	4	6.99	20.64	48.27	28.58	43.54	Tumor	-3.09E+00	1.35E-04
ENSMUSG00000017861_Mybl2	2.73	4.2	22.68	23.55	15.9	13.16	Tumor	-3.09E+00	1.53E-06
ENSMUSG00000026814_Eng	1.8	0.93	9.31	5.88	17.52	5.82	Tumor	-3.08E+00	1.08E-03
ENSMUSG00000021262_Evl	2.19	2.55	13.1	17.42	18.12	22.22	Tumor	-3.08E+00	1.27E-10
ENSMUSG00000017697_Ada	2.81	2.73	16.8	15.88	22.86	27.7	Tumor	-3.07E+00	7.19E-10
ENSMUSG00000049939_Lrrc4	0.66	0.45	4.06	4.22	3.92	3.64	Tumor	-3.07E+00	3.96E-15
ENSMUSG00000032715_Trib3	1.55	2.28	13.23	17.08	14.41	13.62	Tumor	-3.07E+00	5.91E-10
ENSMUSG00000089762_Ier5l	1.6	1.93	13.06	10	16.31	12.05	Tumor	-3.05E+00	1.22E-09
ENSMUSG00000003271_Sult2b1	18.42	24.15	145.3	136.84	168.47	182.44	Tumor	-3.04E+00	9.16E-13
ENSMUSG00000025555_Farp1	1.75	1.12	8.83	10	11.47	8.62	Tumor	-3.03E+00	9.74E-15
ENSMUSG00000020866_Cacna1g	0.69	0.08	1.73	2.35	3.74	2.46	Tumor	-3.03E+00	2.15E-03
ENSMUSG00000074604_Mgst2	12.32	7.88	93.52	115.42	88.96	53.44	Tumor	-3.03E+00	2.05E-07
ENSMUSG00000005667_Mthfd2	1.93	4.07	20.04	21.27	21.06	18.64	Tumor	-3.03E+00	1.87E-06
ENSMUSG00000050359_Sprr1a	29.49	70.39	409.38	320.67	464.42	425.04	Tumor	-3.03E+00	5.84E-06
ENSMUSG00000034813_Grip1	2.13	0.94	11.71	12.42	9.93	9.33	Tumor	-3.03E+00	7.94E-11
ENSMUSG00000032041_Tirap	2.18	1.54	11.75	13.28	15.81	20.37	Tumor	-3.02E+00	2.23E-11
ENSMUSG00000034926_Dhcr24	13.93	18.35	120.91	108.26	126.43	105.42	Tumor	-3.02E+00	2.64E-13
ENSMUSG00000050108_Bpifc	2.03	2.17	15.21	16.88	15.85	11.28	Tumor	-3.01E+00	1.08E-11
ENSMUSG00000025271_Pfkfb1	2	1.06	6.51	6.97	7.09	15.15	Tumor	-3.00E+00	8.36E-04
ENSMUSG00000028980_H6pd	0.98	0.75	6.46	8.51	6.48	2.71	Tumor	-3.00E+00	5.53E-05
ENSMUSG00000037712_Fermt2	2.22	0.81	5.92	6.29	11.01	13.73	Tumor	-3.00E+00	8.35E-05
ENSMUSG00000022221_Ripk3	6	7.55	34.76	39.09	47.85	75.19	Tumor	-3.00E+00	6.54E-07
ENSMUSG00000054690_Emcn	1.37	0.47	6.85	3.68	10.93	5.52	Tumor	-3.00E+00	6.25E-03
ENSMUSG00000063524_Eno1	205.79	171.46	978.2	1786.35	1156.8	1235.9	Tumor	-2.99E+00	1.95E-14
ENSMUSG00000097928_Gm26578	0.29	0.41	1.56	1.6	2.55	4.21	Tumor	-2.99E+00	8.18E-04
ENSMUSG00000020900_Myh10	1.14	0.68	2.01	2.5	3.03	6.5	Tumor	-2.99E+00	1.26E-03
ENSMUSG00000023232_Serinc2	19.97	22.57	131.53	156.24	170.47	148.54	Tumor	-2.99E+00	3.50E-16
ENSMUSG00000037936_Scarb1	5.57	4.26	31.44	32.36	34.42	29.61	Tumor	-2.98E+00	1.22E-25
ENSMUSG00000018362_Kpna2	19.67	44.22	110.42	248.08	219.93	148.47	Tumor	-2.97E+00	1.90E-03
ENSMUSG00000073418_C4b	0.74	0.63	3.83	4.9	5.74	4.57	Tumor	-2.97E+00	4.07E-09
ENSMUSG00000001120_Pcbp3	2.47	2.23	13.67	19.05	13.24	15.92	Tumor	-2.97E+00	4.02E-14
ENSMUSG00000048895_Cdk5r1	0.32	0.29	2.35	2.94	2.14	0.88	Tumor	-2.97E+00	1.56E-03
ENSMUSG00000036902_Neto2	0.39	0.33	1.86	1.5	2.07	4.4	Tumor	-2.97E+00	2.79E-04
ENSMUSG00000042804_Gpr153	1.67	1.16	4.37	7.98	9.47	8.04	Tumor	-2.96E+00	7.72E-07
ENSMUSG00000010154_Spire2	1.2	0.44	4.65	5.22	5.08	6.43	Tumor	-2.96E+00	1.73E-06
ENSMUSG00000022575_Gsdmd	1.04	0.85	5.47	6.53	6.19	7.69	Tumor	-2.96E+00	1.67E-10
ENSMUSG00000087299_Gm12953	5.66	2.82	15.98	31.81	20.59	49.36	Tumor	-2.95E+00	2.20E-03

ENSMUSG00000024164_C3	1.12	1.31	5.16	12.85	7.45	2.91	Tumor	-2.94E+00	2.59E-03
ENSMUSG00000074445_Sprr2a3	6.86	23.34	92.69	81.36	132.87	132.98	Tumor	-2.94E+00	1.26E-03
ENSMUSG00000073002_Vamp5	2.92	2.41	20.13	26.73	27.82	20.71	Tumor	-2.93E+00	1.87E-08
ENSMUSG00000074743_Thbd	10.13	5.53	55.81	57.73	49.98	32.59	Tumor	-2.90E+00	3.08E-08
ENSMUSG00000025743_Sdc3	1.72	1.56	8.01	9.57	13.45	10.78	Tumor	-2.90E+00	1.03E-09
ENSMUSG00000024997_Prdx3	12.56	8.83	53.96	53.59	75.93	96.91	Tumor	-2.89E+00	1.23E-08
ENSMUSG00000021567_Nkd2	0.7	0.37	1.71	3.87	3.32	3.91	Tumor	-2.89E+00	1.70E-04
ENSMUSG00000028497_Hacd4	0.51	0.29	1.12	1.12	1.62	3.47	Tumor	-2.88E+00	4.12E-03
ENSMUSG00000073599_Ecscr	1.91	0.95	7.55	6.94	13.49	6.62	Tumor	-2.88E+00	5.03E-04
ENSMUSG00000018819_Lsp1	0.99	1.71	5.48	6.38	7.26	5.45	Tumor	-2.88E+00	7.69E-05
ENSMUSG00000097493_9930014A18Rik	0.65	0.47	4.34	2.47	3.48	2.74	Tumor	-2.88E+00	5.77E-06
ENSMUSG00000031434_Morc4	5.73	4.25	18.96	20.65	28.27	36.82	Tumor	-2.88E+00	4.48E-08
ENSMUSG00000024968_Rcor2	1.19	1.37	6.22	8.56	6.72	8.69	Tumor	-2.87E+00	2.02E-09
ENSMUSG00000028059_Arhgef2	4	3.04	22.28	19.86	27.05	21.61	Tumor	-2.86E+00	1.74E-15
ENSMUSG00000041625_Ggact	1.52	0.99	5.82	6.23	10.68	11.07	Tumor	-2.85E+00	2.99E-04
ENSMUSG00000020439_Smtn	19.35	15.67	96.96	125.18	92.82	81.04	Tumor	-2.85E+00	1.43E-14
ENSMUSG00000019539_Rcn3	1.3	0.8	4.24	4.6	7.94	5.67	Tumor	-2.85E+00	3.01E-04
ENSMUSG00000070348_Ccnd1	38.97	37.27	181.92	160.91	300.47	301.73	Tumor	-2.84E+00	2.79E-07
ENSMUSG00000033032_Afap1l1	6.89	4.57	23.3	26.62	43.69	43.63	Tumor	-2.84E+00	4.21E-07
ENSMUSG00000017499_Cdc6	0.85	1.36	8.77	6.89	7.64	5.18	Tumor	-2.83E+00	3.38E-05
ENSMUSG00000039748_Exo1	0.93	1.99	18.04	18.15	14.98	19.07	Tumor	-2.83E+00	1.29E-11
ENSMUSG00000056665_Them6	1.17	1.74	12.7	7.98	8.97	7.77	Tumor	-2.82E+00	8.90E-06
ENSMUSG00000028339_Col15a1	1.37	0.73	7.06	4.51	14.38	3.49	Tumor	-2.82E+00	6.78E-03
ENSMUSG00000037370_Enpp1	3.8	2.8	18.42	20.94	22.71	26.86	Tumor	-2.81E+00	1.45E-19
ENSMUSG00000023224_Serping1	2.38	1.32	9.37	9.01	18.07	7.83	Tumor	-2.81E+00	3.21E-04
ENSMUSG00000034773_BC030867	1.44	1.69	10.04	11.18	6.94	9.57	Tumor	-2.80E+00	3.01E-05
ENSMUSG00000022750_Klhl22	1.47	1.03	6.19	5	9.8	11.05	Tumor	-2.80E+00	1.95E-05
ENSMUSG00000087213_2810408I11Rik	1.15	1.92	12.69	8.49	9.99	17.58	Tumor	-2.79E+00	1.05E-03
ENSMUSG00000022451_Twf1	26.01	20.26	118.05	136.31	130.42	155.58	Tumor	-2.79E+00	4.34E-24
ENSMUSG00000045667_Smtnl2	1.11	1.17	6.32	7.32	5.04	4.8	Tumor	-2.79E+00	1.91E-09
ENSMUSG00000026921_Egfl7	6.71	2.79	29.32	17.26	46.52	24.54	Tumor	-2.77E+00	5.62E-04
ENSMUSG00000002900_Lamb1	9.08	4.9	26.93	35.58	52.46	47.57	Tumor	-2.76E+00	1.22E-05
ENSMUSG00000025161_Slc16a3	17.53	31.5	143.92	154.2	167.59	156.57	Tumor	-2.76E+00	1.84E-06
ENSMUSG00000031871_Cdh5	1.43	0.86	5.12	2.92	10.57	7.31	Tumor	-2.76E+00	3.74E-03
ENSMUSG00000038587_Akap12	0.36	0.12	1.22	0.56	2.3	1.12	Tumor	-2.75E+00	3.36E-02
ENSMUSG00000029832_Nfe2l3	2.05	2.17	8.1	12.77	15.46	12.56	Tumor	-2.75E+00	5.09E-06
ENSMUSG00000033684_Qsox1	10.6	9.51	45.64	53.97	70.48	66.9	Tumor	-2.74E+00	4.44E-10
ENSMUSG00000017724_Etv4	9.37	8.77	56.01	50.62	52.46	47.9	Tumor	-2.73E+00	1.66E-16
ENSMUSG00000062515_Fabp4	26.92	13.54	129.81	132.15	168.59	73.45	Tumor	-2.73E+00	2.80E-05
ENSMUSG00000037972_Snn	7.19	4.93	32.58	29.73	31.26	44.2	Tumor	-2.72E+00	6.05E-13
ENSMUSG00000096255_Dynlt1b	23.44	26.05	106.18	155.18	174	184.83	Tumor	-2.72E+00	1.49E-06

ENSMUSG00000021994_Wnt5a	12.76	6.91	54.03	49.69	64.53	54.82	Tumor	-2.71E+00	4.04E-10
ENSMUSG00000040875_Osbpl10	0.65	0.87	4.38	4.43	4.68	5.08	Tumor	-2.70E+00	8.87E-08
ENSMUSG00000020185_E2f7	10.14	6.09	13.42	14.29	12.98	16.46	Tumor	-2.70E+00	2.33E-24
ENSMUSG00000020256_Aldh1l2	1.38	0.94	5.03	4.53	3.95	2.2	Tumor	-2.69E+00	2.13E-04
ENSMUSG00000020015_Cdk17	3.26	2.54	13.96	15.4	15.77	19.16	Tumor	-2.69E+00	3.21E-16
ENSMUSG00000031910_Has3	8.15	5.08	30.78	29.96	30.88	38.5	Tumor	-2.69E+00	1.91E-22
ENSMUSG00000021676_Iqgap2	0.4	0.27	2.23	1.45	2.09	1.36	Tumor	-2.68E+00	7.49E-05
ENSMUSG00000056708_Ier5	6.24	7.58	39.22	40.8	38.32	37.91	Tumor	-2.68E+00	1.73E-12
ENSMUSG00000025810_Nrp1	0.62	0.36	2.51	1.66	3.98	2.28	Tumor	-2.68E+00	9.65E-04
ENSMUSG00000026880_Stom	36.83	49.85	245.39	299.17	253.59	189.07	Tumor	-2.68E+00	4.28E-07
ENSMUSG00000062070_Pgk1	130.89	166.2	760.13	812.51	938.93	883.79	Tumor	-2.67E+00	2.61E-10
ENSMUSG00000037035_Inhbb	3.02	2.73	18.06	25.47	12.57	6.18	Tumor	-2.66E+00	6.54E-03
ENSMUSG00000025887_Casp12	1.02	1.07	5.59	7.87	5.46	6.48	Tumor	-2.66E+00	5.57E-06
ENSMUSG00000043439_E130012A19Rik	2.46	3.5	21.54	15	17.72	13	Tumor	-2.66E+00	1.35E-05
ENSMUSG00000035095_Fam167a	13.35	12.46	48.36	69.13	62.75	102.26	Tumor	-2.65E+00	5.47E-07
ENSMUSG00000003500_Impdh1	5.62	7.74	42.17	42.81	35.21	21.43	Tumor	-2.65E+00	6.58E-05
ENSMUSG00000001918_Slc1a5	5.88	5.34	34.09	21.5	26.89	17.39	Tumor	-2.65E+00	9.12E-06
ENSMUSG00000031530_Dusp4	0.58	0.57	3.29	3.41	4.09	1.78	Tumor	-2.65E+00	1.54E-03
ENSMUSG00000046598_Bdh1	12.99	10.13	101.93	87.64	68.21	47.08	Tumor	-2.65E+00	8.55E-08
ENSMUSG00000019699_Akt3	1.01	0.6	2.57	3.65	4.59	5.66	Tumor	-2.65E+00	1.45E-05
ENSMUSG00000030770_Parva	8.58	7.87	40.51	55.2	68.07	83.42	Tumor	-2.64E+00	1.44E-07
ENSMUSG00000036745_Ttll7	2.02	1.64	5.29	5.54	9.35	11.39	Tumor	-2.64E+00	2.30E-04
ENSMUSG00000027799_Nbea	0.42	0.24	1.21	1.24	1.59	1.95	Tumor	-2.63E+00	1.12E-03
ENSMUSG00000032294_Pkm	309.16	460.21	1929.78	2218.11	2145.1	2281.9	Tumor	-2.63E+00	6.13E-08
ENSMUSG00000006517_Mvd	4.72	8.13	41.5	40.38	26.87	36.59	Tumor	-2.62E+00	4.78E-05
ENSMUSG00000023243_Kcnk5	0.44	0.57	3.65	3.15	2.61	1.46	Tumor	-2.62E+00	4.49E-03
ENSMUSG00000030353_Tead4	2.58	2.23	10.86	11.4	12.36	14.95	Tumor	-2.62E+00	4.29E-13
ENSMUSG00000033191_Tie1	1.17	0.76	3.4	2.69	7.22	4.69	Tumor	-2.61E+00	3.26E-03
ENSMUSG00000031207_Msn	54.69	55.86	247.34	269.14	318.86	303.81	Tumor	-2.61E+00	8.43E-13
ENSMUSG00000047205_Dusp18	0.45	0.26	1.1	1.15	2.08	2.56	Tumor	-2.61E+00	6.25E-03
ENSMUSG00000024277_Mapre2	2.87	3.73	17.51	12.37	19.52	22.38	Tumor	-2.61E+00	1.01E-05
ENSMUSG00000032373_Car12	42.84	43.41	207.91	233.02	236.96	139.52	Tumor	-2.60E+00	1.02E-06
ENSMUSG00000023830_Igf2r	4.41	2.96	18.68	18.39	21.87	14.47	Tumor	-2.60E+00	4.89E-09
ENSMUSG00000031584_Gsr	17.64	17.07	93.5	93.53	118.72	79.72	Tumor	-2.59E+00	2.86E-09
ENSMUSG00000027401_Tgm3	1.38	1.83	10.62	6.37	10.98	5.7	Tumor	-2.59E+00	8.40E-04
ENSMUSG00000023064_Sncg	13.18	5.15	29.4	32.84	59.94	73.73	Tumor	-2.58E+00	7.33E-03
ENSMUSG00000035455_Fignl1	1.97	2.35	13.84	10.12	9.81	11.44	Tumor	-2.58E+00	9.20E-08
ENSMUSG00000038872_Zfhx3	0.23	0.11	0.34	0.28	0.42	0.71	Tumor	-2.58E+00	9.73E-03
ENSMUSG00000001435_Col18a1	36.77	58.73	157.31	183.77	355.62	214.23	Tumor	-2.57E+00	1.81E-03
ENSMUSG00000068566_Myadm	19.47	21.37	78.48	86.75	126.9	138.1	Tumor	-2.57E+00	5.28E-06
ENSMUSG00000029718_Pcolce	3.17	1.24	7.32	9.05	13.38	6.53	Tumor	-2.56E+00	4.73E-03

ENSMUSG00000032997_Chpf	2.29	2.91	14.06	11.9	17.68	10.56	Tumor	-2.56E+00	4.96E-05
ENSMUSG00000078202_Nrarp	19.73	20.23	118.67	95.37	112.55	85.64	Tumor	-2.56E+00	1.11E-09
ENSMUSG00000039959_Hip1	3.93	1.26	5.38	6.79	7.72	11.5	Tumor	-2.55E+00	2.49E-04
ENSMUSG00000037419_Endod1	9.48	9.86	34.08	41.75	54.25	67.38	Tumor	-2.55E+00	6.79E-06
ENSMUSG00000070871_Ccnyl1	3.79	3.75	21.26	14.89	21.85	25.33	Tumor	-2.54E+00	6.80E-07
ENSMUSG00000022353_Mtss1	5.75	4.8	28.66	30.94	23.5	21.64	Tumor	-2.54E+00	2.70E-10
ENSMUSG00000055926_Gm14137	1.16	0.63	2.9	3.99	3.88	6.75	Tumor	-2.53E+00	1.49E-03
ENSMUSG00000032875_Arhgef17	1.56	0.93	6.09	6.31	6.32	4.95	Tumor	-2.52E+00	1.07E-08
ENSMUSG00000002274_Metrn	1.51	1.38	8.94	7.39	7.28	7.96	Tumor	-2.51E+00	2.32E-06
ENSMUSG00000003573_Homer3	20.22	14.5	62.67	71.76	79.46	94.57	Tumor	-2.51E+00	1.58E-08
ENSMUSG00000022952_Runx1	5.65	4.39	19.76	23.54	21.48	22.08	Tumor	-2.50E+00	1.22E-13
ENSMUSG00000036256_Igfbp7	43.06	39.41	177.49	112.3	288.41	273.76	Tumor	-2.50E+00	8.78E-04
ENSMUSG00000023036_Pcdhga8	5.72	11.74	53.13	53.48	49.23	35.53	Tumor	-2.49E+00	7.99E-04
ENSMUSG00000006369_Fbln1	9.32	8.89	50.79	59.57	52.54	25.66	Tumor	-2.49E+00	2.99E-04
ENSMUSG00000031400_G6pdx	20.59	21.6	102.39	108.41	98.6	94.97	Tumor	-2.49E+00	1.02E-12
ENSMUSG00000032436_Cmtm7	7.77	7.21	27.2	26.69	40.67	59.4	Tumor	-2.49E+00	1.20E-03
ENSMUSG00000028367_Txn1	152.63	146.23	744.82	833.9	766.43	713.37	Tumor	-2.48E+00	2.10E-14
ENSMUSG00000058013_Sept11	7.88	5.36	21.92	21.27	33.39	37.62	Tumor	-2.48E+00	1.44E-05
ENSMUSG00000074415_2610203C20Rik	5.16	2.16	20.3	14.53	13.29	23.86	Tumor	-2.48E+00	2.70E-04
ENSMUSG00000004748_Mtfp1	1.13	1.37	8.16	6.07	5.35	4.82	Tumor	-2.48E+00	4.37E-04
ENSMUSG00000025001_Hells	4.3	5.44	24.85	21.35	26.51	20.71	Tumor	-2.47E+00	5.36E-09
ENSMUSG00000072568_Fam84b	4.36	2.39	14.9	13.75	16.28	17.05	Tumor	-2.47E+00	2.38E-09
ENSMUSG00000020840_Blmh	37.7	41.75	203.18	249.88	174.93	153.3	Tumor	-2.47E+00	5.46E-07
ENSMUSG00000028885_Smpdl3b	1.66	1.83	9.67	9.43	9.06	6.05	Tumor	-2.47E+00	6.54E-05
ENSMUSG00000026980_Ly75	0.15	0.29	0.84	0.98	1.26	1.27	Tumor	-2.47E+00	7.43E-03
ENSMUSG00000035557_Krt17	402.82	694.38	2441.02	2727.1	2569.7	3453.6	Tumor	-2.47E+00	1.19E-04
ENSMUSG00000032020_Ubash3b	1.44	1.12	6.36	6.57	4.28	5.97	Tumor	-2.46E+00	2.49E-08
ENSMUSG00000008035_Mid1ip1	16.76	17.09	98.85	93.19	78.76	47.63	Tumor	-2.46E+00	8.55E-05
ENSMUSG00000033268_Duox1	5.32	4.68	25.76	27.47	26.2	13.99	Tumor	-2.45E+00	1.26E-04
ENSMUSG00000018171_Vmp1	30.47	30.87	189.57	175.22	177.87	252.28	Tumor	-2.45E+00	8.93E-09
ENSMUSG00000045629_Sh3tc2	1.75	0.77	5.18	7.63	5.89	3.96	Tumor	-2.44E+00	1.34E-03
ENSMUSG00000026623_Lpgat1	4.36	2.14	10.31	8.19	12.81	14.37	Tumor	-2.42E+00	5.56E-05
ENSMUSG00000046841_Ckap4	24.66	24.09	113.23	105.61	124.55	112.82	Tumor	-2.42E+00	4.60E-13
ENSMUSG00000038178_Slc43a2	2.84	3.85	18.81	18.46	14.39	8.53	Tumor	-2.41E+00	1.31E-02
ENSMUSG00000089715_Cbx6	3.32	2.66	18.49	7.17	12.9	11.23	Tumor	-2.41E+00	1.82E-03
ENSMUSG00000042225_Ammecr1	4.83	3.69	19.88	20.56	17.76	18.97	Tumor	-2.41E+00	2.80E-18
ENSMUSG00000051220_Ercc6l	1.32	1.7	7.04	6.74	5.78	8.58	Tumor	-2.40E+00	3.97E-06
ENSMUSG00000037095_Lrg1	2.81	1.21	8.27	5.55	16.28	6.63	Tumor	-2.40E+00	4.44E-02
ENSMUSG00000097971_Gm26917	25.3	17.76	181.29	71.11	92.46	47.7	Tumor	-2.40E+00	4.42E-02
ENSMUSG00000024556_Me2	3.33	4.84	17.26	16.43	18.68	25.16	Tumor	-2.40E+00	1.17E-04
ENSMUSG00000021186_Fbln5	0.42	0.23	1.41	1	2.18	0.99	Tumor	-2.39E+00	2.62E-02

ENSMUSG00000025511_Tspan4	4.22	3.84	18.23	15.24	20.34	12.86	Tumor	-2.38E+00	3.56E-05
ENSMUSG00000032717_Mdfi	16.06	9.66	47.87	50.19	59.98	77.03	Tumor	-2.38E+00	3.49E-06
ENSMUSG00000029552_Tes	14.43	12.69	36.05	52.79	67.36	95.71	Tumor	-2.38E+00	1.96E-03
ENSMUSG00000001025_S100a6	1325.51	1360.88	3515.04	5774.38	4874.5	8431.1	Tumor	-2.37E+00	3.43E-06
ENSMUSG00000054934_Kcnmb4	4	1.13	5.84	7.9	5.32	4.87	Tumor	-2.37E+00	3.36E-02
ENSMUSG00000024742_Fen1	7.71	11.16	46.83	40.98	38.48	47.11	Tumor	-2.37E+00	8.08E-06
ENSMUSG00000030867_Plk1	7.62	11.95	52.61	47.28	44.2	38.16	Tumor	-2.37E+00	1.49E-04
ENSMUSG00000054580_Pla2r1	1.03	0.28	1.51	1.76	1.54	3.52	Tumor	-2.36E+00	3.79E-05
ENSMUSG00000054459_Vsnl1	9.9	8.83	38.48	43.74	39.68	47.26	Tumor	-2.36E+00	1.07E-12
ENSMUSG00000073802_Cdkn2b	4.52	6.04	13.4	23.35	24.43	37.58	Tumor	-2.36E+00	1.36E-02
ENSMUSG00000067818_Myl9	3.17	1.87	10.07	10.5	17.79	10.16	Tumor	-2.35E+00	1.80E-03
ENSMUSG00000057706_Mex3b	0.76	0.41	1.8	3.37	2.58	2.25	Tumor	-2.34E+00	4.60E-03
ENSMUSG00000083773_Gm13394	636.22	946.1	2933.04	4516.59	3257.9	4369.3	Tumor	-2.34E+00	8.35E-04
ENSMUSG00000043613_Mmp3	5.72	9.87	23.45	25.68	46.45	49.12	Tumor	-2.34E+00	1.57E-02
ENSMUSG00000009585_Apobec3	11.96	10.16	14.16	58.57	15.07	51.92	Tumor	-2.34E+00	7.24E-03
ENSMUSG00000035769_Xylb	0.56	0.34	2.77	2.21	1.57	1.1	Tumor	-2.33E+00	2.74E-02
ENSMUSG00000031502_Col4a1	9.51	8.25	34.44	26.66	64.36	25.23	Tumor	-2.33E+00	1.37E-02
ENSMUSG00000021365_Nedd9	5	4.09	12.04	23.06	19.32	23.58	Tumor	-2.33E+00	1.30E-04
ENSMUSG00000067219_Nipal1	0.78	1.52	3.32	3.63	3.93	4.24	Tumor	-2.33E+00	2.18E-05
ENSMUSG00000052921_Arhgef15	1.9	0.67	4.3	5.15	4.7	5.53	Tumor	-2.32E+00	3.39E-03
ENSMUSG00000092074_Dynlt1a	6.75	12.13	47.27	50.7	40.01	47.22	Tumor	-2.32E+00	2.62E-03
ENSMUSG00000095677_Dynlt1f	23.15	21.94	121.58	98.98	108.44	96.77	Tumor	-2.32E+00	2.16E-13
ENSMUSG00000004446_Bid	2.23	2.21	9.99	9.97	10.37	10.47	Tumor	-2.32E+00	2.22E-08
ENSMUSG00000047945_Marcksl1	24.66	21.58	89.6	79.92	115.34	124.1	Tumor	-2.31E+00	1.36E-06
ENSMUSG00000019261_Map1s	1.35	1.12	4.4	3.89	7.11	5.72	Tumor	-2.31E+00	1.16E-03
ENSMUSG00000027171_Prrg4	6.95	6.03	21.56	19.33	36.4	40.49	Tumor	-2.30E+00	1.52E-03
ENSMUSG00000069920_B3gnt9	0.97	0.77	3.3	2.78	4.44	4.51	Tumor	-2.30E+00	1.59E-03
ENSMUSG00000029073_Cptp	5.76	4.81	13.69	21.44	18.22	36.76	Tumor	-2.30E+00	1.63E-05
ENSMUSG00000102700_Gm38312	49.79	36.79	235.14	144.47	205.64	161.63	Tumor	-2.30E+00	3.75E-06
ENSMUSG00000037601_Nme1	20.62	28.6	135.14	88.27	141.04	130.2	Tumor	-2.30E+00	1.21E-05
ENSMUSG00000042035_Igsf3	5.97	6.17	25.9	26.69	26	12.73	Tumor	-2.28E+00	3.06E-03
ENSMUSG00000024538_Ppic	29.98	27.64	87.94	91.94	148.47	175.57	Tumor	-2.28E+00	1.78E-03
ENSMUSG00000020253_Ppm1m	3.44	3.06	11.34	12.61	10.55	19.61	Tumor	-2.27E+00	2.73E-04
ENSMUSG00000023009_Nckap5l	1.58	1.13	6.83	7.01	7.27	7.16	Tumor	-2.27E+00	1.15E-04
ENSMUSG00000029392_Rilpl1	3.55	2.91	11.73	12.34	11.91	18.38	Tumor	-2.27E+00	2.94E-05
ENSMUSG00000030717_Nupr1	28.2	26.86	99.53	145.79	120.17	98.33	Tumor	-2.27E+00	9.41E-06
ENSMUSG00000030641_Ddias	1.63	1.97	6.66	6.81	6.83	10.44	Tumor	-2.27E+00	2.90E-04
ENSMUSG00000047963_Stbd1	0.88	0.92	2.19	4.52	4.86	3.77	Tumor	-2.27E+00	2.55E-02
ENSMUSG00000027379_Bub1	4.27	4.83	16.52	16.17	14.36	21.13	Tumor	-2.26E+00	6.85E-06
ENSMUSG00000029093_Sorcs2	5.72	6.08	20.63	26.2	30.74	17.5	Tumor	-2.25E+00	1.43E-03
ENSMUSG00000005410_Mcm5	10.36	20.2	76.98	73.14	57.99	53.84	Tumor	-2.25E+00	6.16E-03

ENSMUSG00000038366_Lasp1	27.02	26.38	89.52	90.14	130.36	135.25	Tumor	-2.25E+00	3.22E-05
ENSMUSG00000044005_Gls2	2.1	2.51	9.99	7.02	10.41	9.9	Tumor	-2.24E+00	2.30E-04
ENSMUSG00000091021_Gm17300	4.41	3.47	22.37	13.24	15.47	14.97	Tumor	-2.24E+00	1.17E-04
ENSMUSG00000039055_Eme1	1.21	1.55	6.99	6.73	5.03	5.21	Tumor	-2.23E+00	7.52E-04
ENSMUSG00000026305_Lrrfip1	21.49	16.28	54.2	54.8	73.2	86.07	Tumor	-2.23E+00	1.18E-05
ENSMUSG00000024579_Pcyox1l	3.18	1.71	13.44	9.06	8.13	6.18	Tumor	-2.23E+00	4.60E-03
ENSMUSG00000002997_Prkar2b	3.17	1.35	12.37	9.5	6.76	6.77	Tumor	-2.23E+00	9.71E-03
ENSMUSG00000040447_Spns2	0.92	0.83	3.39	2.25	6.05	4.46	Tumor	-2.23E+00	4.31E-02
ENSMUSG00000038843_Gcnt1	0.61	0.39	1.3	1.32	1.6	1.97	Tumor	-2.22E+00	2.14E-03
ENSMUSG00000029622_Arpc1b	110.63	108.2	441.84	465.72	475.75	526.59	Tumor	-2.22E+00	1.03E-07
ENSMUSG00000024056_Ndc80	2.86	3.69	14.77	14.94	11.27	13.6	Tumor	-2.22E+00	1.23E-04
ENSMUSG00000027224_Duoxa1	20.46	15.48	78.7	64.76	81.38	75.39	Tumor	-2.21E+00	1.50E-10
ENSMUSG00000028541_B4galt2	1.44	1.41	5.71	5.7	5.8	5.04	Tumor	-2.21E+00	7.50E-05
ENSMUSG00000021831_Ero1l	13.21	11.05	36.25	47.99	41.35	67.9	Tumor	-2.21E+00	8.78E-05
ENSMUSG00000040699_Limd2	2.95	2.25	19.32	21.94	21.09	13.77	Tumor	-2.21E+00	1.45E-04
ENSMUSG00000034919_Ttc22	2.72	3.23	12.74	12.76	12.24	10.29	Tumor	-2.20E+00	6.39E-05
ENSMUSG00000023345_Poc1a	4.23	4.54	16.4	19.53	14.26	18.56	Tumor	-2.20E+00	1.56E-04
ENSMUSG00000041313_Slc7a1	9.45	8.61	32.49	29.13	37.3	30.99	Tumor	-2.20E+00	6.95E-07
ENSMUSG00000041642_Kif21b	1.28	0.39	2.42	2.21	2.73	3.69	Tumor	-2.20E+00	2.23E-02
ENSMUSG00000032380_Dapk2	10.97	8.81	36.79	39.59	33.16	45.37	Tumor	-2.18E+00	5.18E-08
ENSMUSG00000063229_Ldha	382.2	575.25	1697.49	1985.24	1958.1	2276.8	Tumor	-2.18E+00	6.27E-04
ENSMUSG00000020108_Ddit4	63.25	59.52	218.24	238.89	296.46	234.23	Tumor	-2.18E+00	5.58E-07
ENSMUSG00000066877_Nck2	6.37	3.68	16.46	19.61	19.69	19.98	Tumor	-2.18E+00	5.83E-07
ENSMUSG00000060716_Plekhh1	0.43	0.36	1.37	1.23	1.86	1.6	Tumor	-2.17E+00	1.95E-03
ENSMUSG00000019889_Ptprk	3.38	2.03	9.17	9.15	11.28	11.11	Tumor	-2.17E+00	5.13E-06
ENSMUSG00000002835_Chaf1a	4.31	5.66	24.51	20.84	18.61	14.72	Tumor	-2.16E+00	2.26E-03
ENSMUSG00000052906_Ubxn8	3.67	3.48	12.55	13.99	14.36	14.65	Tumor	-2.16E+00	3.15E-08
ENSMUSG00000055407_Map6	8.86	6.58	18.38	21.86	33.47	43.82	Tumor	-2.16E+00	1.52E-02
ENSMUSG00000041859_Mcm3	14.29	21.18	89.32	76.56	65.32	52.37	Tumor	-2.16E+00	8.38E-03
ENSMUSG00000045319_Proser2	3.28	3.85	12.23	16.3	13.64	16.78	Tumor	-2.15E+00	5.42E-05
ENSMUSG00000000628_Hk2	6.98	6.03	26.79	32.23	24.13	26.8	Tumor	-2.15E+00	1.97E-04
ENSMUSG00000020089_Ppa1	26.44	37.71	121.81	106.99	135.25	157.65	Tumor	-2.15E+00	1.12E-03
ENSMUSG00000057789_Bak1	15.48	17.7	70.72	69.04	81.92	66.98	Tumor	-2.14E+00	7.42E-05
ENSMUSG00000015714_Cers2	17.4	15.23	63.33	49.39	65.91	67.55	Tumor	-2.14E+00	1.11E-06
ENSMUSG00000021604_Irx4	5.52	4.72	25.58	23.37	19.28	10.19	Tumor	-2.14E+00	2.31E-02
ENSMUSG00000003518_Dusp3	1.77	1.55	5.35	5.68	8.14	10.56	Tumor	-2.13E+00	2.11E-03
ENSMUSG00000024535_Snx24	1.96	1.42	4.64	4.99	7.81	9.47	Tumor	-2.13E+00	2.28E-02
ENSMUSG00000021868_Ppif	9.53	7.54	49.36	46.33	45.91	46.17	Tumor	-2.13E+00	5.79E-10
ENSMUSG00000022351_Sqle	24.55	30.5	133.29	109.34	110.21	96.03	Tumor	-2.12E+00	1.40E-04
ENSMUSG00000059895_Ptp4a3	6.38	8.11	19.94	23.31	28.57	39.31	Tumor	-2.12E+00	6.64E-03
ENSMUSG00000037852_Cpe	79.73	56.68	215.1	266.05	289.47	252.35	Tumor	-2.11E+00	6.02E-07

ENSMUSG00000038388_Mpp6	8.99	11.36	29.41	37.6	33.14	47.15	Tumor	-2.11E+00	1.01E-03
ENSMUSG00000028124_Gclm	16.2	15.5	80.11	102.78	53.21	47.78	Tumor	-2.10E+00	2.10E-02
ENSMUSG00000074796_Slc4a11	2.86	3.02	12.32	8.8	15.5	8.64	Tumor	-2.10E+00	7.38E-03
ENSMUSG00000035697_Hmha1	0.96	1.16	4.64	3.82	2.9	3.92	Tumor	-2.10E+00	3.24E-03
ENSMUSG00000006715_Gmnn	14.52	15.98	65.86	59.73	58.38	59.96	Tumor	-2.10E+00	1.99E-06
ENSMUSG00000006589_Aprt	86.59	100.32	310.46	298.32	385.52	513.87	Tumor	-2.10E+00	3.99E-03
ENSMUSG00000001794_Capns1	158.66	184.29	526.97	606.95	632.79	755.04	Tumor	-2.10E+00	1.34E-04
ENSMUSG00000041836_Ptpre	5.49	2.74	12.04	12.07	15.04	19.34	Tumor	-2.09E+00	2.69E-03
ENSMUSG00000024732_Ccdc86	7.26	6.76	29.07	25.23	26.8	24.5	Tumor	-2.09E+00	9.91E-08
ENSMUSG00000048612_Myof	26.23	19.89	71.42	77.58	90.68	91.68	Tumor	-2.08E+00	1.31E-07
ENSMUSG00000037465_Klf10	15.39	14.56	63.6	62.5	51.44	42.56	Tumor	-2.08E+00	1.58E-04
ENSMUSG00000038305_Spats2l	2.12	1.47	5.49	6.48	5.4	5.53	Tumor	-2.08E+00	1.65E-03
ENSMUSG00000006575_Rundc3a	1.3	1.22	4.56	5.43	4.5	5.36	Tumor	-2.08E+00	3.03E-04
ENSMUSG00000020869_Lrrc59	41.17	53.97	163.45	153.29	185.72	207.6	Tumor	-2.08E+00	5.14E-04
ENSMUSG00000027646_Src	17.05	15.53	48.78	55.37	68.13	64.59	Tumor	-2.07E+00	2.53E-05
ENSMUSG00000049532_Sall2	0.7	0.62	2.08	2.9	2.71	1.81	Tumor	-2.07E+00	9.39E-03
ENSMUSG00000003955_Fam162a	214.44	299.28	856.82	1219.92	933.53	1202.6	Tumor	-2.06E+00	1.59E-02
ENSMUSG00000032815_Fanca	6.98	4.97	17.57	16.03	9.42	12.2	Tumor	-2.06E+00	3.10E-03
ENSMUSG00000048007_Timm8a1	11.34	14.01	63.1	35.47	65.05	29.89	Tumor	-2.06E+00	4.41E-02
ENSMUSG00000051674_Dcun1d4	4.01	2.48	7.16	7.77	9.89	19.01	Tumor	-2.06E+00	4.74E-02
ENSMUSG00000029674_Limk1	6.04	5.92	18.16	16.87	19.93	32.33	Tumor	-2.06E+00	3.51E-03
ENSMUSG00000022322_Shcbp1	5.47	5.86	23.09	21.86	17.58	21.21	Tumor	-2.06E+00	2.94E-05
ENSMUSG00000020307_Cdc34	38.18	44.04	144.84	130.78	173.02	187.78	Tumor	-2.06E+00	3.78E-04
ENSMUSG00000028044_Cks1b	30.81	39.72	146.24	127.34	132.13	153.71	Tumor	-2.05E+00	3.24E-04
ENSMUSG00000028849_Map7d1	36.94	40.43	137.27	148.44	118.99	118.64	Tumor	-2.05E+00	1.97E-05
ENSMUSG00000021569_Trip13	3.04	3.33	12.47	10.97	10.58	12.14	Tumor	-2.05E+00	1.59E-05
ENSMUSG00000031365_Zfp275	1.26	0.72	2.96	2.61	3.18	5	Tumor	-2.05E+00	2.01E-03
ENSMUSG00000038034_Igsf8	50.91	56.69	178.91	203.35	201.66	195.49	Tumor	-2.05E+00	1.03E-05
ENSMUSG00000025792_Slc25a10	10.61	14.23	54.85	44.91	43.75	41.52	Tumor	-2.05E+00	1.41E-03
ENSMUSG00000006731_B4galnt1	18.29	23.92	82.78	88.84	77.78	59.12	Tumor	-2.04E+00	3.18E-03
ENSMUSG00000001228_Uhrf1	12.4	17.45	62.07	54.52	44.15	38.46	Tumor	-2.04E+00	2.11E-02
ENSMUSG00000021451_Sema4d	10.85	6.69	22.39	20.6	23.39	17.06	Tumor	-2.04E+00	1.49E-03
ENSMUSG00000032113_Chek1	2.63	2.98	10.83	10.14	8.7	11.09	Tumor	-2.03E+00	6.53E-04
ENSMUSG00000026994_Galnt3	14.53	10.65	26.89	27.42	36.13	67.19	Tumor	-2.03E+00	4.41E-02
ENSMUSG00000102918_Pcdhgc3	16.23	16.28	62.89	61.54	53.7	38.01	Tumor	-2.03E+00	2.84E-03
ENSMUSG00000014303_Glis2	2.06	1.81	3.55	5.1	5.9	6.27	Tumor	-2.03E+00	6.64E-03
ENSMUSG00000028573_Fggy	3.15	2.19	7.43	11.09	9.27	23.33	Tumor	-2.03E+00	3.53E-02
ENSMUSG00000015839_Nfe2l2	70.76	50.29	205.75	198.9	199.54	203.57	Tumor	-2.03E+00	1.60E-12
ENSMUSG00000027997_Casp6	20.49	12.88	53.09	66.58	52.6	69.57	Tumor	-2.03E+00	3.33E-06
ENSMUSG00000040078_Gm9769	15.6	8.75	46.04	40.17	43.43	66.46	Tumor	-2.02E+00	4.90E-02
ENSMUSG00000009097_Tbx1	8.03	3.33	24.01	20.39	19.04	15.04	Tumor	-2.02E+00	1.90E-02

ENSMUSG00000020733_Slc9a3r1	23.86	26.8	93.13	84.49	98.62	89	Tumor	-2.01E+00	2.15E-05
ENSMUSG00000021411_Pxdc1	25.81	23.98	73.04	93.6	77.14	103.74	Tumor	-2.01E+00	1.01E-04
ENSMUSG00000037278_Tmem97	12.6	20.1	65.29	54.97	57.55	66.24	Tumor	-2.01E+00	6.90E-03
ENSMUSG00000006782_Cnp	9.2	3	13.51	19.96	19.28	20.55	Tumor	-2.01E+00	4.36E-02
ENSMUSG00000057963_Itpk1	8.65	6.73	31.36	31.06	21.01	17.19	Tumor	-2.01E+00	1.08E-02
ENSMUSG00000014778_Fhod1	8.08	3.35	16.62	12.98	15.55	13.89	Tumor	-2.00E+00	6.02E-03
ENSMUSG00000019849_Prep	31.72	39.32	116.32	132.95	127.29	126.67	Tumor	-2.00E+00	1.73E-04
ENSMUSG00000035107_Dcbld2	11.87	6.37	9.26	7.45	7.28	12.18	Tumor	-2.00E+00	2.48E-03
ENSMUSG00000011752_Pgam1	168.32	244.35	658.34	737.93	768.18	822.01	Tumor	-2.00E+00	2.90E-03
ENSMUSG00000038633_Degs1	61.02	67.04	230.74	248.24	240.23	184.54	Tumor	-2.00E+00	2.88E-04
ENSMUSG00000051444_Bbs12	2.03	1.72	7.36	6.44	5.46	6.89	Tumor	-2.00E+00	2.02E-04
ENSMUSG00000026202_Tuba4a	206.19	229.22	617.83	765.53	622.46	981.87	Tumor	-1.99E+00	6.92E-04
ENSMUSG00000024140_Epas1	7.18	3.09	20.08	18.72	16.24	12.26	Tumor	-1.99E+00	2.35E-02
ENSMUSG00000016477_E2f3	2.36	2.39	9.2	6.36	7.1	5.47	Tumor	-1.99E+00	5.14E-06
ENSMUSG00000028961_Pgd	35.17	47.47	144.06	156.95	150.79	133.66	Tumor	-1.99E+00	1.35E-03
ENSMUSG00000033033_Calhm2	4.9	3.78	14.17	14.53	16.12	15.26	Tumor	-1.99E+00	7.55E-07
ENSMUSG00000028702_Rad54l	2.14	2.83	8.45	7.72	5.91	6.21	Tumor	-1.98E+00	1.84E-02
ENSMUSG00000023832_Acat2	14.14	17.81	58.13	62.34	43.19	58.44	Tumor	-1.98E+00	2.76E-03
ENSMUSG00000022378_Fam49b	21.2	17.82	61.04	52.89	75.74	87.13	Tumor	-1.98E+00	1.72E-03
ENSMUSG00000031628_Casp3	13.58	12.68	43.99	51.88	44.18	44.69	Tumor	-1.97E+00	7.25E-06
ENSMUSG00000039168_Dap	37.17	44.66	136.59	135.42	157.77	160.89	Tumor	-1.97E+00	3.25E-04
ENSMUSG00000032392_Parp16	2.28	1.91	6.6	8.18	6.97	6.77	Tumor	-1.97E+00	1.90E-04
ENSMUSG00000041438_Cirh1a	18.2	15.65	54.38	48.77	59.09	68.33	Tumor	-1.96E+00	2.02E-05
ENSMUSG00000073295_Nudt11	1.33	0.94	3.85	3.49	4.11	3.59	Tumor	-1.95E+00	1.32E-03
ENSMUSG00000024480_Ap3s1	10.03	7.59	20.98	26.25	31.47	41.98	Tumor	-1.95E+00	2.04E-02
ENSMUSG00000024587_Nars	51.69	48.43	184.8	167.25	173.84	150.68	Tumor	-1.95E+00	4.44E-06
ENSMUSG00000030528_Blm	2.25	2.27	8.75	7.28	6.88	7.35	Tumor	-1.95E+00	2.08E-04
ENSMUSG00000015335_Zdhhc12	4.59	4.06	14.25	12.53	19.24	15.36	Tumor	-1.95E+00	4.64E-03
ENSMUSG00000041782_Lad1	118.96	130.68	388.38	476.44	381.57	415.85	Tumor	-1.94E+00	5.72E-05
ENSMUSG00000030970_Ctbp2	13.34	10.72	35.49	38.19	39.89	40.59	Tumor	-1.94E+00	9.09E-08
ENSMUSG00000000296_Tpd52l1	2.76	2.41	8.53	8.92	8.36	9.87	Tumor	-1.94E+00	1.21E-03
ENSMUSG00000037594_BC022687	1.85	1.1	3.71	4.99	5.16	5.76	Tumor	-1.94E+00	2.35E-02
ENSMUSG00000023951_Vegfa	26.34	31.5	86.97	117.95	111.36	112.45	Tumor	-1.94E+00	3.05E-03
ENSMUSG00000028381_Ugcg	7.21	4.74	11.01	10.53	12.96	20.01	Tumor	-1.93E+00	2.16E-02
ENSMUSG00000042410_Agps	7.78	4.72	17.83	16.09	22.03	31.35	Tumor	-1.93E+00	5.71E-03
ENSMUSG00000033933_Vhl	4	4.03	9.54	14.22	10.65	13.51	Tumor	-1.93E+00	1.11E-03
ENSMUSG00000025105_Bnc1	13.52	9.84	39.49	38.48	37.6	35.07	Tumor	-1.92E+00	4.54E-07
ENSMUSG00000029428_Stx2	3.46	2.04	6.46	6.22	9.36	8.78	Tumor	-1.92E+00	3.76E-02
ENSMUSG00000034118_Tpst1	9.45	7.68	25.71	23.01	25.32	35.07	Tumor	-1.92E+00	4.95E-04
ENSMUSG00000022945_Chaf1b	6.37	8.14	30.32	24.92	23.71	19.37	Tumor	-1.92E+00	1.63E-02
ENSMUSG00000016664_Pacsin2	12.51	9.76	32.57	32.29	33.42	41.68	Tumor	-1.91E+00	1.96E-06

ENSMUSG00000074825_Itpripl1	4.7	4.63	16.59	14.9	16.42	13.99	Tumor	-1.91E+00	3.01E-05
ENSMUSG00000028212_Ccne2	2.21	2.72	9.41	8.65	11.16	10.44	Tumor	-1.90E+00	3.04E-03
ENSMUSG00000030530_Furin	26.84	26.92	89.97	91.38	94.72	72.81	Tumor	-1.90E+00	4.86E-04
ENSMUSG00000002459_Rgs20	2.62	3.26	10.24	12.5	9.02	12.73	Tumor	-1.90E+00	2.28E-02
ENSMUSG00000050271_D8Ertd82e	6.01	5.37	17.82	21.79	18.76	14.23	Tumor	-1.89E+00	2.49E-03
ENSMUSG00000027860_Vangl1	13.96	12.85	41.42	41.16	42.44	36.26	Tumor	-1.89E+00	1.36E-05
ENSMUSG00000057137_Tmem140	7.86	7.39	20.19	37.36	28.06	61.24	Tumor	-1.89E+00	4.06E-02
ENSMUSG00000021965_Ska3	2.97	3.7	11.29	11.24	9.03	12.56	Tumor	-1.89E+00	8.56E-03
ENSMUSG00000030254_Rad18	4.06	4.77	16.72	13.87	13.53	12.93	Tumor	-1.89E+00	7.19E-03
ENSMUSG00000025192_Entpd7	2.65	1.25	6.31	3.95	4.52	5.26	Tumor	-1.89E+00	1.03E-02
ENSMUSG00000029777_Gars	34.79	38.63	110.9	113.88	125.1	123.85	Tumor	-1.88E+00	2.76E-04
ENSMUSG00000062127_Cttnbp2nl	5.33	3.94	10.66	16.8	14.06	15.65	Tumor	-1.87E+00	2.29E-03
ENSMUSG00000028896_Rcc1	23.53	21	81.46	69.06	62.93	51.03	Tumor	-1.87E+00	5.42E-03
ENSMUSG00000021906_Oxnad1	5.21	3.76	11.97	12.05	10.01	12.32	Tumor	-1.87E+00	6.90E-04
ENSMUSG00000031617_Tmem184c	4.96	3.58	11.95	10.68	12.26	20.73	Tumor	-1.87E+00	4.00E-02
ENSMUSG00000035914_Cd276	10.44	11.72	29.54	31.86	42.2	36.68	Tumor	-1.85E+00	8.38E-03
ENSMUSG00000022098_Bmp1	23.73	21.65	58.38	59.27	91.89	72.09	Tumor	-1.85E+00	1.21E-02
ENSMUSG00000015880_Ncapg	6.67	8.01	19.59	18.34	15.29	22.38	Tumor	-1.84E+00	4.16E-03
ENSMUSG00000024590_Lmnb1	17.17	12.39	53.02	45.48	39.67	41	Tumor	-1.84E+00	1.52E-03
ENSMUSG00000027454_Gins1	6.45	7.1	24.73	19.89	18.95	21.17	Tumor	-1.84E+00	5.88E-03
ENSMUSG00000029560_Snx8	3.02	3.5	10.37	8.84	9.09	9.52	Tumor	-1.83E+00	4.21E-03
ENSMUSG00000035314_Gdpd5	2.71	1.75	6.42	7.04	8.37	5.03	Tumor	-1.83E+00	4.01E-02
ENSMUSG00000022673_Mcm4	18.25	17.62	64.39	53.76	52.32	51.37	Tumor	-1.83E+00	3.27E-04
ENSMUSG00000025791_Pgm2	12.79	16.1	35.24	45.51	44.81	58.21	Tumor	-1.83E+00	2.65E-02
ENSMUSG00000074916_Chst14	3.25	2.59	7.46	8.03	10.08	11.01	Tumor	-1.83E+00	1.09E-02
ENSMUSG00000070372_Capza1	42.63	35.03	94.48	111.05	107.52	157.35	Tumor	-1.82E+00	6.82E-03
ENSMUSG00000021036_Sptlc2	33.75	27.03	71.49	84	93.3	110.48	Tumor	-1.82E+00	4.62E-04
ENSMUSG00000023277_Twf2	6.36	5.7	16.12	15.64	16.89	22.05	Tumor	-1.82E+00	6.74E-03
ENSMUSG00000048440_Cyp4f16	9.54	5.35	14.01	15.66	17.94	24.18	Tumor	-1.82E+00	4.14E-02
ENSMUSG00000049764_Zfp280b	1.53	1.32	4.98	3.63	4.6	3.96	Tumor	-1.82E+00	1.02E-02
ENSMUSG00000051391_Ywhag	64.09	61.64	151.02	178.31	195.37	216.88	Tumor	-1.82E+00	5.01E-04
ENSMUSG00000044149_Nkrf	3.62	2.07	9.09	7.34	7.53	9.9	Tumor	-1.81E+00	9.65E-03
ENSMUSG00000031960_Aars	15.07	15.29	44.86	46.73	47.55	42.65	Tumor	-1.81E+00	6.46E-04
ENSMUSG00000029467_Atp2a2	58.67	45.9	170.47	144.09	175.54	118.79	Tumor	-1.81E+00	4.72E-03
ENSMUSG00000031490_Eif4ebp1	36.03	46.09	118.76	137.93	141.96	138.62	Tumor	-1.80E+00	1.41E-02
ENSMUSG00000037313_Tacc3	19.53	25.07	77.07	77.25	65.08	69.82	Tumor	-1.80E+00	1.19E-02
ENSMUSG00000006442_Srm	42.68	48.04	148.01	130.29	136.59	146.89	Tumor	-1.79E+00	1.52E-03
ENSMUSG00000024299_Adamts10	1.35	1.5	3.37	4.75	4.7	5.3	Tumor	-1.79E+00	2.97E-02
ENSMUSG00000061024_Rrs1	21.3	16.68	71.02	52.5	56.22	49.64	Tumor	-1.79E+00	2.58E-03
ENSMUSG00000030980_Knop1	11.43	9.72	34.61	35.17	34.65	32.76	Tumor	-1.79E+00	1.52E-05
ENSMUSG00000004451_Ralb	16.2	22.72	50.67	58.85	59.54	65.92	Tumor	-1.79E+00	2.66E-02

ENSMUSG00000051236_Msrb3	2.15	1.96	4.68	7.27	5.26	6.55	Tumor	-1.79E+00	1.17E-02
ENSMUSG00000007891_Ctsd	193.31	248.6	562.66	769.45	662.19	667.62	Tumor	-1.78E+00	1.62E-02
ENSMUSG00000025980_Hspd1	107.71	107.98	322.35	273.88	303.53	368.77	Tumor	-1.78E+00	1.08E-03
ENSMUSG00000025034_Trim8	17.68	14.36	48.01	52.89	45.89	43.02	Tumor	-1.78E+00	8.85E-05
ENSMUSG00000039693_Msantd3	6.29	6.39	20.52	18.32	18.79	19.9	Tumor	-1.78E+00	8.45E-04
ENSMUSG00000039323_Igfbp2	10.99	10.26	40.11	36.74	28.7	26.3	Tumor	-1.78E+00	2.50E-02
ENSMUSG00000055760_Gemin6	7.25	7.73	23.62	21.54	21.79	23.69	Tumor	-1.77E+00	3.25E-03
ENSMUSG00000015944_Gatsl2	2.43	2.28	4.53	4.19	4.7	5.89	Tumor	-1.77E+00	1.82E-03
ENSMUSG00000069793_Slfn9	4.54	4.47	20.03	11.2	11.58	14.9	Tumor	-1.77E+00	4.85E-02
ENSMUSG00000029381_Shroom3	4.56	2.05	11.87	19.59	12.95	27.06	Tumor	-1.76E+00	3.64E-03
ENSMUSG00000001175_Calm1	152.75	147.97	333.4	417.46	371.11	692.91	Tumor	-1.76E+00	1.33E-02
ENSMUSG00000028680_Plk3	8.02	7.24	23.57	18.56	27.08	19.88	Tumor	-1.76E+00	2.06E-02
ENSMUSG00000017386_Traf4	7.82	9.86	23.32	24.08	34.06	26.88	Tumor	-1.76E+00	4.85E-02
ENSMUSG00000019960_Dusp6	33.96	34.29	89	125.38	88.43	101.85	Tumor	-1.76E+00	7.42E-03
ENSMUSG00000038279_Nop2	25.71	28.65	94.74	74.43	80.83	77.56	Tumor	-1.76E+00	5.76E-03
ENSMUSG00000051235_Gen1	1.41	1.23	4.36	3.64	3	4.44	Tumor	-1.75E+00	3.37E-02
ENSMUSG00000032400_Zwilch	7.32	8.41	25.79	22.56	18.98	23.19	Tumor	-1.75E+00	1.61E-02
ENSMUSG00000003865_Gys1	12.11	12.16	23.74	37.26	27.98	30.88	Tumor	-1.74E+00	2.91E-02
ENSMUSG00000023022_Lima1	44.54	42.4	110.84	130.93	129.88	121.32	Tumor	-1.74E+00	6.64E-04
ENSMUSG00000028633_Ctps	18.87	21.2	55.93	48.78	58.44	66.09	Tumor	-1.74E+00	8.34E-03
ENSMUSG00000031924_Cyb5b	25.87	26.29	71.73	68.75	72.14	89.41	Tumor	-1.74E+00	1.72E-03
ENSMUSG00000092203_1110038B12Rik	57.88	60.06	233.88	182.85	227.42	155.09	Tumor	-1.74E+00	1.04E-03
ENSMUSG00000037104_Socs5	7.99	6.23	19.04	23.22	17.47	20.99	Tumor	-1.73E+00	4.75E-04
ENSMUSG00000002297_Dbf4	13.04	11.09	32.5	30.3	28.58	38.81	Tumor	-1.72E+00	1.60E-03
ENSMUSG00000024952_Rps6ka4	37.66	44.22	135.87	119.72	117.05	101.96	Tumor	-1.72E+00	2.19E-02
ENSMUSG00000038335_Tsr1	17.31	15.22	49.26	41.45	47.66	45.97	Tumor	-1.72E+00	2.85E-04
ENSMUSG00000049091_Sephs2	9.52	11.43	33.55	32.8	30.35	28.42	Tumor	-1.71E+00	2.22E-02
ENSMUSG00000006273_Atp6v1b2	38.3	33.46	81.29	101.82	99.25	84.89	Tumor	-1.71E+00	5.10E-03
ENSMUSG00000025533_Asl	14.59	13.4	31.08	36.45	30.67	46.11	Tumor	-1.70E+00	6.86E-03
ENSMUSG00000030748_Il4ra	23.04	21.55	60.48	73.19	61.12	54.91	Tumor	-1.70E+00	4.68E-03
ENSMUSG00000048351_Coa7	4.34	4.29	22.34	17.63	20.42	20.69	Tumor	-1.70E+00	1.85E-02
ENSMUSG00000057440_Mpp7	8.38	8.49	23.55	24.58	22.24	24.62	Tumor	-1.70E+00	5.79E-04
ENSMUSG00000037466_4930427A07Rik	4.31	4.45	14.7	10.94	11.71	10.96	Tumor	-1.70E+00	2.76E-03
ENSMUSG00000044813_Shb	11.92	10.57	24.81	37.83	30.77	28.8	Tumor	-1.70E+00	1.87E-02
ENSMUSG00000038267_Slc22a23	5.79	3.93	10.85	12.54	13.4	13.03	Tumor	-1.69E+00	1.51E-03
ENSMUSG00000022594_Lynx1	3.12	2.74	6.92	8.41	7.46	9.53	Tumor	-1.69E+00	1.32E-02
ENSMUSG00000029196_Tada2b	5.44	4.4	14.96	12.48	14.23	10.56	Tumor	-1.69E+00	3.21E-02
ENSMUSG00000043067_Dpy19l1	6.24	3.9	12.66	10.68	12.37	15.85	Tumor	-1.69E+00	2.65E-02
ENSMUSG00000069662_Marcks	17.36	13.37	43.46	46.44	40.17	37.99	Tumor	-1.68E+00	1.12E-03
ENSMUSG00000067367_Lyar	25.52	22.49	89.68	63.04	70.57	70.11	Tumor	-1.67E+00	7.27E-03
ENSMUSG00000057469_E2f6	5.89	6.02	16.09	14.75	15.2	20.81	Tumor	-1.67E+00	3.03E-02

ENSMUSG00000024989_Cep55	6.94	8.01	21.8	22.81	16.62	21.88	Tumor	-1.66E+00	4.50E-02
ENSMUSG00000029063_Nadk	55.96	54.44	135.56	150.17	146.41	181.92	Tumor	-1.66E+00	1.85E-03
ENSMUSG00000028614_Ndc1	5.36	5.79	16.17	15.34	13.45	16.04	Tumor	-1.65E+00	1.59E-02
ENSMUSG00000029860_Zyx	29.29	24.54	63.98	69.99	86.52	77.29	Tumor	-1.65E+00	8.47E-03
ENSMUSG00000049922_Slc35c1	5.95	6.68	20.05	16.69	17.33	16.65	Tumor	-1.64E+00	4.79E-02
ENSMUSG00000053801_Grwd1	17.16	20.7	56.49	49.42	53.5	51.66	Tumor	-1.64E+00	2.56E-02
ENSMUSG00000000378_Ccm2	13.23	12.22	30.73	31.47	32.53	37.71	Tumor	-1.63E+00	8.08E-03
ENSMUSG00000016382_Pls3	76.75	73.48	166.19	185.62	195.69	243.2	Tumor	-1.63E+00	1.96E-02
ENSMUSG00000042487_Leo1	14.1	11.35	35.1	36.39	31.35	34.46	Tumor	-1.63E+00	5.16E-04
ENSMUSG00000057497_Fam136a	12.44	14.73	35.98	35.1	37.43	42.86	Tumor	-1.63E+00	4.62E-02
ENSMUSG00000021707_Dhfr	2.01	2.29	6.1	6.07	5.1	5.78	Tumor	-1.62E+00	4.49E-02
ENSMUSG00000003868_Ruvbl2	30.38	35.34	95.4	92.48	84.31	92.52	Tumor	-1.62E+00	1.85E-02
ENSMUSG00000037851_Iars	23.38	19.5	54.46	50.45	53.27	48.81	Tumor	-1.62E+00	3.57E-04
ENSMUSG00000029482_Aacs	21.58	21.31	55.03	54.15	44.23	43.87	Tumor	-1.61E+00	2.77E-02
ENSMUSG00000057113_Npm1	680.68	538.12	1284.37	1427.26	1344.5	1947.2	Tumor	-1.61E+00	7.17E-03
ENSMUSG00000010755_Cars	28.06	23.14	51.28	58.92	58.63	63.77	Tumor	-1.61E+00	6.37E-03
ENSMUSG00000085241_Snhg3	32.08	32.1	147.78	72.61	123.05	86.54	Tumor	-1.60E+00	4.34E-02
ENSMUSG00000036678_Aaas	17.36	18.81	45.89	46	45.23	57.88	Tumor	-1.59E+00	4.62E-02
ENSMUSG00000016756_Cmah	7.82	4.66	16.64	14.74	14.45	16.74	Tumor	-1.59E+00	2.23E-02
ENSMUSG00000025950_Idh1	32.84	25.6	71.61	73.28	79.99	81.07	Tumor	-1.59E+00	1.12E-03
ENSMUSG00000074305_Peak1	5.01	4.24	11.1	10.72	9.91	12.69	Tumor	-1.59E+00	7.78E-03
ENSMUSG00000008305_Tle1	10.05	7.26	21.06	27.49	21.56	22	Tumor	-1.58E+00	3.22E-02
ENSMUSG00000041570_Camsap2	23.07	15.63	50.11	46.4	49.77	56.58	Tumor	-1.57E+00	1.29E-02
ENSMUSG00000058799_Nap1l1	95.73	96.46	240.64	242.19	234.06	284.32	Tumor	-1.57E+00	1.11E-02
ENSMUSG00000021116_Eif2s1	30.09	30.74	69.47	73.16	75.76	93.89	Tumor	-1.55E+00	4.61E-02
ENSMUSG00000021996_Esd	174.4	171.52	483.92	458.19	493.83	443.05	Tumor	-1.55E+00	1.40E-02
ENSMUSG00000027531_Impa1	24.08	17.65	45.55	49.51	46.49	68.78	Tumor	-1.55E+00	4.33E-02
ENSMUSG00000024937_Ehbp1l1	9.7	8.55	21.91	23.08	24.24	29.87	Tumor	-1.55E+00	1.86E-02
ENSMUSG00000033356_Pus7l	3.67	3.01	8.82	8.65	8	7.88	Tumor	-1.55E+00	2.66E-02
ENSMUSG00000031633_Slc25a4	76.64	72.6	162.54	192.46	187.02	211.85	Tumor	-1.55E+00	1.86E-02
ENSMUSG00000007476_Lrrc8a	7.17	6.13	16.29	17.18	15.91	17.3	Tumor	-1.55E+00	1.41E-03
ENSMUSG00000041351_Rap1gap	10.16	8.3	23.73	23.46	22.73	23.47	Tumor	-1.54E+00	6.51E-03
ENSMUSG00000069910_Spdl1	5.22	5.47	12.06	11.21	10.29	12.3	Tumor	-1.54E+00	4.04E-02
ENSMUSG00000021067_Sav1	24.67	16.11	48.15	54.18	47.48	52.61	Tumor	-1.53E+00	1.64E-02
ENSMUSG00000069094_Pde7a	17.37	13.11	24.33	27.11	29.01	35.88	Tumor	-1.53E+00	1.43E-02
ENSMUSG00000021474_Sfxn1	14.05	14.21	35.33	34.04	33.91	39.13	Tumor	-1.52E+00	2.57E-02
ENSMUSG00000014859_E2f4	37.8	31.83	96.69	91.39	81.97	80.75	Tumor	-1.52E+00	1.41E-02
ENSMUSG00000059456_Ptk2b	26.62	22.19	52.46	67.65	59.12	65.84	Tumor	-1.52E+00	1.52E-02
ENSMUSG00000021595_Nsun2	66.77	56.48	136.89	136.03	132.25	132.4	Tumor	-1.44E+00	2.19E-02
ENSMUSG00000062203_Gspt1	69.42	58.7	146.17	135.16	143.81	152.8	Tumor	-1.44E+00	2.20E-02
ENSMUSG00000081604_Gm11518	129.53	165.16	0	0	0	0	Normal	1.34E+01	1.77E-28

ENSMUSG00000063696_Gm8730	211.64	0.29	0.48	0.4	0.33	0	Normal	8.19E+00	1.28E-02
ENSMUSG00000026628_Atf3	1437.54	1902.01	7.64	1.46	8.75	4.71	Normal	8.07E+00	3.57E-33
ENSMUSG00000028341_Nr4a3	56.66	27.29	0.19	0.07	0.1	0.04	Normal	7.92E+00	3.31E-38
ENSMUSG00000097925_Gm26574	17.04	6.63	0.12	0.04	0.04	0	Normal	7.65E+00	4.93E-23
ENSMUSG00000031757_Mt4	284.44	257.25	6.43	0.49	1.26	0.36	Normal	7.41E+00	1.85E-07
ENSMUSG00000090582_Gm17024	97.74	83.77	0.41	0.37	0.75	0.57	Normal	7.40E+00	4.69E-79
ENSMUSG00000022206_Npr3	5.24	2.11	0.03	0.02	0.03	0	Normal	7.20E+00	1.67E-24
ENSMUSG00000023034_Nr4a1	923.47	828.94	7.6	3.19	7.33	2.93	Normal	7.17E+00	2.17E-43
ENSMUSG00000037016_Frem2	17.86	11.55	0.36	0.03	0.17	0	Normal	6.57E+00	3.52E-02
ENSMUSG00000104841_RP24-271G16.1	19.16	11.56	0.43	0.03	0.05	0.08	Normal	6.55E+00	3.57E-10
ENSMUSG00000019880_Rspo3	18.72	9.4	0.23	0.01	0.11	0.22	Normal	6.42E+00	3.40E-13
ENSMUSG00000066364_Serpina3b	9.39	8.76	0.15	0.15	0.03	0.11	Normal	6.20E+00	8.77E-25
ENSMUSG00000041986_Elmod1	22.5	22.89	0.9	0.06	0.15	0	Normal	6.19E+00	4.04E-02
ENSMUSG00000090121_Abhd12b	15.54	6.63	0.35	0.06	0.13	0	Normal	6.19E+00	1.55E-09
ENSMUSG00000000125_Wnt3	105.74	106.97	3.79	0.21	0.66	0.48	Normal	6.17E+00	4.01E-04
ENSMUSG00000003545_Fosb	266.1	236.05	3.92	0.73	6.65	0.73	Normal	6.14E+00	2.09E-05
ENSMUSG00000107879_RP24-363O21.3	8.02	8.19	0.08	0.15	0.05	0.12	Normal	6.11E+00	1.26E-35
ENSMUSG00000026077_Npas2	10.71	8.14	0.33	0.12	0.01	0	Normal	6.07E+00	4.11E-02
ENSMUSG00000030228_Pik3c2g	32.72	21.62	0.81	0.19	0.24	0	Normal	6.05E+00	3.03E-02
ENSMUSG00000087042_Gm11611	33.84	12.61	0.91	0.17	0.07	0.1	Normal	6.04E+00	6.29E-08
ENSMUSG00000075014_Gm10800	17.15	164.68	1.45	1.03	0.29	2.94	Normal	6.04E+00	1.00E-03
ENSMUSG00000059901_Adamts14	67.87	30.02	1.79	0.17	0.27	0.23	Normal	6.02E+00	2.99E-04
ENSMUSG00000040254_Sema3d	71.36	74.73	2.1	0.43	0.36	0.96	Normal	5.98E+00	1.45E-05
ENSMUSG00000051497_Kcnj16	10.78	8.16	0.4	0.07	0.02	0.26	Normal	5.96E+00	1.52E-03
ENSMUSG00000020599_Rgs9	9.06	8.15	0.35	0.15	0.11	0.05	Normal	5.78E+00	3.47E-22
ENSMUSG00000074766_Ism1	11.56	6.74	0.31	0.12	0.16	0	Normal	5.74E+00	7.19E-03
ENSMUSG00000039628_Hs3st6	133.24	91.49	2.79	1.28	1.75	1.85	Normal	5.73E+00	1.58E-53
ENSMUSG00000038453_Srcin1	34.57	13.31	0.96	0.17	0.23	0.09	Normal	5.70E+00	2.69E-03
ENSMUSG00000034910_Pygo1	4.78	2.89	0.13	0.03	0.08	0.01	Normal	5.62E+00	7.25E-09
ENSMUSG00000082035_Rpl17-ps8	401.23	139.79	1.77	11.13	1.94	4.95	Normal	5.57E+00	1.67E-04
ENSMUSG00000022383_Ppara	13.16	9.64	1	0.09	0.26	0	Normal	5.48E+00	4.93E-02
ENSMUSG00000098496_1810026B05Rik	1.97	1.5	0.88	0.54	0.65	0.57	Normal	5.44E+00	4.46E-13
ENSMUSG00000086040_Wipf3	17.69	10.11	0.75	0.11	0.16	0.1	Normal	5.43E+00	9.06E-09
ENSMUSG00000005268_Prlr	13.01	11.97	0.51	0.2	0.2	0.07	Normal	5.43E+00	4.45E-13
ENSMUSG00000029830_Svopl	5.85	10.48	0.1	0.13	0.3	0.44	Normal	5.42E+00	1.67E-18
ENSMUSG00000021835_Bmp4	67.1	23.88	2.32	0.22	0.66	0.02	Normal	5.42E+00	4.39E-02
ENSMUSG00000074345_Tnfaip8l3	22.79	9.86	0.95	0.03	0.23	0.1	Normal	5.40E+00	9.73E-03
ENSMUSG00000021573_Tppp	60.52	34.12	2.27	0.87	1.17	0.08	Normal	5.37E+00	2.92E-03
ENSMUSG00000097312_Gm26870	5.89	48.22	0.71	0.09	0.16	1.7	Normal	5.35E+00	2.39E-02
ENSMUSG00000019761_Krt10	3446.16	3818.25	188.4	84.9	52.62	4.85	Normal	5.29E+00	3.66E-04
ENSMUSG00000026989_Dapl1	396.4	301.17	30.29	4.24	3.17	1.81	Normal	5.25E+00	3.87E-03

ENSMUSG00000052821_Cysltr1	16.51	10.33	0.57	0.05	0.23	0.18	Normal	5.24E+00	3.99E-03
ENSMUSG00000029120_Ppp2r2c	40.96	46.17	2.34	0.19	0.5	1.31	Normal	5.24E+00	4.03E-03
ENSMUSG00000103230_Gm17970	37.66	17.74	1.79	0.68	0.59	0	Normal	5.14E+00	4.49E-05
ENSMUSG00000049214_Skint7	132.36	91.08	6.11	1.03	1.15	3.17	Normal	5.13E+00	1.80E-09
ENSMUSG00000043165_Lor	7.6	20.9	0.98	0.24	0.27	0.12	Normal	5.06E+00	1.65E-06
ENSMUSG00000030862_Cpxm2	107.5	93.35	4.69	2.05	2.17	0.77	Normal	5.00E+00	7.01E-04
ENSMUSG00000019876_Pkib	93.43	74.69	4.84	0.41	0.94	0.73	Normal	4.99E+00	7.99E-08
ENSMUSG00000073888_Ccl27a	2460.05	2336.87	185.29	32.58	56.89	56.27	Normal	4.97E+00	2.76E-16
ENSMUSG00000027499_Pkia	15.99	14.35	0.89	0.14	0.34	0.32	Normal	4.94E+00	1.08E-09
ENSMUSG00000032015_Pou2f3	122.87	105.17	9.37	1.14	2.79	0.55	Normal	4.90E+00	7.17E-03
ENSMUSG00000087141_Plcxd2	6.41	5.84	0.38	0.13	0.14	0.05	Normal	4.88E+00	9.85E-09
ENSMUSG00000052062_Pard3b	5.18	4.57	0.23	0.07	0.11	0.04	Normal	4.86E+00	3.54E-09
ENSMUSG00000028214_Gem	33.43	11.48	1.32	0.36	0.76	0.2	Normal	4.83E+00	1.36E-07
ENSMUSG00000044534_Ackr2	17.17	17.77	0.93	0.21	0.69	0.37	Normal	4.80E+00	3.11E-11
ENSMUSG00000031750_Il34	238.16	207.68	13.14	4.78	6.01	5.25	Normal	4.79E+00	1.50E-17
ENSMUSG00000033863_Klf9	86.64	66.71	4.3	1.75	2.08	1.49	Normal	4.77E+00	4.41E-17
ENSMUSG00000024697_Gna14	24.19	18.86	2.07	0.11	0.41	0.17	Normal	4.73E+00	3.10E-02
ENSMUSG00000034917_Tjp3	17.52	16.85	1.5	0.26	0.35	0.19	Normal	4.70E+00	5.41E-06
ENSMUSG00000006342_Susd2	107.36	130.06	6.72	3.83	4.7	0.75	Normal	4.70E+00	9.83E-08
ENSMUSG00000031209_Heph	11.76	11.28	0.55	0.18	0.59	0.16	Normal	4.69E+00	2.36E-09
ENSMUSG00000050370_Ch25h	13.64	19.84	0.56	1	0.78	0.02	Normal	4.69E+00	1.15E-04
ENSMUSG00000024190_Dusp1	820.43	866.22	37.82	19.11	56.94	13.35	Normal	4.68E+00	1.84E-11
ENSMUSG00000069114_Zbtb10	3.44	2.27	0.19	0.02	0.12	0.04	Normal	4.67E+00	6.83E-06
ENSMUSG00000037868_Egr2	40.61	50.23	2.66	0.96	2.91	0.08	Normal	4.65E+00	3.36E-02
ENSMUSG00000020173_Cobl	29.41	21.91	2.45	0.31	0.34	0.45	Normal	4.62E+00	7.36E-03
ENSMUSG00000089773_Skint1	94.59	95.79	6.24	4.59	5.35	1.16	Normal	4.60E+00	8.72E-10
ENSMUSG00000034825_Nrip3	3.83	5.72	0.45	0.05	0.11	0.11	Normal	4.58E+00	5.39E-05
ENSMUSG00000024039_Cbs	82.65	69.46	7.02	1.1	1.2	1.39	Normal	4.58E+00	8.69E-03
ENSMUSG00000020423_Btg2	493.2	594.46	18.48	18.11	24.18	19.82	Normal	4.58E+00	3.30E-43
ENSMUSG00000039481_Nrtn	15.38	16.27	1.28	0.21	0.33	0.75	Normal	4.57E+00	5.00E-07
ENSMUSG00000039092_Sptlc3	30.7	28.09	1.96	0.8	1.17	0.64	Normal	4.53E+00	2.32E-14
ENSMUSG00000005628_Tmod4	44.8	31.06	4.84	0.28	0.48	0.85	Normal	4.53E+00	2.74E-02
ENSMUSG00000026676_Ccdc3	76.76	86.05	6.38	3.33	2	0.79	Normal	4.52E+00	4.59E-07
ENSMUSG00000037185_Krt80	235.28	256.98	26.63	3.97	6.95	1.29	Normal	4.51E+00	4.42E-02
ENSMUSG00000022754_Tmem45a	685	674.87	52.66	22.44	29.51	2.95	Normal	4.49E+00	3.55E-03
ENSMUSG00000027253_Lrp4	89.41	52.88	5.88	1.93	1.97	0.94	Normal	4.48E+00	1.47E-03
ENSMUSG00000026399_Cd55	189.42	134.54	13.36	1.03	3.48	7.31	Normal	4.47E+00	1.80E-03
ENSMUSG00000037736_Limch1	56.02	49.2	4.2	0.38	2.31	1.3	Normal	4.47E+00	4.86E-03
ENSMUSG00000042500_Ago4	28.46	14.92	1.7	0.73	0.42	0.41	Normal	4.45E+00	2.28E-08
ENSMUSG00000056025_Clca3a1	68.24	35.01	4.88	0.96	1.8	0.34	Normal	4.42E+00	1.58E-02
ENSMUSG00000103509_Gm38372	7.61	4.72	0.37	0.16	0.24	0.21	Normal	4.42E+00	9.63E-17

ENSMUSG00000021250_Fos	1396.2	1496.16	80.45	39.72	106.99	27.93	Normal	4.42E+00	6.27E-11
ENSMUSG00000021508_Cxcl14	876.15	1150.16	53.76	35.65	47.81	34.66	Normal	4.41E+00	1.83E-28
ENSMUSG00000028713_Cyp4b1	103.85	80.84	8.4	1.85	2.9	1.04	Normal	4.40E+00	4.82E-06
ENSMUSG00000016283_H2-M2	12.95	12.13	1.39	0.29	0.45	0.17	Normal	4.37E+00	1.44E-05
ENSMUSG00000037490_Slc2a12	93.33	76.01	9.33	1.16	1.65	2.06	Normal	4.37E+00	1.62E-06
ENSMUSG00000032010_Usp2	9.64	8.69	0.89	0.47	0.42	0.22	Normal	4.36E+00	9.46E-05
ENSMUSG00000044786_Zfp36	933.49	1179.61	65.22	39.23	62.06	20.2	Normal	4.35E+00	5.66E-12
ENSMUSG00000055254_Ntrk2	12.34	11.66	1.22	0.32	0.26	0.22	Normal	4.34E+00	4.61E-06
ENSMUSG00000032515_Csrnp1	114.86	163.11	7.12	5.56	7.99	3.7	Normal	4.34E+00	9.34E-17
ENSMUSG00000037989_Wnk2	64.21	36.43	6.66	1.48	1.18	0.46	Normal	4.33E+00	2.39E-02
ENSMUSG00000079604_Gm13219	25.4	17.12	2.17	0.5	0.57	0.42	Normal	4.30E+00	1.03E-06
ENSMUSG00000108207_RP23-134H19.4	68.76	33.98	3.07	2.22	1.24	2.38	Normal	4.29E+00	2.24E-16
ENSMUSG00000019838_Slc16a10	18.06	9.88	1.11	0.21	0.44	0.66	Normal	4.28E+00	8.30E-08
ENSMUSG00000020785_Camkk1	28.85	23.66	2.43	0.47	1.14	0.67	Normal	4.27E+00	4.99E-07
ENSMUSG00000050860_Phospho1	112.6	148.11	11.52	3.03	3.81	3.65	Normal	4.25E+00	2.95E-09
ENSMUSG00000075593_Gal3st4	23.03	18.9	0.96	1.05	1.3	0.93	Normal	4.22E+00	2.09E-17
ENSMUSG00000062866_Phactr2	19.7	16.04	1.82	0.4	0.51	0.24	Normal	4.21E+00	3.52E-05
ENSMUSG00000039116_Adgrg6	45.12	33.37	3.37	0.8	1.79	1.28	Normal	4.19E+00	7.56E-09
ENSMUSG00000020334_Slc22a4	156.48	94.97	11.49	3.25	4.61	2.71	Normal	4.18E+00	2.62E-08
ENSMUSG00000028528_Dnajc6	6.58	3.93	0.7	0.09	0.13	0.09	Normal	4.17E+00	3.02E-04
ENSMUSG00000027932_Slc27a3	194.51	360.79	28.11	11.73	13.02	8.01	Normal	4.17E+00	6.69E-08
ENSMUSG00000023886_Smoc2	252.61	219.16	22.81	13.8	7.83	1.07	Normal	4.16E+00	3.45E-02
ENSMUSG00000033389_Arhgap44	19.35	17.16	1.48	0.87	0.57	0.4	Normal	4.13E+00	2.64E-09
ENSMUSG00000055653_Gpc3	20.03	20.51	1.13	1.02	1.49	0.44	Normal	4.11E+00	1.36E-10
ENSMUSG00000022708_Zbtb20	6.68	2.94	0.41	0.21	0.27	0.16	Normal	4.11E+00	3.88E-10
ENSMUSG00000000247_Lhx2	13.97	5.91	0.8	0.09	0.81	0.13	Normal	4.09E+00	1.90E-03
ENSMUSG00000063873_Slc24a3	49.05	37.23	4.37	1.35	1.43	1.26	Normal	4.09E+00	1.31E-07
ENSMUSG00000026360_Rgs2	45.62	51.47	2.19	1.14	3.88	0.99	Normal	4.07E+00	2.84E-08
ENSMUSG00000024042_Sik1	240.97	167.6	15.75	9.37	10.27	6.34	Normal	4.05E+00	2.16E-15
ENSMUSG00000025997_Ikzf2	41.07	28.71	2.58	1.11	2.02	1.59	Normal	4.04E+00	1.98E-19
ENSMUSG00000048388_Fam171b	3.31	2.36	0.18	0.05	0.07	0.27	Normal	4.04E+00	1.02E-05
ENSMUSG00000102504_Gm21955	0.81	7.42	0.54	0.09	0.16	0.17	Normal	4.04E+00	6.43E-03
ENSMUSG00000007888_Crlf1	85.06	132.88	8.99	2.53	2.22	7.6	Normal	4.04E+00	3.92E-06
ENSMUSG00000049555_Tmie	12.85	10.04	1.31	0.59	0.36	0.13	Normal	4.03E+00	2.38E-04
ENSMUSG00000086448_9330162012Rik	14.19	10.16	1.29	0.61	0.54	0.11	Normal	4.01E+00	1.36E-04
ENSMUSG00000041695_Kcnj2	15.25	10.93	1.4	0.28	0.68	0.35	Normal	4.01E+00	5.96E-06
ENSMUSG00000028195_Cyr61	479.62	535.67	28.53	15.45	46.6	21.93	Normal	4.00E+00	5.57E-11
ENSMUSG00000069170_Adgrv1	12.01	9.86	1.6	0.39	0.22	0.13	Normal	4.00E+00	7.29E-04
ENSMUSG00000020101_4632428N05Rik	18.95	23.97	2.31	0.73	2.31	0.42	Normal	3.97E+00	2.07E-05
ENSMUSG00000056569_Mpz	51.8	10.64	1.39	0.41	3.35	2.05	Normal	3.96E+00	4.25E-04
ENSMUSG00000021214_Akr1c18	105.73	97.84	3.77	10.78	7.5	1.56	Normal	3.96E+00	3.50E-05

ENSMUSG00000040209_Zfp704	5.06	2.28	0.29	0.15	0.39	0.11	Normal	3.95E+00	2.40E-04
ENSMUSG00000022123_Scel	208.64	162.69	24.18	7.09	7.86	2.86	Normal	3.92E+00	2.16E-02
ENSMUSG00000017417_Plxdc1	25.69	23.87	3.26	1.58	0.93	0.22	Normal	3.92E+00	4.00E-02
ENSMUSG00000031451_Gas6	293.84	281.37	27.05	19.26	13.92	6.84	Normal	3.90E+00	1.21E-08
ENSMUSG00000068617_Efcab1	9.01	7.09	0.62	0.26	0.61	0.4	Normal	3.89E+00	1.48E-10
ENSMUSG00000030107_Usp18	45.79	20.03	1.96	0.73	1.95	3.08	Normal	3.89E+00	2.00E-06
ENSMUSG00000000037_Scml2	10.52	6.97	0.77	0.41	0.32	0.49	Normal	3.88E+00	1.03E-09
ENSMUSG00000019368_Sec14l4	26.47	18.27	1.68	1.51	1.04	1.21	Normal	3.87E+00	5.84E-18
ENSMUSG00000062345_Serpinb2	987.59	771.3	65	31.39	52.64	92.16	Normal	3.87E+00	3.75E-12
ENSMUSG00000019850_Tnfaip3	125.22	115.77	9.42	6.39	7.54	4.13	Normal	3.87E+00	2.35E-16
ENSMUSG00000054263_Lifr	30.98	15.14	1.77	0.84	1.14	1.4	Normal	3.86E+00	4.71E-12
ENSMUSG00000027246_Ell3	25.15	19.67	2.28	0.8	1.4	0.78	Normal	3.86E+00	1.11E-06
ENSMUSG00000015619_Gata3	251.53	176.89	25.21	6.94	6.67	8.33	Normal	3.86E+00	1.39E-05
ENSMUSG00000045730_Adrb2	126.57	121.2	14.09	4.55	7.16	4.74	Normal	3.84E+00	1.37E-08
ENSMUSG00000045019_Acer1	40	44.02	4.03	2.03	2.75	1.63	Normal	3.83E+00	1.14E-11
ENSMUSG00000032249_Anp32a	159.94	116.42	14.88	4.9	12.11	6.2	Normal	3.82E+00	2.79E-09
ENSMUSG00000032278_Paqr5	43.66	39.82	3.69	2.04	1.91	2.67	Normal	3.82E+00	2.22E-15
ENSMUSG00000027347_Rasgrp1	23.48	20.39	2	1.55	0.64	0.84	Normal	3.81E+00	7.15E-09
ENSMUSG00000031936_Hephl1	5.08	5.13	0.84	0.04	0.14	0.24	Normal	3.81E+00	1.29E-02
ENSMUSG00000032578_Cish	132.33	211.07	7.22	9.6	6.4	12.02	Normal	3.81E+00	1.50E-17
ENSMUSG00000026463_Atp2b4	132.34	80.94	8.67	5.75	4.55	2.14	Normal	3.81E+00	5.97E-08
ENSMUSG00000085971_Gm15411	16.01	4.51	0.63	0.4	0.37	0.31	Normal	3.80E+00	2.88E-10
ENSMUSG00000085237_Gm15406	28.85	32.42	4.84	2.48	2.75	2.02	Normal	3.80E+00	9.50E-12
ENSMUSG00000055413_H2-Q5	149.49	126.78	11.64	5.42	4.11	10.01	Normal	3.75E+00	2.35E-09
ENSMUSG00000040998_Npnt	17.08	14.46	1.56	0.45	1.2	0.65	Normal	3.75E+00	1.76E-07
ENSMUSG00000038418_Egr1	480.11	566.99	59.96	34.31	30.72	11.93	Normal	3.74E+00	3.05E-06
ENSMUSG00000093164_Gm22993	94.97	56.43	4.05	7.78	7.31	7.82	Normal	3.71E+00	2.31E-04
ENSMUSG00000055148_Klf2	20.9	23.59	1.76	0.74	2.74	0.85	Normal	3.70E+00	8.63E-06
ENSMUSG00000073409_H2-Q6	178.26	206.45	24.43	7.98	5.25	15.62	Normal	3.70E+00	5.95E-06
ENSMUSG00000030739_Myh14	33.73	31.46	2.99	2.36	2.19	4.01	Normal	3.70E+00	6.08E-20
ENSMUSG00000025092_Hspa12a	10.26	8.25	0.93	0.11	0.68	0.7	Normal	3.70E+00	2.47E-04
ENSMUSG00000050463_Krt78	13.34	12.65	1.7	0.86	0.57	0.37	Normal	3.68E+00	1.36E-05
ENSMUSG00000078350_Smim1	26.17	14.55	3.89	0.74	0.99	3.87	Normal	3.68E+00	2.22E-04
ENSMUSG00000102414_Gm36938	10.61	4.81	0.43	0.32	0.43	0.87	Normal	3.68E+00	1.60E-07
ENSMUSG00000047446_Arl4a	171.27	172.51	18.99	8.99	11.96	9.5	Normal	3.67E+00	1.62E-10
ENSMUSG00000040987_Mill2	18.7	12.55	1.11	0.97	0.6	1.82	Normal	3.67E+00	1.13E-07
ENSMUSG00000032289_Thsd4	6.32	3.67	0.82	0.28	0.17	0.24	Normal	3.66E+00	1.27E-03
ENSMUSG00000028716_Pdzk1ip1	129.83	151.88	11.12	11.7	10.48	8.87	Normal	3.65E+00	1.94E-21
ENSMUSG00000032238_Rora	57.44	37.77	3.79	2.54	1.84	1.94	Normal	3.65E+00	6.48E-16
ENSMUSG00000025790_Slco3a1	145.95	138.54	16.5	5.6	8.82	8.08	Normal	3.64E+00	5.65E-10
ENSMUSG00000074794_Arrdc3	227.29	170.3	28.12	10.39	8.55	5.04	Normal	3.63E+00	6.10E-05

ENSMUSG00000037306_Man1c1	23.34	17.81	2.49	1.17	1.39	0.84	Normal	3.62E+00	9.30E-09
ENSMUSG00000084315_Vmn1r-ps128	15.55	7.16	1.15	1.17	0.84	0.01	Normal	3.60E+00	3.38E-02
ENSMUSG00000069441_Dsg1a	351.76	306.99	34.28	23.03	18.8	16.4	Normal	3.60E+00	8.26E-14
ENSMUSG00000055368_Slc6a2	22.23	13.04	2.11	1.45	0.74	0.81	Normal	3.59E+00	3.88E-06
ENSMUSG00000071076_Jund	205.93	286.31	21.25	16.69	20.22	14.8	Normal	3.58E+00	1.90E-16
ENSMUSG00000026604_Ptpn14	117.87	58.11	8.8	4.61	4.55	2.65	Normal	3.58E+00	1.35E-06
ENSMUSG00000028047_Thbs3	25.19	18.05	2.5	1.52	1.69	0.09	Normal	3.58E+00	1.89E-03
ENSMUSG00000020653_Klf11	28.8	24.66	2.29	2.24	1.8	1.29	Normal	3.57E+00	4.12E-17
ENSMUSG00000026826_Nr4a2	22.54	11.68	0.87	1.02	1.85	0.69	Normal	3.56E+00	1.56E-17
ENSMUSG00000024235_Map3k8	15.12	17.71	2.34	1.17	1.42	0.37	Normal	3.56E+00	4.86E-05
ENSMUSG00000079056_Kcnip3	8.7	5.8	0.8	0.75	0.53	0.2	Normal	3.55E+00	4.34E-05
ENSMUSG00000021097_Clmn	4.1	1.8	0.28	0.18	0.17	0.2	Normal	3.55E+00	1.28E-10
ENSMUSG00000096992_Gm26788	65.95	35.15	4.49	1.72	3.2	4.43	Normal	3.55E+00	2.68E-09
ENSMUSG00000030737_Slco2b1	7.77	7.29	0.82	0.37	0.85	0.21	Normal	3.54E+00	9.27E-05
ENSMUSG00000097353_A430046D13Rik	10.48	6.33	0.91	0.67	0.55	0.34	Normal	3.54E+00	4.55E-08
ENSMUSG00000043496_Tril	3.83	2.29	0.38	0.14	0.32	0.02	Normal	3.54E+00	1.45E-02
ENSMUSG00000014846_Tppp3	182.68	182.54	25.87	14.2	10.63	6.68	Normal	3.53E+00	7.21E-06
ENSMUSG00000039976_Tbc1d16	9.29	7.55	0.85	0.66	0.37	0.72	Normal	3.53E+00	2.68E-12
ENSMUSG00000070822_Zscan18	5.54	2.8	0.5	0.24	0.3	0.17	Normal	3.52E+00	4.20E-06
ENSMUSG00000026220_Slc16a14	41.6	27.71	4.02	4.2	1.12	0.53	Normal	3.52E+00	1.67E-03
ENSMUSG00000097347_Gm17275	66.56	49.43	5.72	5.27	2.9	3.64	Normal	3.52E+00	2.68E-14
ENSMUSG00000027358_Bmp2	18.97	17.4	2.15	0.88	1.6	0.93	Normal	3.49E+00	4.24E-08
ENSMUSG00000029868_Trpv6	13.77	8.49	1.26	1.33	0.64	0.15	Normal	3.46E+00	2.81E-03
ENSMUSG00000056602_Fry	59.88	30.52	4.54	3.02	3.61	3.62	Normal	3.46E+00	1.09E-11
ENSMUSG00000023827_Agpat4	17.43	21.68	2.59	0.86	1.75	0.94	Normal	3.46E+00	4.08E-06
ENSMUSG00000048764_Tmprss11f	7.01	6.39	1.18	0.35	0.18	0.11	Normal	3.45E+00	1.23E-02
ENSMUSG00000036492_Rnf39	37.09	32.16	4.86	2.08	1.66	2.76	Normal	3.45E+00	5.40E-08
ENSMUSG00000071856_Mcc	38.19	27.24	3.8	1.99	2.17	1.74	Normal	3.45E+00	5.52E-12
ENSMUSG00000091542_Gm17167	4.07	5.03	0.49	0.12	0.28	0.58	Normal	3.45E+00	1.97E-04
ENSMUSG00000002985_Apoe	8815.85	8880.74	1551.92	779.03	817.06	181.84	Normal	3.44E+00	3.80E-04
ENSMUSG00000059325_Hopx	210.74	169.51	23.63	6.48	12.52	20.27	Normal	3.44E+00	8.18E-07
ENSMUSG00000039942_Ptger4	37.4	31.78	4.82	2.03	2.41	1.92	Normal	3.42E+00	6.59E-08
ENSMUSG00000024371_C2	20.05	17.31	2.23	1.68	1.64	3.62	Normal	3.42E+00	6.94E-10
ENSMUSG00000022358_Fbxo32	46.29	25.1	4.32	2.67	2.26	1.86	Normal	3.41E+00	4.80E-09
ENSMUSG00000052684_Jun	751.47	689.11	66.92	57.23	81.49	27.22	Normal	3.41E+00	1.04E-07
ENSMUSG00000072812_Ahnak2	209.26	155.46	21.06	15.96	17.62	11.54	Normal	3.41E+00	1.39E-13
ENSMUSG00000102718_Gm37761	10.08	5.19	0.25	0.61	0.25	1.39	Normal	3.40E+00	5.32E-03
ENSMUSG00000028518_Prkaa2	2.92	2.03	0.34	0.18	0.14	0.14	Normal	3.39E+00	1.64E-06
ENSMUSG00000055322_Tns1	36.41	27.86	4.56	1.66	3.07	1.54	Normal	3.39E+00	1.79E-06
ENSMUSG00000051910_Sox6	17.55	14.81	1.24	0.84	1.42	0.75	Normal	3.38E+00	8.94E-11
ENSMUSG00000060550_H2-Q7	491.54	621.52	68.54	44.36	21.24	70.65	Normal	3.38E+00	2.09E-06

ENSMUSG00000046719_Nxph3	8.65	6.75	0.82	0.29	0.34	1.19	Normal	3.37E+00	4.81E-04
ENSMUSG00000034584_Exph5	28.25	18.8	3.76	1.74	1.12	0.92	Normal	3.36E+00	2.12E-04
ENSMUSG00000086245_Gm16170	17.72	7.85	1.62	0.56	0.76	1.23	Normal	3.36E+00	5.85E-06
ENSMUSG00000022203_Efs	60.13	61.4	9.54	4.6	4.88	1.4	Normal	3.36E+00	6.08E-04
ENSMUSG00000041046_Ramp3	20.51	18.56	3.63	0.85	1.98	0.57	Normal	3.35E+00	2.57E-03
ENSMUSG00000040183_Ankrd6	7.9	4.1	0.6	0.27	0.19	1.44	Normal	3.34E+00	1.36E-05
ENSMUSG00000057337_Chst3	4.05	2.84	0.45	0.31	0.19	0.23	Normal	3.34E+00	1.24E-07
ENSMUSG00000028838_Extl1	57.11	48.15	6.67	5.24	2.4	3.59	Normal	3.33E+00	7.75E-04
ENSMUSG00000025165_Sectm1a	56.18	43.41	9.03	4.22	2.17	1.71	Normal	3.31E+00	8.26E-04
ENSMUSG00000034209_Rasl10a	16.89	14.17	0.97	0.71	1.97	1.99	Normal	3.30E+00	1.31E-04
ENSMUSG00000021340_Gpld1	60.95	45.56	8.94	7.56	5.17	4.72	Normal	3.29E+00	6.79E-07
ENSMUSG00000066705_Fxyd6	29.35	25.29	3.03	2.47	2.84	1.49	Normal	3.29E+00	7.40E-11
ENSMUSG00000055960_Skint4	7.64	7.72	0.13	0.92	0.91	0.74	Normal	3.28E+00	2.31E-03
ENSMUSG00000032202_Rab27a	40.12	29.48	4.82	2.21	1.77	2.43	Normal	3.28E+00	3.85E-06
ENSMUSG00000028488_Sh3gl2	14.76	11.44	1.55	0.92	0.94	1.01	Normal	3.28E+00	7.90E-13
ENSMUSG00000079491_H2-T10	23.62	39.28	3.24	3.06	1.44	2.59	Normal	3.28E+00	5.18E-08
ENSMUSG00000073600_Prob1	10.22	10.46	2.08	0.62	0.42	0.12	Normal	3.26E+00	3.25E-02
ENSMUSG00000022941_Ripply3	20.14	15.16	2.54	1.16	1.9	0.97	Normal	3.25E+00	1.41E-06
ENSMUSG00000018217_Pmp22	77.7	51.05	6.27	3.65	8.74	7.5	Normal	3.25E+00	6.89E-09
ENSMUSG00000029333_Rasgef1b	18.46	22.97	2.37	2.22	1.95	0.64	Normal	3.24E+00	6.58E-05
ENSMUSG00000031070_Mrgprf	9.56	7.12	0.67	0.39	1.03	1.05	Normal	3.24E+00	5.14E-06
ENSMUSG00000060429_Sntb1	13.82	6.65	0.88	0.89	0.75	0.71	Normal	3.24E+00	2.39E-09
ENSMUSG00000086399_Gm16144	24.35	11.74	2	1.68	1.69	1.6	Normal	3.23E+00	3.31E-09
ENSMUSG00000026637_Traf5	58.24	37.46	5.22	4.99	4.5	4.43	Normal	3.23E+00	3.10E-22
ENSMUSG00000042477_Tfap2e	23.32	21.14	2.96	2.95	2.08	0.28	Normal	3.23E+00	1.03E-02
ENSMUSG00000024030_Abcg1	12.64	8.81	1.84	0.43	1.2	0.38	Normal	3.23E+00	3.40E-03
ENSMUSG00000056174_Col8a2	5.01	2.91	0.38	0.4	0.57	0.04	Normal	3.23E+00	2.17E-02
ENSMUSG00000009248_Ascl2	14.07	9.45	2.08	1.09	0.72	0.61	Normal	3.21E+00	2.02E-04
ENSMUSG00000063564_Col23a1	46.33	52.21	6.3	4.68	3.83	3.3	Normal	3.20E+00	1.64E-10
ENSMUSG00000038515_Grtp1	13.09	8.89	1.39	0.74	0.77	1.43	Normal	3.19E+00	6.12E-07
ENSMUSG00000105285_RP24-447I18.1	69.94	31.32	7.56	5.45	6.42	5.39	Normal	3.18E+00	1.36E-07
ENSMUSG00000017639_Rab11fip4	14.31	14.85	2.07	1.54	1.3	0.61	Normal	3.17E+00	2.77E-06
ENSMUSG00000042073_Abhd14b	33.76	25.92	4.51	3.65	2.2	2.77	Normal	3.16E+00	1.26E-09
ENSMUSG00000063450_Syne2	159.62	73.75	23.73	16.34	14.43	10.17	Normal	3.16E+00	1.08E-07
ENSMUSG00000003531_Dgcr6	303.92	317.84	43.61	33.26	26.8	25.69	Normal	3.16E+00	2.06E-12
ENSMUSG00000024044_Epb4.1l3	17.7	17.11	2.89	0.35	1.48	2.05	Normal	3.16E+00	5.05E-03
ENSMUSG00000045790_Ccdc149	5.77	3.82	0.37	0.34	0.43	0.67	Normal	3.14E+00	2.98E-07
ENSMUSG00000080058_Gm11175	192.1	329.08	42.78	24.93	34.54	23.97	Normal	3.14E+00	4.49E-09
ENSMUSG00000030287_Itpr2	63.08	34.81	6.56	3.92	3	2.65	Normal	3.13E+00	7.41E-06
ENSMUSG00000029059_Fam213b	89.8	96.37	9.67	9.09	8.84	12.37	Normal	3.13E+00	2.97E-15
ENSMUSG00000043953_Ccrl2	8.7	10.14	0.89	0.31	3.57	0.45	Normal	3.13E+00	3.99E-02

ENSMUSG00000107476_Zfp862-ps	5.48	3.48	0.38	0.31	0.59	0.16	Normal	3.12E+00	4.45E-06
ENSMUSG00000078144_Capns2	405.17	310.53	70.01	41.55	31.01	9.84	Normal	3.12E+00	2.03E-03
ENSMUSG00000067235_H2-Q10	13.99	8.77	1.66	1.17	0.83	1.35	Normal	3.11E+00	3.98E-09
ENSMUSG00000040435_Ppp1r15a	120.77	186.76	17.26	15.82	21.76	11.91	Normal	3.11E+00	4.15E-07
ENSMUSG00000066842_Hmcn1	9.34	5.36	1.06	1.31	0.4	0.29	Normal	3.10E+00	2.65E-02
ENSMUSG00000092586_Ly6g6c	146.23	162.84	28.38	16.48	16.11	7.59	Normal	3.10E+00	2.27E-05
ENSMUSG00000026321_Tnfrsf11a	8.61	4.97	0.99	0.46	0.68	0.93	Normal	3.09E+00	7.31E-07
ENSMUSG00000060733_Ipmk	140.51	90.5	15.01	9.05	8.92	6.67	Normal	3.09E+00	3.45E-09
ENSMUSG00000022822_Abcc5	145.66	93.69	15.71	8.88	9.45	7.88	Normal	3.09E+00	4.71E-10
ENSMUSG00000050549_5730508B09Rik	48.39	42.97	7.63	4.41	4.75	2.36	Normal	3.09E+00	6.39E-06
ENSMUSG00000106205_RP23-326O2.2	11.65	10.16	1.67	0.89	0.89	1.17	Normal	3.08E+00	4.84E-08
ENSMUSG00000041153_Osgin2	58.65	34.73	6.69	3.67	5.09	4.89	Normal	3.06E+00	1.02E-08
ENSMUSG00000020140_Lgr5	9.08	2.13	0.61	0.34	0.69	0.46	Normal	3.06E+00	1.69E-03
ENSMUSG00000031129_Slc9a9	8.53	5.13	0.95	0.87	0.78	0.3	Normal	3.06E+00	4.87E-03
ENSMUSG00000086825_Gm15675	10.32	6.29	1.69	0.3	0.32	1.11	Normal	3.05E+00	1.74E-02
ENSMUSG00000046532_Ar	6.2	3.54	0.49	0.42	0.42	0.63	Normal	3.05E+00	2.45E-12
ENSMUSG00000042793_Lgr6	48.19	29.07	3.39	1.96	6.92	3.35	Normal	3.04E+00	1.84E-04
ENSMUSG00000053040_Aph1c	9.56	5.76	0.66	0.37	1.78	0.41	Normal	3.03E+00	2.44E-02
ENSMUSG00000032735_Ablim3	18.57	13.69	4.13	0.72	1.26	0.6	Normal	3.03E+00	2.77E-02
ENSMUSG00000070407_Hs3st3b1	13.71	11.67	2	1.59	1.39	0.31	Normal	3.02E+00	5.15E-03
ENSMUSG00000031904_Slc7a6	129.02	107.8	21.86	9.01	11.56	8.18	Normal	3.00E+00	1.95E-05
ENSMUSG00000103593_Gm37352	6.69	6.29	0.75	0.83	0.62	0.66	Normal	2.99E+00	4.53E-10
ENSMUSG00000033420_Antxr1	94.76	77.87	12.49	8.8	9.16	5.9	Normal	2.99E+00	3.26E-08
ENSMUSG00000019872_Smpdl3a	55.3	64.22	11.25	5.53	7.17	3.06	Normal	2.97E+00	2.92E-04
ENSMUSG00000104377_Gm37515	32.99	20.11	3.58	1.65	2.6	3.68	Normal	2.97E+00	5.53E-07
ENSMUSG00000053769_Lysmd1	78.78	45.67	11.07	5.57	5.83	4.7	Normal	2.97E+00	4.27E-06
ENSMUSG00000078599_Skint8	22.07	19.02	2.65	4.1	2.15	2.15	Normal	2.96E+00	9.30E-08
ENSMUSG00000053675_Tgm5	20.87	11.2	2.03	2.25	2.24	0.2	Normal	2.96E+00	4.43E-02
ENSMUSG00000024462_Gabbr1	33.5	10.08	2.95	1.33	2.03	1.14	Normal	2.96E+00	5.00E-04
ENSMUSG00000007682_Dio2	5.83	4.46	0.87	0.64	0.49	0.23	Normal	2.96E+00	6.79E-04
ENSMUSG00000031274_Col4a5	27.38	15.57	2.71	3.98	1.78	1.41	Normal	2.94E+00	1.56E-04
ENSMUSG00000029838_Ptn	132.06	108.45	20.91	16.32	12.73	5.67	Normal	2.94E+00	1.86E-04
ENSMUSG00000034413_Neurl1b	8.84	9.09	1.72	1.03	0.75	0.41	Normal	2.94E+00	1.60E-03
ENSMUSG00000106948_RP23-256D7.2	36.94	20.22	3.69	1.96	2.74	4.24	Normal	2.93E+00	4.57E-07
ENSMUSG00000044197_Gpr146	9.37	6.57	1.48	0.4	0.87	0.86	Normal	2.93E+00	6.30E-04
ENSMUSG00000031431_Tsc22d3	346.79	310.3	80.61	31.45	27.28	13.2	Normal	2.93E+00	7.40E-03
ENSMUSG00000049892_Rasd1	12.32	12.23	3.06	0.54	1.62	0.61	Normal	2.92E+00	2.85E-02
ENSMUSG00000022512_Cldn1	147.9	126.36	27.18	16.68	12.59	5.71	Normal	2.92E+00	1.62E-03
ENSMUSG00000041235_Chd7	18.61	10.05	2.02	1.81	1.41	1.4	Normal	2.92E+00	2.20E-05
ENSMUSG00000043467_Zbtb37	8.45	5.87	1.22	1.19	1.2	1.96	Normal	2.90E+00	3.25E-12
ENSMUSG00000031284_Pak3	8.55	6.56	1.04	0.73	0.94	1	Normal	2.90E+00	1.75E-09

ENSMUSG00000019577_Pdk4	4.7	6.45	0.95	0.56	0.76	0.87	Normal	2.90E+00	1.40E-04
ENSMUSG00000034949_Zfr2	13.97	5.9	1.6	1.45	0.54	0.73	Normal	2.90E+00	2.76E-04
ENSMUSG00000020105_Lrig3	38.73	26.01	5.89	4.55	3.57	0.67	Normal	2.89E+00	2.32E-02
ENSMUSG00000041120_Nbl1	164.39	136.83	23.06	16.49	17.34	13.75	Normal	2.88E+00	6.65E-13
ENSMUSG00000028211_Trp53inp1	144.35	68.36	9.53	8	8.58	17.2	Normal	2.86E+00	7.00E-06
ENSMUSG00000024805_Pcgf5	16.02	14.49	2.43	1.34	1.76	1.97	Normal	2.86E+00	1.32E-08
ENSMUSG00000031442_Mcf2l	16.57	11.74	3.39	1.6	2	0.94	Normal	2.86E+00	5.33E-03
ENSMUSG00000031214_Ophn1	15.69	11.82	1.31	3.16	1.28	1.1	Normal	2.84E+00	2.51E-07
ENSMUSG00000040680_Kremen2	8.72	4.93	1.66	0.22	0.57	0.84	Normal	2.84E+00	4.52E-02
ENSMUSG00000032561_Acpp	203.28	176.25	39.45	30.81	15.75	5.41	Normal	2.84E+00	1.82E-02
ENSMUSG00000055725_Paqr3	12.05	10.57	1.87	1.19	1.13	1.62	Normal	2.84E+00	1.57E-09
ENSMUSG00000084911_Gm16185	7.39	4.43	0.65	0.46	0.51	1.23	Normal	2.84E+00	5.27E-04
ENSMUSG00000035929_H2-Q4	316.29	204.94	46.11	28.58	20.46	33.99	Normal	2.83E+00	5.68E-07
ENSMUSG00000035112_Wnk4	11.45	7.39	1.38	1.18	0.95	1.33	Normal	2.83E+00	1.34E-04
ENSMUSG00000048399_Tprg	29.98	37.25	5.55	6.53	4.51	1.15	Normal	2.83E+00	1.39E-02
ENSMUSG00000073758_Sh3d21	111.72	90.2	24.1	7.05	9.25	9	Normal	2.83E+00	1.55E-03
ENSMUSG00000028749_Pla2g2f	49.71	94.97	14.31	7.94	11.12	3.69	Normal	2.82E+00	5.65E-03
ENSMUSG00000007989_Fzd3	3.73	3.22	0.59	0.3	0.62	0.3	Normal	2.82E+00	1.95E-04
ENSMUSG00000029090_Adgra3	80.3	47.69	9.68	7.45	7.86	6.41	Normal	2.82E+00	1.98E-08
ENSMUSG00000106819_RP24-230L6.3	14.77	7.54	1.21	0.82	1.22	2.32	Normal	2.81E+00	1.24E-03
ENSMUSG00000001627_Ifrd1	685.78	586.25	79.26	61.02	68.68	74.73	Normal	2.81E+00	1.56E-17
ENSMUSG00000033713_Foxn3	96.1	53.52	13.88	7.07	11.11	7.06	Normal	2.80E+00	2.79E-07
ENSMUSG00000036278_Macrod1	31.72	33.41	6.83	5.27	3.77	1.17	Normal	2.80E+00	1.25E-02
ENSMUSG00000038236_Hoxa7	74.49	52.75	5.45	5.03	8.58	11.48	Normal	2.80E+00	9.18E-06
ENSMUSG00000016552_Foxred2	6.78	3.74	1.25	0.69	0.52	0.27	Normal	2.79E+00	1.20E-02
ENSMUSG00000026983_Il1f5	16.18	14.8	3.45	2.16	1.93	3.02	Normal	2.79E+00	7.26E-10
ENSMUSG00000101599_Gm20342	2.1	1.01	0.24	0.26	0.19	0.14	Normal	2.79E+00	2.02E-05
ENSMUSG00000106702_RP24-230P10.6	50.25	42.36	3.44	12.69	6.4	3.23	Normal	2.79E+00	3.17E-02
ENSMUSG00000097417_Gm26669	13.92	11.23	2.07	1.78	2.08	0.41	Normal	2.79E+00	1.42E-02
ENSMUSG00000032377_Plscr4	15.77	4.89	1.55	1.43	1.11	0.67	Normal	2.78E+00	2.23E-03
ENSMUSG00000022199_Slc22a17	12.54	4.08	1.58	0.85	1	0.57	Normal	2.78E+00	5.81E-03
ENSMUSG00000079017_Ifi27l2a	41.79	25.84	6.94	2.26	7.31	4.8	Normal	2.78E+00	2.92E-04
ENSMUSG00000024782_Ak3	71.7	69.61	14.81	10.82	7.35	6.8	Normal	2.78E+00	6.99E-03
ENSMUSG00000107962_RP23-83P5.5	33.88	18.91	3.79	2.02	3.59	4.04	Normal	2.78E+00	4.18E-06
ENSMUSG00000092341_Malat1	368.78	156.17	38.64	26.89	30.77	35.47	Normal	2.77E+00	3.84E-08
ENSMUSG00000086968_4933431E20Rik	18.36	10.53	2.06	3.09	1.61	2.44	Normal	2.76E+00	5.46E-07
ENSMUSG00000101776_Gm28268	15.53	6.4	2.08	1.14	1.46	2.19	Normal	2.75E+00	1.73E-04
ENSMUSG00000073910_Mob3b	16.03	13.01	1.47	1.02	2.33	1.87	Normal	2.75E+00	1.26E-06
ENSMUSG00000097879_Gm26869	9.46	4.3	1.22	0.57	0.75	0.9	Normal	2.74E+00	2.32E-04
ENSMUSG00000025170_Rab40b	14.03	12.14	1.96	2.13	1.43	1.3	Normal	2.73E+00	1.45E-06
ENSMUSG00000032591_Mst1	23.97	20.31	4.36	4.3	1.91	1.04	Normal	2.73E+00	2.63E-03

ENSMUSG00000022197_Pdzd2	76.03	46.99	8.62	4.67	5.63	3.95	Normal	2.73E+00	2.37E-05
ENSMUSG00000042289_Hsd3b7	100.47	80.12	10.84	5.54	6.68	6.39	Normal	2.73E+00	4.88E-10
ENSMUSG00000022270_Fam134b	71.63	67.31	10.15	8.01	7.4	8.28	Normal	2.73E+00	2.39E-17
ENSMUSG00000028635_Edn2	13.23	9.8	1.04	0.66	1.23	3.28	Normal	2.73E+00	3.06E-02
ENSMUSG00000064215_Ifi27	285.7	236.43	43.35	28.09	38.43	35.63	Normal	2.72E+00	2.18E-14
ENSMUSG00000034245_Hdac11	19.64	19.46	3.32	2.33	1.81	1.5	Normal	2.72E+00	1.13E-04
ENSMUSG00000103070_Gm37903	8.93	3.74	0.81	0.72	1	0.71	Normal	2.71E+00	1.73E-04
ENSMUSG00000034107_Ano7	6.36	4.61	1.16	0.97	0.73	0.38	Normal	2.71E+00	9.36E-03
ENSMUSG00000090386_Mir99ahg	10.73	5.77	1.29	1.52	1.05	0.49	Normal	2.70E+00	1.31E-03
ENSMUSG00000071226_Cecr2	17.51	11.18	3.22	1.72	0.81	0.67	Normal	2.69E+00	4.62E-02
ENSMUSG00000033209_Ttc28	2.7	0.97	0.28	0.16	0.35	0.2	Normal	2.69E+00	2.46E-03
ENSMUSG00000040327_Cul9	6.95	4.22	1.3	0.55	0.67	1.15	Normal	2.68E+00	2.28E-03
ENSMUSG00000031841_Cdh13	84.25	86.72	15.88	9.46	10.42	9.48	Normal	2.68E+00	4.04E-07
ENSMUSG00000066258_Trim12a	15.54	9.73	1.14	1.81	3.02	0.31	Normal	2.67E+00	3.41E-02
ENSMUSG00000002565_Scin	162.03	161.21	32.5	18.1	19.72	18.07	Normal	2.67E+00	1.53E-06
ENSMUSG00000015224_Cyp2j9	14.88	10.73	1.67	2.03	1.96	1.44	Normal	2.67E+00	1.10E-08
ENSMUSG00000037681_Esyt3	16.99	9.61	2.02	2.01	1.72	1.06	Normal	2.67E+00	4.46E-04
ENSMUSG00000023032_Slc4a8	42.47	42	8.91	1.51	5.42	6.73	Normal	2.67E+00	3.65E-02
ENSMUSG00000015085_Entpd2	27.68	30.12	6.05	5.13	3.44	1.77	Normal	2.66E+00	3.41E-03
ENSMUSG00000087177_E130307A14Rik	22.66	11.91	2.43	3.04	1.51	2.75	Normal	2.66E+00	5.50E-04
ENSMUSG00000103039_Gm37123	20.33	10.28	2.25	2.66	1.49	2.11	Normal	2.66E+00	1.19E-04
ENSMUSG00000046186_Cd109	126.86	111.62	22.62	18.53	15.01	7.66	Normal	2.66E+00	5.27E-04
ENSMUSG00000016206_H2-M3	22.86	21.38	3.63	2.67	3.2	3.15	Normal	2.66E+00	1.46E-11
ENSMUSG00000042010_Acacb	2.78	1.92	0.88	0.19	0.38	0.27	Normal	2.65E+00	3.03E-02
ENSMUSG00000032796_Lama1	10.89	11.64	2.91	1.33	0.89	1.04	Normal	2.65E+00	5.82E-03
ENSMUSG00000057719_Sh3rf2	40	34.53	6.89	6.55	4.44	2.47	Normal	2.64E+00	7.68E-03
ENSMUSG00000032679_Cd59a	51.27	45.79	12.19	2.97	7.36	6.07	Normal	2.64E+00	7.39E-03
ENSMUSG00000066362_Rps13-ps1	90.62	187.1	37.92	17.22	32.29	11.04	Normal	2.64E+00	6.27E-03
ENSMUSG00000030643_Rab30	24.73	20.44	4.97	3.2	2.89	2.12	Normal	2.62E+00	6.54E-05
ENSMUSG00000100768_Gm29055	16.93	8.31	1.96	0.93	1.88	2.98	Normal	2.62E+00	7.07E-04
ENSMUSG00000028532_Cachd1	38.29	23.05	8.45	6.2	4.6	0.79	Normal	2.61E+00	3.57E-02
ENSMUSG00000027947_Il6ra	60.49	53.94	13.1	6.32	6.19	4.37	Normal	2.61E+00	2.08E-03
ENSMUSG00000001672_Marveld3	25.96	19.2	4.19	3.11	2.33	1.97	Normal	2.61E+00	9.47E-06
ENSMUSG00000087575_Gm12976	120.44	44.65	11.58	14.18	12.72	15.54	Normal	2.61E+00	3.02E-03
ENSMUSG00000019359_Gdpd2	105.25	85.81	19.87	9.13	11.13	14.4	Normal	2.61E+00	3.70E-05
ENSMUSG00000089940_Gm4117	1.36	0.76	0.33	0.19	0.21	0.23	Normal	2.60E+00	7.23E-05
ENSMUSG00000026833_Olfm1	8.55	5.74	0.91	0.46	1.44	1.01	Normal	2.60E+00	4.72E-03
ENSMUSG00000001665_Gstt3	36.43	29.16	5.62	5.42	3.17	4.79	Normal	2.59E+00	2.88E-07
ENSMUSG00000013483_Card14	9.67	8.49	1.75	1.41	0.69	1.57	Normal	2.59E+00	1.67E-04
ENSMUSG00000105247_RP23-33C9.1	28.62	16.14	3.84	2.09	2.75	3.97	Normal	2.58E+00	1.95E-05
ENSMUSG00000033016_Nfatc1	17.97	11.36	2.64	1.62	2.63	1.36	Normal	2.58E+00	1.93E-04

ENSMUSG00000097095_Gm26547	15.35	6.04	1.43	1.23	1.25	2.26	Normal	2.58E+00	2.79E-03
ENSMUSG00000049858_Suox	25.42	24.18	4.29	3.04	3.1	4.42	Normal	2.56E+00	1.15E-08
ENSMUSG00000017418_Arl5b	66.12	47.81	7.76	8.03	8.01	14.51	Normal	2.56E+00	6.84E-11
ENSMUSG00000036356_Csgalnact1	13.94	8.21	2.34	0.68	2.25	1.08	Normal	2.55E+00	2.35E-02
ENSMUSG00000019256_Ahr	65.88	49.67	10.53	7.22	6.78	5.08	Normal	2.55E+00	5.59E-06
ENSMUSG00000074151_Nlrc5	86.61	52.64	14.22	11.12	5.23	13.83	Normal	2.55E+00	4.90E-04
ENSMUSG00000038119_Cdon	15.97	10.17	1.93	1.71	2.04	1.92	Normal	2.55E+00	1.03E-11
ENSMUSG00000027438_Napb	4.18	2.49	0.45	0.28	0.41	0.8	Normal	2.55E+00	5.39E-03
ENSMUSG00000038894_Irs2	21.29	17.24	2.63	2.45	3.23	2.99	Normal	2.55E+00	1.06E-11
ENSMUSG00000072591_5930412G12Rik	31.97	24.83	8.88	4.78	4.69	13.79	Normal	2.54E+00	8.19E-06
ENSMUSG00000104149_Gm37138	8.69	4.66	1.05	0.72	1.07	1.09	Normal	2.54E+00	1.19E-04
ENSMUSG00000035258_Abi3bp	16.28	10.19	1.85	1.49	2.87	1.07	Normal	2.54E+00	3.39E-03
ENSMUSG00000042156_Dzip1	19.23	11.79	2.62	2.24	1.84	2.22	Normal	2.54E+00	1.50E-09
ENSMUSG00000041548_Hspb8	193.23	170.78	32.04	22.07	25.12	31.58	Normal	2.54E+00	3.04E-11
ENSMUSG00000030077_Chl1	122.82	102.01	23.84	15.54	17.73	13.89	Normal	2.54E+00	2.47E-09
ENSMUSG00000013766_Ly6g6e	44.63	44.12	6.89	7.34	6.43	7.55	Normal	2.54E+00	1.74E-10
ENSMUSG00000008855_Hdac5	117.52	99.36	19.51	19.7	12.41	9.33	Normal	2.53E+00	1.21E-04
ENSMUSG00000104174_Gm37701	36.9	20.04	3.07	3.61	4.01	6.75	Normal	2.53E+00	1.20E-03
ENSMUSG00000033227_Wnt6	20.9	19.81	4.56	3.49	2.5	1.58	Normal	2.53E+00	2.55E-03
ENSMUSG00000052783_Grk4	10.33	4.64	1.06	1.16	1.01	2.24	Normal	2.53E+00	1.70E-02
ENSMUSG00000000142_Axin2	48.08	37.84	8.58	3.57	7.23	6.16	Normal	2.53E+00	1.74E-04
ENSMUSG00000029287_Tgfbr3	20.21	10.46	3.08	1.76	1.64	1.82	Normal	2.53E+00	1.21E-04
ENSMUSG00000097242_Gm16907	22.37	8.37	3.43	3	1.32	1.23	Normal	2.52E+00	2.85E-02
ENSMUSG00000043681_Fam25c	637.46	691.83	200.48	128.18	129.52	71.38	Normal	2.51E+00	3.05E-05
ENSMUSG00000073405_C920025E04Rik	8.85	17.3	1.91	2.56	1.42	2.82	Normal	2.51E+00	1.71E-02
ENSMUSG00000038893_Fam117a	34.79	21	5.36	2.67	5.3	3.67	Normal	2.51E+00	5.40E-05
ENSMUSG00000048376_F2r	15.08	15.55	3.03	1.89	3.19	1.2	Normal	2.51E+00	4.84E-03
ENSMUSG00000022382_Wnt7b	45.43	55.3	10.3	4.6	8.81	7.45	Normal	2.51E+00	4.18E-04
ENSMUSG00000061331_Gm17132	77.68	36.07	9.1	5.97	8.92	11.25	Normal	2.51E+00	1.11E-04
ENSMUSG00000031596_Slc7a2	2.34	1.03	0.27	0.2	0.28	0.23	Normal	2.50E+00	1.08E-03
ENSMUSG00000052837_Junb	1079.1	1400.37	237.71	190.04	217.86	144.2	Normal	2.50E+00	8.25E-06
ENSMUSG00000048442_Smim5	20.72	21.39	4.55	3.75	3.9	1.54	Normal	2.50E+00	3.27E-03
ENSMUSG00000099881_2810013P06Rik	17.86	13.96	4.88	3.73	3.39	2.31	Normal	2.50E+00	1.23E-02
ENSMUSG00000108092_RP23-461C23.2	8.02	4.09	1.08	0.76	0.78	1.02	Normal	2.50E+00	7.91E-05
ENSMUSG00000040350_Trim7	125.83	78.95	20.4	12.4	13.72	13.58	Normal	2.49E+00	8.04E-06
ENSMUSG00000094472_Gm21897	27.83	11.1	3.23	1.84	3.33	3.51	Normal	2.49E+00	2.08E-03
ENSMUSG00000087658_Hotairm1	79.28	71.49	21.64	10.56	17.34	16.75	Normal	2.49E+00	1.70E-06
ENSMUSG00000022090_Pdlim2	102.17	100.74	17.83	17.39	14.84	16.52	Normal	2.49E+00	1.15E-11
ENSMUSG00000071847_Apcdd1	100.45	90.95	24.29	19.04	10.33	5.65	Normal	2.49E+00	2.58E-02
ENSMUSG00000028949_Smarcd3	13.38	9.68	1.52	0.92	1	1.26	Normal	2.48E+00	2.33E-06
ENSMUSG00000042340_Ctf1	12.69	11.15	2.26	2.01	1.81	1.55	Normal	2.48E+00	1.47E-06

ENSMUSG00000038058_Nod1	43.84	28.02	7.24	4.21	5.28	3.71	Normal	2.48E+00	2.19E-05
ENSMUSG00000038253_Hoxa5	23.92	13.7	1.79	1.53	3.11	5.27	Normal	2.48E+00	2.53E-02
ENSMUSG00000056938_Acbd4	185.68	188.54	38.34	32.08	21.09	16.71	Normal	2.48E+00	1.07E-03
ENSMUSG00000050808_Muc15	11.37	9.15	1.25	1.92	1.78	1.14	Normal	2.48E+00	4.78E-05
ENSMUSG00000028634_Hivep3	6.14	5.26	0.97	0.7	0.96	0.96	Normal	2.47E+00	1.04E-06
ENSMUSG00000099597_Gm28933	70.74	47.97	19.72	13.03	12.43	17.42	Normal	2.47E+00	8.58E-05
ENSMUSG00000041268_Dmxl2	6.69	4	0.77	0.49	1.28	1.16	Normal	2.46E+00	3.43E-03
ENSMUSG00000037108_Zcwpw1	8.79	8.18	1.6	1.75	0.95	2.71	Normal	2.46E+00	3.78E-03
ENSMUSG00000086607_4930511M06Rik	8.75	3.53	0.86	0.62	1.04	1.25	Normal	2.46E+00	2.37E-02
ENSMUSG00000000078_Klf6	211.23	220.17	31.33	34.11	35.15	36.34	Normal	2.45E+00	1.46E-13
ENSMUSG00000024642_Tle4	23.95	15.78	4.45	3.1	2.43	2.36	Normal	2.44E+00	1.09E-04
ENSMUSG00000038354_Ankrd35	35.05	26.74	7.78	5.27	4	2.07	Normal	2.44E+00	1.64E-02
ENSMUSG00000028967_Errfi1	164.78	179.9	24.99	20.41	27.15	24.11	Normal	2.44E+00	8.61E-09
ENSMUSG00000045287_Rtn4rl1	5.03	4.25	0.94	0.39	0.88	0.73	Normal	2.44E+00	4.78E-03
ENSMUSG00000074733_Zfp950	42.66	25.15	5.59	5.38	7.4	7.74	Normal	2.43E+00	8.58E-10
ENSMUSG00000105065_RP23-1B20.4	17.43	8.65	1.89	2	1.23	3.18	Normal	2.43E+00	4.85E-03
ENSMUSG00000101609_Kcnq1ot1	2.14	1.14	0.19	0.16	0.12	0.31	Normal	2.43E+00	3.70E-03
ENSMUSG00000036928_Stag3	5.75	12.02	1.64	0.73	1.16	1.26	Normal	2.42E+00	1.71E-02
ENSMUSG00000104837_RP23-118K12.1	11.59	6.53	1.13	1.88	0.68	2.22	Normal	2.41E+00	4.12E-02
ENSMUSG00000039835_Nhsl1	97.25	68.48	14.04	11.86	12.96	9.22	Normal	2.41E+00	1.11E-07
ENSMUSG00000025427_Rnf165	4.07	1.79	0.47	0.53	0.53	0.86	Normal	2.41E+00	1.47E-03
ENSMUSG00000039145_Camk1d	10.67	11.41	2.98	1.31	1.61	2.08	Normal	2.41E+00	9.73E-03
ENSMUSG00000035356_Nfkbiz	112.82	76.93	20.26	14.13	13.67	12.69	Normal	2.41E+00	1.36E-06
ENSMUSG00000010601_Apol7a	10.02	7.81	1.22	0.9	1.24	2.17	Normal	2.41E+00	2.09E-02
ENSMUSG00000044244_Il20rb	199.8	212.96	50.77	48.42	24.37	14.66	Normal	2.40E+00	4.14E-02
ENSMUSG00000036885_Arhgef26	3.52	2.58	0.45	0.39	0.38	0.74	Normal	2.40E+00	6.75E-04
ENSMUSG00000042501_Cpa6	3.7	1.68	0.45	0.44	0.26	1.13	Normal	2.40E+00	4.57E-02
ENSMUSG00000020420_Zfp607	11.91	7.33	1.92	1.5	1.67	1.16	Normal	2.40E+00	1.15E-04
ENSMUSG00000102672_Gm37105	10.05	5.63	1.39	1.24	1.16	1.32	Normal	2.40E+00	1.52E-05
ENSMUSG00000036478_Btg1	159.09	166.48	29.52	25.58	24.69	28.03	Normal	2.39E+00	1.09E-11
ENSMUSG00000053560_Ier2	362.8	522.67	91.18	78.25	85.5	54.49	Normal	2.39E+00	1.86E-04
ENSMUSG00000001911_Nfix	146.56	122.48	34.6	27.81	20.57	9.04	Normal	2.39E+00	2.02E-02
ENSMUSG00000068551_Zfp467	22.57	13.79	2.03	1.6	2.23	1.31	Normal	2.39E+00	4.54E-06
ENSMUSG00000105287_RP23-282L6.1	9.85	4.68	1.46	0.91	1.19	1.1	Normal	2.38E+00	7.29E-04
ENSMUSG00000050621_Rps27rt	215.36	355.35	69.38	52.11	98.44	45.31	Normal	2.38E+00	7.01E-04
ENSMUSG00000106411_RP23-342M4.6	25.32	14.28	2.71	2.51	2.78	5.02	Normal	2.38E+00	7.74E-04
ENSMUSG00000028977_Casz1	66.31	49.18	11.08	8.42	5.64	3.82	Normal	2.38E+00	7.45E-03
ENSMUSG00000033174_Mgll	53	55.74	6.89	3.59	10.39	14.96	Normal	2.38E+00	4.76E-02
ENSMUSG00000085328_Gm17131	57.52	27.43	7.14	4.16	6.42	9.74	Normal	2.37E+00	1.81E-03
ENSMUSG00000040564_Apoc1	737.45	948.84	215.66	213.1	214.12	79.43	Normal	2.37E+00	5.58E-03
ENSMUSG00000021638_Ocln	9.84	7.72	1.68	1.97	0.91	1.58	Normal	2.37E+00	3.40E-03

ENSMUSG00000047712_Ust	32.7	31.95	5.87	4.86	4.71	6.36	Normal	2.37E+00	1.26E-09
ENSMUSG00000095105_Edaradd	15.54	9.54	3.2	1.88	1.65	1.39	Normal	2.36E+00	3.06E-03
ENSMUSG00000034607_Pof1b	107.54	114.61	20.63	22.18	17.61	15.11	Normal	2.36E+00	8.63E-07
ENSMUSG00000019944_Rhobtb1	12.85	5.66	1.39	1.8	1.3	0.85	Normal	2.35E+00	4.63E-02
ENSMUSG00000014592_Camta1	53.82	35.7	16.33	11.52	11.12	9.35	Normal	2.35E+00	1.45E-03
ENSMUSG00000105370_RP24-323L24.1	12.5	6.95	1.25	1.05	1.19	3.05	Normal	2.35E+00	3.17E-02
ENSMUSG00000036995_Asap3	9.53	5.97	1.55	1.2	1.47	0.88	Normal	2.35E+00	4.85E-04
ENSMUSG00000030849_Fgfr2	302.76	198.07	68.08	40.78	37.46	32.54	Normal	2.35E+00	7.01E-04
ENSMUSG00000030217_Art4	26.08	27.87	6.14	4.32	4.48	3.82	Normal	2.34E+00	2.44E-05
ENSMUSG00000030409_Dmpk	37.44	15.14	6.46	6.09	6.4	6.08	Normal	2.34E+00	3.35E-05
ENSMUSG00000022865_Cxadr	119.55	166.9	32.45	24.6	28.08	26.21	Normal	2.34E+00	1.08E-05
ENSMUSG00000009739_Pou6f1	19.62	9.63	3.24	2.2	2.53	1.42	Normal	2.33E+00	6.16E-03
ENSMUSG00000051316_Taf7	11.29	11.24	2.05	1.83	2.02	1.9	Normal	2.33E+00	2.26E-08
ENSMUSG00000103657_Gm37204	6.46	2.91	0.91	0.46	0.66	1.12	Normal	2.32E+00	2.19E-02
ENSMUSG00000044433_Camsap3	54.65	38	11.24	9.01	7.48	3.68	Normal	2.32E+00	1.31E-02
ENSMUSG00000071637_Cebpd	40.66	47.65	9.21	6.17	11.53	5.91	Normal	2.31E+00	1.81E-03
ENSMUSG00000105207_RP23-324P1.1	77.63	36.73	10.36	7.1	8.68	12.44	Normal	2.31E+00	3.12E-04
ENSMUSG00000017314_Mpp2	4.26	5.01	1.27	0.63	0.67	0.69	Normal	2.31E+00	6.04E-03
ENSMUSG00000023206_Il15ra	32.56	28.73	9.15	4.63	6.51	6.03	Normal	2.30E+00	2.25E-04
ENSMUSG00000047115_Fam221a	22.21	9.75	3.24	2.45	1.48	3.79	Normal	2.30E+00	5.38E-03
ENSMUSG00000037138_Aff3	13.39	12.69	1.72	1.29	2.11	3.8	Normal	2.30E+00	1.26E-02
ENSMUSG00000073096_Lrrc61	19.12	19.74	6.65	3.77	3.49	2.97	Normal	2.29E+00	6.81E-04
ENSMUSG00000017009_Sdc4	557.72	559.54	107.85	98.24	88.58	106.99	Normal	2.29E+00	1.34E-11
ENSMUSG00000031523_Dlc1	17.65	12.98	2.41	2.91	3.08	2.79	Normal	2.29E+00	2.29E-08
ENSMUSG00000038056_Kmt2c	36.21	20.51	7.36	4.99	4.86	4.7	Normal	2.29E+00	3.89E-04
ENSMUSG00000021636_Marveld2	12.39	9.4	2.55	2.39	1.55	1.24	Normal	2.28E+00	5.96E-03
ENSMUSG00000022508_Bcl6	103.16	59.74	19.3	16.86	11.97	8.3	Normal	2.28E+00	4.72E-03
ENSMUSG00000023092_Fhl1	18.85	14.15	3.63	2.1	3.03	1.86	Normal	2.28E+00	6.84E-04
ENSMUSG00000030047_Arhgap25	9.3	9.45	2.64	1.42	1.54	0.86	Normal	2.28E+00	2.87E-02
ENSMUSG00000026778_Prkcq	4.05	2.79	1.02	0.28	0.64	0.79	Normal	2.28E+00	4.17E-02
ENSMUSG00000027829_Ccnl1	427.72	349.9	67.45	56.56	58.64	61.33	Normal	2.28E+00	5.27E-14
ENSMUSG00000105855_RP23-183L19.3	12.87	7.71	2.06	1.62	1.76	2	Normal	2.27E+00	5.39E-05
ENSMUSG00000102591_Gm38383	14.45	5.81	1.74	1.51	1.53	2.26	Normal	2.27E+00	3.99E-03
ENSMUSG00000040265_Dnm3	5.62	4.51	1.03	1.66	1.37	1.41	Normal	2.27E+00	1.67E-04
ENSMUSG00000059327_Eda	5.21	5.06	0.72	0.64	0.87	0.95	Normal	2.27E+00	7.39E-05
ENSMUSG00000030483_Cyp2b10	30.01	38.02	11.37	3.52	5.99	4.73	Normal	2.26E+00	4.39E-02
ENSMUSG00000027805_Pfn2	15.88	12.83	2.16	2.41	2.66	1.92	Normal	2.26E+00	5.64E-05
ENSMUSG00000028795_Ccdc28b	36.08	23.84	7.45	5.79	5.21	2.62	Normal	2.26E+00	1.55E-02
ENSMUSG00000042826_Fgf11	6.32	3.24	1	0.88	0.92	0.65	Normal	2.26E+00	7.45E-03
ENSMUSG00000060012_Kif13b	16.36	9.72	3.24	2.36	1.92	1.6	Normal	2.26E+00	2.48E-03
ENSMUSG00000026072_Il1r1	30.03	22.39	6	5.13	4.32	1.86	Normal	2.25E+00	2.83E-02

ENSMUSG00000056144_Trim34a	6.57	4.03	0.84	0.9	1.32	1.09	Normal	2.25E+00	1.41E-02
ENSMUSG00000037321_Tap1	150.22	204.46	35.32	31.35	21.85	34.11	Normal	2.25E+00	1.17E-04
ENSMUSG00000073889_Il11ra1	188.73	179.15	36.45	26.39	26.3	19.92	Normal	2.25E+00	9.42E-05
ENSMUSG00000032224_Fam81a	31.21	31.69	6.88	6.92	4.07	4.52	Normal	2.25E+00	1.31E-03
ENSMUSG00000029869_Ephb6	195.69	184.19	43.2	42.72	32.44	18.67	Normal	2.24E+00	7.33E-03
ENSMUSG00000027447_Cst3	1085.73	1260.83	258.48	220.15	246.24	215.93	Normal	2.24E+00	3.33E-08
ENSMUSG00000069892_9930111J21Rik2	4.88	2.7	0.55	0.55	0.69	0.91	Normal	2.24E+00	1.51E-03
ENSMUSG00000005483_Dnajb1	311.04	413.34	62.89	70.45	65.1	76.99	Normal	2.24E+00	1.13E-05
ENSMUSG00000053113_Socs3	232.22	259.54	58.78	49.24	52.6	22.18	Normal	2.23E+00	1.58E-02
ENSMUSG00000034035_Ccdc17	19.56	10.63	3.03	2.61	2.82	3.51	Normal	2.22E+00	2.41E-04
ENSMUSG00000104060_Gm37954	25.92	13.04	3.94	2.51	3.03	4.84	Normal	2.22E+00	4.00E-03
ENSMUSG00000090394_4930523C07Rik	53.24	39.35	10.19	9.69	6.83	5.82	Normal	2.22E+00	1.14E-04
ENSMUSG00000036622_Atp13a2	37.21	29.72	7.76	6.64	4.9	2.91	Normal	2.21E+00	3.76E-02
ENSMUSG00000091562_Gm9581	10.12	7.88	2.45	1.63	1.66	0.93	Normal	2.21E+00	1.89E-02
ENSMUSG00000105454_RP23-309G12.4	52.55	26.52	8.22	6.18	6.29	9.66	Normal	2.21E+00	1.33E-03
ENSMUSG00000097320_Tmem147os	20.8	12.58	3.84	3.62	2.12	2.54	Normal	2.21E+00	8.83E-03
ENSMUSG00000026879_Gsn	566.23	900.55	124.68	118.63	164.43	175.17	Normal	2.21E+00	2.03E-03
ENSMUSG00000029313_Aff1	61.52	48.02	11.42	9	9.51	9.25	Normal	2.21E+00	5.06E-10
ENSMUSG00000020009_Ifngr1	214.39	161.07	50.54	31.44	29.13	16.91	Normal	2.21E+00	1.46E-02
ENSMUSG00000078808_Vmn1r58	7.48	3.38	0.98	0.95	0.93	1.1	Normal	2.21E+00	3.39E-03
ENSMUSG00000102858_Gm37086	21.72	10.27	3.06	2.43	2.44	3.73	Normal	2.21E+00	1.10E-03
ENSMUSG00000023845_Lnpep	40.92	30.86	6.99	4.38	7.23	7.9	Normal	2.20E+00	2.22E-04
ENSMUSG00000046580_Gm7862	71.49	68.27	25	9.84	32.69	16.87	Normal	2.20E+00	2.74E-03
ENSMUSG00000010362_Rdm1	46.27	41.62	8.71	10.03	6.48	8.31	Normal	2.20E+00	2.93E-04
ENSMUSG00000019848_Popdc3	35.2	33.19	8.14	4.29	6.1	8.33	Normal	2.20E+00	1.47E-03
ENSMUSG00000036687_Tmem184a	31	26.67	6.14	7.01	9.59	7.21	Normal	2.20E+00	9.06E-09
ENSMUSG00000096054_Syne1	16.01	7.91	1.54	1.35	2.03	3.86	Normal	2.20E+00	4.92E-02
ENSMUSG00000022231_Sema5a	12.59	8.71	2.8	1.64	1.48	1.96	Normal	2.19E+00	1.20E-03
ENSMUSG00000038065_Mturn	4.63	4.16	1.21	0.89	0.81	0.49	Normal	2.19E+00	4.57E-03
ENSMUSG00000026471_Mr1	10.32	7.47	2.18	1.7	1.8	1.14	Normal	2.18E+00	1.14E-03
ENSMUSG00000023885_Thbs2	62.87	86.1	13.81	17.01	19.17	7.15	Normal	2.18E+00	3.96E-02
ENSMUSG00000106951_RP23-134H19.3	15.99	12.28	3.12	2.82	3.26	1.81	Normal	2.18E+00	4.09E-04
ENSMUSG00000021238_Aldh6a1	28.94	23.05	5.91	5.05	3.98	4.92	Normal	2.17E+00	6.95E-07
ENSMUSG00000067616_Klk11	73.07	53.98	16.99	14.92	12.77	5.81	Normal	2.17E+00	2.80E-02
ENSMUSG00000022018_Rgcc	37.29	22.27	8.63	5.94	7.07	2.71	Normal	2.16E+00	4.86E-02
ENSMUSG00000096727_Psmb9	105.65	122.49	18.91	20.72	12.73	31.78	Normal	2.16E+00	2.06E-02
ENSMUSG00000037235_Mxd4	111.07	105.5	18.25	24.5	18.89	26.52	Normal	2.16E+00	7.70E-09
ENSMUSG00000043252_Tmem64	13.18	10.88	2.95	1.44	2.53	2.26	Normal	2.16E+00	3.85E-03
ENSMUSG00000022788_Fgd4	31.86	16.87	4.05	3.49	3.35	6.32	Normal	2.16E+00	3.37E-03
ENSMUSG00000097695_Gm26905	63.03	31.86	8.47	7.7	6.59	12.78	Normal	2.16E+00	2.10E-03
ENSMUSG00000094614_Gm21769	9.33	6.04	2.01	1.28	1.31	1.25	Normal	2.15E+00	1.75E-03

ENSMUSG00000079547_H2-DMb1	13.48	13.25	3.4	1.86	3.55	2.11	Normal	2.15E+00	3.53E-02
ENSMUSG00000035284_Vps13c	9.1	5.8	1.57	1.16	1.48	1.41	Normal	2.15E+00	2.05E-05
ENSMUSG00000015966_Il17rb	9.34	5.38	1.71	1.86	1.16	1.27	Normal	2.15E+00	8.15E-03
ENSMUSG00000098318_1190002F15Rik	15.18	20.96	4.86	5.47	3.24	1.3	Normal	2.15E+00	1.15E-02
ENSMUSG00000031016_Wee1	60.47	38.39	12.95	10.38	8.13	7.61	Normal	2.13E+00	8.63E-04
ENSMUSG00000041954_Tnfrsf18	200.76	302.64	51.82	60.81	30.78	26.61	Normal	2.13E+00	2.11E-02
ENSMUSG00000048027_Rgmb	54.11	36.82	11.29	8.2	8.82	7.41	Normal	2.13E+00	6.58E-05
ENSMUSG00000048200_Cracr2b	33.57	30.45	10.55	5.9	8.6	9.74	Normal	2.13E+00	1.41E-03
ENSMUSG00000003134_Tbc1d8	50.94	26.32	10.24	6.83	5.85	7.04	Normal	2.12E+00	1.92E-02
ENSMUSG00000057948_Unc13d	42.83	31.15	8.75	11.2	9.53	18.02	Normal	2.12E+00	2.52E-03
ENSMUSG00000015597_Zfp318	16.61	7.95	3.25	1.61	1.84	2.07	Normal	2.12E+00	1.29E-02
ENSMUSG00000086320_Gm12840	779.04	383.4	155.58	162.97	104.7	82.12	Normal	2.12E+00	1.54E-02
ENSMUSG00000092572_Serpinb10	164.45	127.77	34.24	20.3	28.64	45.36	Normal	2.11E+00	3.47E-03
ENSMUSG00000035828_Pim3	136.01	180.42	32.04	31.79	37.45	29.74	Normal	2.11E+00	3.65E-04
ENSMUSG00000026981_Il1rn	77.94	66.14	21.73	16.49	20.9	13.47	Normal	2.10E+00	6.45E-05
ENSMUSG00000052407_Ccdc171	11.63	6.59	1.1	1.27	0.78	1.73	Normal	2.10E+00	6.50E-04
ENSMUSG00000037940_Inpp4b	48.73	28.06	3.69	3.75	4.01	6.4	Normal	2.09E+00	2.83E-04
ENSMUSG00000079470_Utp14b	7.95	5.58	1.3	0.89	1.09	1.79	Normal	2.09E+00	3.86E-03
ENSMUSG00000053070_9230110C19Rik	19.14	19.68	4.72	4.81	3.59	3.23	Normal	2.09E+00	1.44E-03
ENSMUSG00000102411_Gm36936	7.29	3.73	1.06	0.84	0.93	1.6	Normal	2.09E+00	3.06E-02
ENSMUSG00000024059_Clip4	67.12	49.31	13.7	11.58	10.26	11.35	Normal	2.08E+00	1.77E-07
ENSMUSG00000097375_6720427I07Rik	5.22	4.86	1.15	0.88	0.7	1.49	Normal	2.08E+00	2.93E-02
ENSMUSG00000038143_Stox2	17.28	11.11	3.99	2.32	3.34	1.9	Normal	2.07E+00	2.26E-02
ENSMUSG00000071632_2510002D24Rik	93.56	71.85	21.18	18.5	14.03	13.77	Normal	2.07E+00	8.63E-05
ENSMUSG00000029727_Cyp3a13	9.84	5.64	1.72	1.53	1.34	1.68	Normal	2.07E+00	5.16E-04
ENSMUSG00000021678_F2rl1	61.08	62.15	13.48	11.33	16.07	10.61	Normal	2.06E+00	7.38E-04
ENSMUSG00000105578_RP23-342M4.7	11.88	7.15	1.9	1.85	2.08	2.15	Normal	2.06E+00	1.37E-03
ENSMUSG00000040389_Wdr47	40.02	30.39	7.02	6.43	7.54	8.07	Normal	2.06E+00	2.39E-09
ENSMUSG00000034177_Rnf43	30.8	23.65	10.08	6.24	6.93	2.76	Normal	2.05E+00	4.29E-02
ENSMUSG00000055897_Ppp4r1l-ps	22.01	10.61	5.37	3.15	2.79	3.37	Normal	2.05E+00	3.99E-02
ENSMUSG00000030424_Zfp939	7.57	5.5	1.62	1.26	0.9	1.66	Normal	2.05E+00	1.02E-02
ENSMUSG00000020083_2010107G23Rik	46.3	45.15	9.07	9.51	7.96	11.98	Normal	2.05E+00	1.03E-04
ENSMUSG00000043811_Rtn4r	10.37	11.24	3.37	2.47	1.91	1.57	Normal	2.05E+00	3.90E-02
ENSMUSG00000033060_Lmo7	26.4	21.01	6.64	4.42	5.61	6.92	Normal	2.04E+00	4.03E-05
ENSMUSG00000029455_Aldh2	304.58	293.58	64.72	60.32	76.45	62.31	Normal	2.04E+00	7.10E-06
ENSMUSG00000027901_Dennd2d	26.8	18.55	6.5	4.91	4.34	4.04	Normal	2.04E+00	9.43E-04
ENSMUSG00000070942_Il1rl2	148.79	119.79	40.45	28	24.59	16.1	Normal	2.04E+00	9.86E-03
ENSMUSG00000038949_Cnst	35.12	23.52	6.93	4.53	4.64	5.6	Normal	2.04E+00	6.82E-04
ENSMUSG00000040591_1110051M20Rik	44.6	34.07	7.87	7.08	5	9.28	Normal	2.03E+00	1.61E-02
ENSMUSG00000032666_1700025G04Rik	79.13	88.03	14.18	21.82	17	18.53	Normal	2.02E+00	3.57E-07
ENSMUSG00000035236_Scai	11.02	5.85	1.53	1.63	1.71	2.02	Normal	2.02E+00	9.93E-03

ENSMUSG00000030557_Mef2a	114.84	73.29	22.65	15.14	20.22	23.59	Normal	2.02E+00	2.80E-04
ENSMUSG00000022893_Adamts1	39.84	39.89	10.97	6.25	7.5	8	Normal	2.02E+00	1.00E-02
ENSMUSG00000069833_Ahnak	196.49	160.88	42.56	36.24	38.98	41.73	Normal	2.02E+00	1.33E-09
ENSMUSG00000037795_N4bp2	11	4.5	1.37	1.27	1.77	1.13	Normal	2.01E+00	4.53E-02
ENSMUSG00000031292_Cdkl5	3.14	1.82	0.63	0.57	0.69	0.94	Normal	2.01E+00	5.58E-03
ENSMUSG00000001583_Tnk1	61.58	40.83	14.26	8.93	9	11.08	Normal	2.01E+00	8.90E-03
ENSMUSG00000003752_Itpkc	129.5	119.99	22.66	30.67	21.19	21.86	Normal	2.01E+00	3.92E-05
ENSMUSG00000026004_Kansl1l	26.81	14.2	3.13	5.83	2.84	4.93	Normal	2.00E+00	2.76E-02
ENSMUSG00000018143_Mafk	78.13	69.9	17.93	14.25	16.6	13.48	Normal	2.00E+00	1.32E-05
ENSMUSG00000093593_Gm20683	14.58	11	3.95	3.17	2.19	1.76	Normal	1.99E+00	4.83E-02
ENSMUSG00000085037_4933421O10Rik	3.67	2.28	0.82	0.58	0.5	0.65	Normal	1.99E+00	2.10E-02
ENSMUSG00000020427_Igfbp3	549.84	326.31	94.87	69.21	106.13	103.18	Normal	1.99E+00	1.08E-03
ENSMUSG00000045934_Mtmr11	96.57	72.52	24.9	24.71	16.78	10.97	Normal	1.99E+00	4.46E-02
ENSMUSG00000064373_Sepp1	110.58	77.94	23.02	21.46	30.17	15.5	Normal	1.99E+00	2.65E-03
ENSMUSG00000030207_8430419L09Rik	26.96	20.77	6.24	6.4	4.44	3.14	Normal	1.98E+00	2.52E-02
ENSMUSG00000008575_Nfib	58.67	38.43	10.76	7.92	8.15	9.11	Normal	1.98E+00	4.06E-05
ENSMUSG00000066595_Mfsd7b	56.33	39.02	9.52	6.05	7.29	8.02	Normal	1.97E+00	9.55E-04
ENSMUSG00000022546_Gpt	71.46	69.8	20.46	19.06	13.96	10.66	Normal	1.97E+00	1.62E-02
ENSMUSG00000033538_Casp4	10.29	11.52	3.49	3.78	2.53	2.38	Normal	1.97E+00	2.89E-02
ENSMUSG00000057614_Gnai1	96.41	92.37	22.98	14.85	15.26	31.64	Normal	1.97E+00	2.85E-02
ENSMUSG00000036528_Ppfibp2	27.21	18.82	6.75	4.78	4.79	3.67	Normal	1.96E+00	9.98E-03
ENSMUSG00000031736_Crnde	36.92	20.67	8.45	6.63	7.22	5.61	Normal	1.96E+00	1.21E-02
ENSMUSG00000018796_Acsl1	75.98	58.27	18.93	14.78	14.43	10.54	Normal	1.96E+00	1.36E-03
ENSMUSG00000034614_Pik3ip1	30.91	23.8	6.58	5.68	6.32	4.91	Normal	1.96E+00	3.24E-03
ENSMUSG00000047767_Atg16l2	13.78	6.63	3.77	2.18	2.27	2.4	Normal	1.96E+00	4.21E-02
ENSMUSG00000099608_4933411E06Rik	11.33	7.86	1.42	1.61	1.12	1.95	Normal	1.95E+00	3.06E-02
ENSMUSG00000036960_Clca2	138.61	129.74	30.52	22.2	34.7	29.14	Normal	1.95E+00	1.70E-03
ENSMUSG00000024074_Crim1	42.68	27.29	9.74	6.59	7.97	6	Normal	1.95E+00	6.82E-03
ENSMUSG00000061313_Ddhd2	13.42	8.1	2.76	2.11	2.83	1.65	Normal	1.95E+00	2.74E-02
ENSMUSG00000035967_Ddx26b	42.1	25.04	12.2	7.87	7.44	7.3	Normal	1.94E+00	4.78E-02
ENSMUSG00000054843_Atrnl1	31.24	26.19	7.4	5.52	6.39	6.22	Normal	1.94E+00	5.97E-05
ENSMUSG00000021950_Anxa8	2406.27	2534.79	698.71	655.72	510.81	448.69	Normal	1.93E+00	3.50E-03
ENSMUSG00000026315_Serpinb8	111.99	75.04	19.9	22.03	22.25	28.02	Normal	1.92E+00	9.28E-06
ENSMUSG00000032281_Acsbg1	354.26	270.74	56.48	38.24	72.12	71.74	Normal	1.92E+00	1.47E-02
ENSMUSG00000096917_2500002B13Rik	5.83	4.66	1.25	1.09	1	1.5	Normal	1.92E+00	7.19E-03
ENSMUSG00000039701_Usp53	29.56	17	4.93	4.1	3.02	4.05	Normal	1.92E+00	1.16E-03
ENSMUSG00000078954_Arhgap8	9.63	11.25	2.66	2.1	1.85	2.4	Normal	1.92E+00	3.44E-02
ENSMUSG00000041961_Znrf3	21.21	12.68	4.62	3.01	3.64	3.24	Normal	1.91E+00	5.19E-03
ENSMUSG00000002409_Dyrk1b	18.28	12.5	3.37	2.73	3.94	4.12	Normal	1.91E+00	3.60E-03
ENSMUSG00000103839_Gm37607	13.29	6.67	2.44	2.19	2.04	2.35	Normal	1.90E+00	9.83E-03
ENSMUSG00000061232_H2-K1	2051.92	2046	543.44	514.87	356.3	511.36	Normal	1.90E+00	1.28E-03

ENSMUSG00000040746_Rnf167	106.82	90.87	30.82	27.8	18.89	18.16	Normal	1.90E+00	1.50E-02
ENSMUSG00000020142_Slc1a4	17.63	15.41	5.18	4.08	3.48	2.5	Normal	1.90E+00	4.48E-02
ENSMUSG00000019820_Utrn	33.03	23.04	5.65	4.41	6.49	8.81	Normal	1.90E+00	1.61E-02
ENSMUSG00000058756_Thra	72.18	58.38	17.94	17.81	13.85	11.18	Normal	1.90E+00	1.44E-02
ENSMUSG00000033781_Asb13	39.81	22.88	9.61	7.11	6.36	4.94	Normal	1.89E+00	2.30E-02
ENSMUSG00000030771_Micalcl	11.42	6.58	2.15	2.14	2.07	1.48	Normal	1.89E+00	1.91E-02
ENSMUSG00000056116_H2-T22	153.52	191.45	43.94	36.12	36.07	55.29	Normal	1.89E+00	1.05E-02
ENSMUSG00000031380_Figf	21.51	20.85	6.96	5.17	4.21	3.55	Normal	1.89E+00	3.75E-02
ENSMUSG00000025323_Sp4	4.24	3.06	0.96	0.82	0.86	0.69	Normal	1.89E+00	6.05E-03
ENSMUSG00000024750_Zfand5	166.82	115.22	29.13	29.73	29.35	28.95	Normal	1.88E+00	7.38E-09
ENSMUSG00000021514_Zfp369	16.34	12.12	4.25	3.05	3.85	3.58	Normal	1.88E+00	1.39E-03
ENSMUSG00000097145_9230114K14Rik	6.96	4.93	1.67	1.61	1.64	2.75	Normal	1.88E+00	9.34E-03
ENSMUSG00000105476_RP23-381I16.6	5.16	2.85	0.86	0.9	0.75	1.18	Normal	1.87E+00	2.46E-02
ENSMUSG00000022994_Adcy6	31.64	17.92	6.15	5.16	6.51	4.67	Normal	1.87E+00	1.02E-02
ENSMUSG00000037369_Kdm6a	48.47	32.33	8.65	9.35	6.41	9.44	Normal	1.87E+00	4.06E-04
ENSMUSG00000057766_Ankrd29	22.54	16.34	4.43	4.9	4.09	5.09	Normal	1.87E+00	3.27E-04
ENSMUSG00000033192_Lpcat2	49.94	31.36	10.09	9.3	8.47	7.42	Normal	1.87E+00	2.09E-02
ENSMUSG00000090100_Ttbk2	3.97	2.23	0.72	0.5	1.08	0.87	Normal	1.87E+00	2.68E-02
ENSMUSG00000039031_Arhgap18	31.99	24.73	6.78	5.95	6.02	6.63	Normal	1.87E+00	1.29E-06
ENSMUSG00000048249_Crebrf	12.41	11.96	3.32	2.18	1.7	2.02	Normal	1.86E+00	3.00E-02
ENSMUSG00000028152_Tspan5	37.74	39.67	13.82	9.82	8.95	6.71	Normal	1.86E+00	3.39E-02
ENSMUSG00000040717_Il17rd	2.1	1.57	0.42	0.37	0.43	0.51	Normal	1.85E+00	8.35E-03
ENSMUSG00000037887_Dusp8	6.28	6.45	1.24	1.55	1.33	1.16	Normal	1.85E+00	2.65E-02
ENSMUSG00000034640_Tiparp	79.42	73.67	17.04	18.19	18.4	18.51	Normal	1.84E+00	4.32E-06
ENSMUSG00000031337_Mtm1	17.86	11.46	3.9	2.88	2.56	4.46	Normal	1.84E+00	2.57E-02
ENSMUSG00000042810_Krba1	20.03	12.08	4.56	4.85	3.75	4.19	Normal	1.84E+00	2.85E-03
ENSMUSG00000000876_Pxmp4	25.65	25.81	8.24	9.44	7.09	8.47	Normal	1.83E+00	3.31E-03
ENSMUSG00000062098_Btbd3	40.15	35.76	10.54	8.68	8.98	9.13	Normal	1.83E+00	8.04E-05
ENSMUSG00000037573_Tob1	74.52	58.23	17.39	13.22	16.7	17.73	Normal	1.83E+00	2.44E-04
ENSMUSG00000048108_Tmem72	27.06	13.73	4.92	3.49	4.36	6.25	Normal	1.83E+00	3.96E-02
ENSMUSG00000028015_Ctso	14.12	9.91	2.91	2.03	2.42	2.78	Normal	1.82E+00	2.54E-03
ENSMUSG00000022895_Ets2	365.84	276.77	76.58	61.5	62.96	48.51	Normal	1.81E+00	3.28E-03
ENSMUSG00000075595_Zfp652	35.97	23.96	10.86	8.65	8.7	7.81	Normal	1.81E+00	7.49E-03
ENSMUSG00000031937_Vstm5	16.05	12.13	3.35	2.77	3.06	4.98	Normal	1.80E+00	4.76E-02
ENSMUSG00000087370_Tmem170b	9.35	5.67	2.16	1.72	1.72	1.61	Normal	1.80E+00	1.09E-02
ENSMUSG00000024055_Cyp4f13	32.84	21.47	7.12	6.13	5.79	7.93	Normal	1.80E+00	5.86E-04
ENSMUSG00000003032_Klf4	380.73	261.66	98.15	85.19	73.27	58.87	Normal	1.80E+00	1.87E-02
ENSMUSG00000081094_Rpl19-ps11	78.54	111.71	28.45	23.65	27.1	28.19	Normal	1.80E+00	3.33E-02
ENSMUSG00000022951_Rcan1	83.5	80.59	23.92	21.29	20.58	19.2	Normal	1.80E+00	4.90E-04
ENSMUSG00000032702_Kank1	79.83	48.38	20.62	12.61	12.64	10.98	Normal	1.80E+00	3.30E-02
ENSMUSG00000006356_Crip2	301.17	277.31	77.51	71.37	65.88	62.75	Normal	1.80E+00	7.44E-04

ENSMUSG00000020275_Rel	15.38	10.37	4.11	2.75	2.6	3.03	Normal	1.80E+00	1.93E-02
ENSMUSG00000020111_Micu1	91.87	90.79	20.5	18.83	18.45	27.41	Normal	1.79E+00	4.35E-03
ENSMUSG00000034285_Nipsnap1	24.58	22.65	5.87	5.68	5.96	5.02	Normal	1.79E+00	1.15E-03
ENSMUSG00000031791_Tmem38a	6.44	4.95	1.6	1.28	1.39	1.51	Normal	1.79E+00	1.69E-02
ENSMUSG00000089756_Gm8898	23.53	11	3.74	4.3	4.6	4.37	Normal	1.78E+00	3.72E-02
ENSMUSG00000059839_Zfp874b	6.96	5.11	1.68	1.5	1.07	1.78	Normal	1.78E+00	2.92E-02
ENSMUSG00000102307_Gm38194	86.99	40.28	16.39	14.65	13.67	18.21	Normal	1.78E+00	3.09E-02
ENSMUSG00000018909_Arrb1	15.2	10.48	2.56	3.29	2.79	2.64	Normal	1.78E+00	2.29E-03
ENSMUSG00000037270_4932438A13Rik	32.3	20.29	7.22	5.92	6.03	10.19	Normal	1.77E+00	1.86E-02
ENSMUSG00000036158_Prickle1	8.83	7.03	2.01	1.59	2.48	1.88	Normal	1.77E+00	3.66E-02
ENSMUSG00000061878_Sphk1	30.63	33.18	9.63	6.85	9.39	9.22	Normal	1.77E+00	2.51E-03
ENSMUSG00000054723_Vmac	12.02	12.37	3.49	3.56	3.24	2.53	Normal	1.76E+00	3.96E-02
ENSMUSG00000008461_Fut1	9.56	10.36	2.81	2.41	2.91	2.18	Normal	1.76E+00	3.69E-02
ENSMUSG00000033763_Mtss1l	14.32	9.43	2.97	2.54	3.55	2.33	Normal	1.76E+00	2.65E-02
ENSMUSG00000043333_Rhbdl2	47.14	31.85	9.95	8.84	10.16	11.23	Normal	1.76E+00	1.51E-03
ENSMUSG00000040865_Ino80d	16.56	10.25	3.57	2.58	2.77	4.37	Normal	1.76E+00	3.57E-02
ENSMUSG00000025907_Rb1cc1	98.63	78.84	20.1	19.46	15.23	29.64	Normal	1.75E+00	3.89E-04
ENSMUSG00000030872_Gga2	86.48	64.09	21.24	17.41	18.67	18.89	Normal	1.75E+00	4.45E-05
ENSMUSG00000099269_Calm5	276.35	246.55	12.85	5.09	2.44	2.71	Normal	1.75E+00	2.54E-02
ENSMUSG00000029735_Tpk1	13.24	9.3	3.69	2.37	2.51	2.87	Normal	1.74E+00	3.31E-03
ENSMUSG00000038024_Dennd4c	47.08	31.63	11.46	8.95	8.99	10.23	Normal	1.73E+00	2.34E-03
ENSMUSG00000025283_Sat1	785.46	675.59	168.25	183.15	218	191.34	Normal	1.73E+00	1.54E-03
ENSMUSG00000101906_Mrgprc2-ps	13.23	5.92	1.26	1.1	0.89	1.66	Normal	1.73E+00	7.52E-03
ENSMUSG00000021767_Kat6b	18.68	14.38	4.61	3.9	3.59	4.28	Normal	1.72E+00	3.49E-03
ENSMUSG00000030917_Tmem159	49.66	42.65	12.53	9.3	13.4	14.48	Normal	1.72E+00	1.92E-02
ENSMUSG00000031762_Mt2	3766.89	4191.67	1705.69	901.15	1322.2	1072.4	Normal	1.72E+00	1.74E-02
ENSMUSG00000025602_Zfp202	5.93	4.19	1.46	1.2	1.26	1.47	Normal	1.71E+00	1.33E-02
ENSMUSG00000037279_Ovol2	21.2	14.86	5	4.77	4.44	5.21	Normal	1.71E+00	4.28E-03
ENSMUSG00000021025_Nfkbia	308.3	309.11	86.56	78.98	96.55	77.03	Normal	1.70E+00	3.85E-03
ENSMUSG00000028393_Alad	140.63	96.25	35.89	35.44	30.44	28.78	Normal	1.70E+00	4.06E-03
ENSMUSG00000001942_Siae	6.79	5.82	1.72	1.35	1.82	1.86	Normal	1.69E+00	4.01E-02
ENSMUSG00000000325_Arvcf	46.34	36.26	11.99	10.28	9.87	9.3	Normal	1.69E+00	1.06E-02
ENSMUSG00000028007_Snx7	51.78	49.83	13.21	13.12	14.19	15.98	Normal	1.69E+00	1.80E-03
ENSMUSG00000062901_Klhl24	12.38	10.6	3.2	3.49	2.8	2.71	Normal	1.68E+00	5.72E-03
ENSMUSG00000050373_Snx21	38.6	38.31	10.39	12.02	8.03	11.82	Normal	1.68E+00	1.09E-02
ENSMUSG00000049686_Orai1	31.09	35.49	9.62	8.26	10.09	9.69	Normal	1.67E+00	3.06E-02
ENSMUSG00000025239_Limd1	72.75	61.18	20.79	17.08	15.85	18.63	Normal	1.67E+00	2.01E-03
ENSMUSG00000027130_Slc12a6	32.42	21.3	8.25	5.66	6.55	6.36	Normal	1.67E+00	1.94E-02
ENSMUSG00000030208_Emp1	508.22	511.99	141.26	126.95	149.92	144.93	Normal	1.66E+00	3.27E-03
ENSMUSG00000097296_Gm26532	67.1	52.9	23.57	15.22	17.9	16.92	Normal	1.65E+00	1.12E-02
ENSMUSG00000055978_Fut2	20.19	16.11	5.42	4.47	5.79	4.43	Normal	1.64E+00	3.78E-02

ENSMUSG00000079037_Prnp	206.49	240.8	67.61	55.69	66.73	71.17	Normal	1.63E+00	4.85E-02
ENSMUSG00000073411_H2-D1	1465.03	1558.02	449.49	462.37	321.46	453.12	Normal	1.61E+00	4.00E-02
ENSMUSG00000051285_Pcmtd1	65.09	43.6	14.04	11.31	12.95	15.43	Normal	1.61E+00	1.51E-02
ENSMUSG00000033004_Mycbp2	56.25	36.77	18.57	15.43	14.1	16.09	Normal	1.61E+00	4.84E-02
ENSMUSG00000032462_Pik3cb	24.32	20.78	6.94	5.09	6.01	6.8	Normal	1.61E+00	2.74E-02
ENSMUSG00000083012_Fam220a	72.81	68.83	22.04	20.11	18.95	24.96	Normal	1.60E+00	6.73E-03
ENSMUSG00000053253_Ndfip2	158.41	142.06	48.23	44.24	50.26	66.45	Normal	1.58E+00	4.63E-02
ENSMUSG00000035919_Bbs9	13.89	9.21	3.44	3.77	2.56	4.06	Normal	1.56E+00	2.67E-02
ENSMUSG00000043154_Ppp2r3a	39.41	27.86	9.18	8.98	9.28	9.15	Normal	1.56E+00	5.72E-03
ENSMUSG00000022146_Osmr	41.17	29.08	10.01	8.16	6.76	7.12	Normal	1.56E+00	4.40E-02

Table 2: Significantly up-regulated genes in papilloma versus SCC basal progenitor cells (TPMs per Sample)

Gene	Normal Normal 1	Normal Normal 2	Papilloma Pap 1	Papilloma Pap 2	SCC SCC 1	SCC SCC 2	Enriched in	Log2(Fold-Change)	padj
ENSMUSG00000080859_Rpl10-ps1	137.52	0	0	0	0	0.13	SCC	-1.62E+01	3.20E-02
ENSMUSG00000078922_Tgtp1	0.36	0.32	0.2	0.68	0.4	11.74	SCC	-4.71E+00	8.41E-03
ENSMUSG00000060019_Gm10073	0.44	3.13	6.94	2.8	84.72	1.87	SCC	-4.27E+00	4.07E-02
ENSMUSG00000094065_Gm21541	0.53	2.93	1.75	1.46	5.72	44.98	SCC	-3.89E+00	7.52E-04
ENSMUSG00000027068_Dhrs9	0.32	0.51	0.71	0.9	2.79	7.4	SCC	-3.75E+00	4.04E-10
ENSMUSG00000068794_Col28a1	0.58	0.11	0.41	0.75	3.11	4.3	SCC	-3.73E+00	7.14E-07
ENSMUSG00000094686_Ccl21a	8.88	5.65	9.94	10.69	56.93	115.71	SCC	-3.72E+00	1.88E-17
ENSMUSG00000030283_St8sia1	0.03	0.04	0.3	0.14	2.5	5.02	SCC	-3.70E+00	2.68E-07
ENSMUSG00000037754_Ppp1r16b	0.36	0.2	0.51	0.42	1.51	3	SCC	-3.26E+00	4.65E-12
ENSMUSG00000031425_Plp1	7.87	1.89	0.82	0.73	4.96	6.47	SCC	-3.24E+00	4.47E-06
ENSMUSG00000022102_Dok2	0.47	0.25	2.3	2.71	17.3	25.28	SCC	-3.13E+00	1.54E-10
ENSMUSG00000019775_Rgs17	0	0.02	0.38	0.97	1.29	5.5	SCC	-2.97E+00	2.15E-02
ENSMUSG00000025780_Itih5	9.53	13.09	0.59	0.65	3.71	6.04	SCC	-2.96E+00	1.04E-13
ENSMUSG00000001270_Ckb	3.94	3.28	4.61	3.78	9.77	38.97	SCC	-2.92E+00	8.04E-06
ENSMUSG00000026420_Il24	0.2	0.38	51.66	46.1	174.49	527.87	SCC	-2.86E+00	1.74E-05
ENSMUSG00000074874_Ctla2b	0.35	0.13	1.8	2.55	11.55	18.87	SCC	-2.78E+00	9.42E-08
ENSMUSG00000023913_Pla2g7	8.55	8.24	11.88	15.3	45.07	59.42	SCC	-2.76E+00	8.41E-29
ENSMUSG00000039070_Cpa4	0.14	0.45	3.31	2.67	12.81	28.05	SCC	-2.76E+00	3.12E-04
ENSMUSG00000056648_Hoxb8	6.49	3.43	0.92	0.22	3.2	3.87	SCC	-2.70E+00	3.92E-04
ENSMUSG00000029338_Antxr2	10.52	6.62	13.27	15	33.77	52.81	SCC	-2.62E+00	1.69E-21
ENSMUSG00000054641_Mmrn1	0.3	0.22	0.72	0.93	3.86	5.76	SCC	-2.53E+00	8.21E-12
ENSMUSG00000000690_Hoxb6	16.05	8.74	2.01	1.23	6.99	11.17	SCC	-2.50E+00	3.50E-07
ENSMUSG00000038721_Hoxb7	8.54	7.23	2.44	2.19	9.42	16.71	SCC	-2.50E+00	2.47E-08
ENSMUSG00000042116_Vwa1	9.75	11.53	16.71	18.52	41.09	62.05	SCC	-2.45E+00	3.15E-16
ENSMUSG00000068246_Apol9b	0.55	0.19	1.5	4.21	10.53	20.61	SCC	-2.42E+00	1.01E-02
ENSMUSG00000037411_Serpine1	3.44	5.81	22.81	31.57	111.59	176.1	SCC	-2.38E+00	3.81E-07
ENSMUSG00000017737_Mmp9	0.42	0.26	13.66	12.2	88.12	51.32	SCC	-2.38E+00	1.20E-07
ENSMUSG00000060675_Pla2g16	9.49	11.29	1.26	0.97	2.96	9.97	SCC	-2.37E+00	1.74E-05
ENSMUSG00000027375_Mal	2.45	0.69	4.51	1.97	3.92	8.62	SCC	-2.32E+00	1.62E-03
ENSMUSG00000027399_Il1a	0.85	0.61	6.69	6.54	20.54	45.31	SCC	-2.30E+00	1.44E-06
ENSMUSG00000042453_Reln	2.12	0.42	0.47	0.54	1.89	4.49	SCC	-2.30E+00	2.46E-02
ENSMUSG00000031342_Gpm6b	1.65	0.75	0.9	1.43	3.95	6.25	SCC	-2.29E+00	8.41E-06
ENSMUSG00000026475_Rgs16	1	0.31	3.19	2.55	9.04	19.17	SCC	-2.28E+00	1.55E-03
ENSMUSG00000079363_Gbp4	0.93	0.54	0.51	0.29	0.76	5.36	SCC	-2.28E+00	2.43E-02
ENSMUSG00000022438_Parvb	0.68	0.36	2.91	8.82	8.41	27.3	SCC	-2.28E+00	1.07E-09
ENSMUSG00000026479_Lamc2	90.51	74.97	258.72	275.64	1020.4	1468.4	SCC	-2.26E+00	3.21E-34
ENSMUSG00000042842_Serpinb6b	0.27	0.35	1.38	1.32	5.62	7.24	SCC	-2.23E+00	6.25E-08
ENSMUSG00000048776_Pthlh	3.27	3.69	41.26	43.84	152.31	247.57	SCC	-2.22E+00	4.77E-12

ENSMUSG00000021765_Fst	32.04	31.92	20.95	22.82	84.23	177.56	SCC	-2.20E+00	5.33E-09
ENSMUSG00000042532_Golga7b	3.45	5.71	0.33	0.28	0.82	1.99	SCC	-2.19E+00	1.35E-02
ENSMUSG00000032374_Plod2	1.27	0.59	4.65	7.38	15.83	35.67	SCC	-2.18E+00	8.29E-05
ENSMUSG00000025268_Maged2	10.25	10.85	9.3	11.18	36.9	57.09	SCC	-2.14E+00	3.59E-13
ENSMUSG00000062826_Ces2f	4.21	3.62	7.56	6.05	10.39	20.17	SCC	-2.14E+00	1.29E-07
ENSMUSG00000027859_Ngf	0.32	1.06	8.56	7.48	24.07	45.83	SCC	-2.13E+00	1.61E-02
ENSMUSG00000024421_Lama3	107.74	73.25	107.71	111.33	339.18	475.05	SCC	-2.13E+00	6.03E-21
ENSMUSG00000104554_RP23-71G16.6	0.17	0.34	12.38	14.69	32.69	81.57	SCC	-2.09E+00	5.56E-03
ENSMUSG00000025809_Itgb1	122.74	117.71	197.49	204.83	349.38	519.37	SCC	-2.08E+00	2.70E-18
ENSMUSG00000040473_Cfap69	0.28	0.17	2.28	2.71	5.97	19.73	SCC	-2.07E+00	1.07E-02
ENSMUSG00000022656_Pvrl3	0.71	0.98	1.84	1.89	4.91	11.05	SCC	-2.07E+00	2.01E-03
ENSMUSG00000029070_Mxra8	3.27	1.01	3.58	4.81	9.01	4.73	SCC	-2.06E+00	4.75E-03
ENSMUSG00000053626_Tll1	0.5	0.2	0.66	1.66	4.36	5.33	SCC	-2.06E+00	6.07E-03
ENSMUSG00000047562_Mmp10	0.11	0.14	4.32	12.38	19.74	50.88	SCC	-2.06E+00	3.38E-02
ENSMUSG00000055723_Rras2	20.29	18.74	28.74	35.9	50.78	91.53	SCC	-2.04E+00	1.06E-09
ENSMUSG00000002289_Angptl4	8.92	15.78	13.43	29.03	49.06	39.49	SCC	-2.04E+00	4.06E-04
ENSMUSG00000026872_Zeb2	0.74	0.49	0.65	0.5	1.73	1.24	SCC	-2.03E+00	2.53E-05
ENSMUSG00000059824_Dbp	3.19	2.06	13.6	2.64	17.66	4.46	SCC	-2.03E+00	3.13E-02
ENSMUSG00000043089_Mmp1a	0	0	2.82	4.21	7.11	21.95	SCC	-2.03E+00	2.84E-02
ENSMUSG00000007783_Cpt1c	3.5	1.93	0.91	1.02	2.05	5.96	SCC	-2.02E+00	1.29E-02
ENSMUSG00000032899_Styk1	5.43	2.79	1.22	2.5	2.95	3.82	SCC	-2.00E+00	1.08E-04
ENSMUSG00000028931_Kcnab2	0.47	1.07	2.79	5.08	11.29	22.27	SCC	-2.00E+00	1.52E-03
ENSMUSG00000068220_Lgals1	8.99	7.6	358.92	408.11	1189.8	1845.6	SCC	-1.99E+00	5.59E-08
ENSMUSG00000045092_S1pr1	1.81	0.79	3.02	1.9	6.08	2.39	SCC	-1.99E+00	3.65E-03
ENSMUSG00000037379_Spon2	5.18	4.15	4.39	7.8	8.24	22.47	SCC	-1.99E+00	2.53E-04
ENSMUSG00000021998_Lcp1	3.16	1.98	5.43	3.45	15.33	19.14	SCC	-1.98E+00	1.30E-09
ENSMUSG00000103472_Pcdhga7	0.75	1.03	1.38	0.79	1.92	3.51	SCC	-1.98E+00	1.98E-03
ENSMUSG00000025666_Tmem47	1.66	1.31	2.05	1.92	4.45	4.77	SCC	-1.98E+00	1.13E-11
ENSMUSG00000011179_Odc1	78.83	64.43	97.51	101.37	152.16	342.57	SCC	-1.97E+00	2.46E-07
ENSMUSG00000001946_Esam	2.55	1.86	6.97	3.53	11	4.45	SCC	-1.97E+00	7.48E-03
ENSMUSG00000046312_AI464131	2.36	0.74	2.64	3.32	6.02	3.92	SCC	-1.96E+00	6.54E-04
ENSMUSG00000007908_Hmgcll1	1.59	1.23	1.33	1.9	3.47	7.34	SCC	-1.95E+00	7.50E-07
ENSMUSG00000029185_Fam114a1	6.76	5.5	5.35	8.01	14.54	26.29	SCC	-1.93E+00	8.62E-07
ENSMUSG00000024899_Papss2	3.69	3.22	5.14	5.96	9.59	13.27	SCC	-1.93E+00	3.40E-15
ENSMUSG00000045827_Serpinb9	1.56	1.52	2.52	3.84	9.8	14.61	SCC	-1.93E+00	1.43E-06
ENSMUSG00000015354_Pcolce2	0.52	0.18	5.34	6.05	13.52	30.67	SCC	-1.93E+00	2.15E-09
ENSMUSG00000037946_Fgd3	0.14	0.16	0.58	0.72	2.21	3.01	SCC	-1.92E+00	2.38E-05
ENSMUSG00000029844_Hoxa1	2.16	1.94	3.46	2.56	4.58	9.39	SCC	-1.92E+00	6.23E-05
ENSMUSG00000028494_Plin2	35.78	33.99	62.34	100.71	239.97	352.17	SCC	-1.91E+00	2.95E-06
ENSMUSG00000049382_Krt8	0.19	0.52	29.16	46.18	148.81	127.86	SCC	-1.88E+00	2.55E-03
ENSMUSG00000044447_Dock5	2.64	1.54	3.15	2.54	5.26	7.61	SCC	-1.87E+00	8.34E-10
ENSMUSG00000022367_Has2	0.51	0.2	3.63	3.29	6.75	19.11	SCC	-1.87E+00	1.48E-02
ENSMUSG00000010830_Kdelr3	0.63	0.84	8.05	9.94	21.44	44.4	SCC	-1.86E+00	2.05E-03

ENSMUSG00000034810_Scn7a	0.7	0.2	0.25	0.34	0.94	1.76	SCC	-1.86E+00	6.66E-03
ENSMUSG00000041378_Cldn5	2.61	2.13	1.84	1.55	6.7	8.59	SCC	-1.85E+00	1.01E-07
ENSMUSG00000024063_Lbh	3.11	5.04	5.02	5.11	12.67	12.11	SCC	-1.84E+00	1.19E-06
ENSMUSG00000053062_Jam2	1.97	0.95	5.95	4.68	12.28	21.13	SCC	-1.84E+00	6.68E-04
ENSMUSG00000041445_Mmrn2	1.2	0.63	1.93	1.42	3.61	1.75	SCC	-1.84E+00	1.80E-03
ENSMUSG00000048960_Prex2	2.35	1.45	0.38	0.43	0.57	1.41	SCC	-1.83E+00	2.71E-02
ENSMUSG00000020176_Grb10	1.12	0.42	1.06	0.69	2.2	1.62	SCC	-1.81E+00	1.76E-03
ENSMUSG00000056492_Adgrf5	1.11	0.38	1.35	0.74	2.46	1.72	SCC	-1.80E+00	3.72E-03
ENSMUSG00000047414_Flrt2	9.74	8.3	12.02	12.78	19.52	29.33	SCC	-1.79E+00	2.82E-12
ENSMUSG00000026817_Ak1	21.62	22.7	51.56	29.07	57.68	98	SCC	-1.79E+00	1.67E-05
ENSMUSG00000052776_Oas1a	4.62	4.5	1.09	1.36	4.2	4.27	SCC	-1.78E+00	9.16E-06
ENSMUSG00000056758_Hmga2	0.42	0.22	49.54	43.66	113.64	207.52	SCC	-1.77E+00	6.11E-06
ENSMUSG00000044337_Ackr3	45.93	53.8	14.22	11.14	32.15	52.64	SCC	-1.76E+00	4.19E-06
ENSMUSG00000050708_Ftl1	456.25	486.64	803.04	693.65	1278.5	1682.6	SCC	-1.76E+00	1.99E-11
ENSMUSG00000034353_Ramp1	0.78	0.52	1.66	3.1	6.8	8.93	SCC	-1.76E+00	1.77E-03
ENSMUSG00000000753_Serpinf1	1.12	0.94	80.42	82.41	180.68	365.23	SCC	-1.74E+00	1.36E-04
ENSMUSG00000032487_Ptgs2	11.56	16.39	4.93	3.69	11.01	16.89	SCC	-1.73E+00	3.17E-04
ENSMUSG00000023043_Krt18	0.07	0.29	48.55	48.29	141.78	178.34	SCC	-1.73E+00	2.54E-07
ENSMUSG00000046157_Tmem229b	0.31	0.32	2	2.35	4.77	10.12	SCC	-1.72E+00	4.82E-03
ENSMUSG00000026600_Soat1	1.47	0.85	12.93	12.08	34.82	40.11	SCC	-1.72E+00	2.23E-06
ENSMUSG00000090084_Srpx	0.1	0.11	2.67	3.05	6.17	11.44	SCC	-1.72E+00	3.97E-03
ENSMUSG00000022623_Shank3	0.55	0.33	1.17	0.58	1.91	0.68	SCC	-1.72E+00	3.00E-02
ENSMUSG00000074934_Grem1	11.49	6.02	1.09	1.11	2.99	4.29	SCC	-1.71E+00	2.61E-05
ENSMUSG00000032068_Plet1	75.03	57.89	70	65.92	117.07	215.49	SCC	-1.71E+00	1.70E-07
ENSMUSG00000024486_Hbegf	29.89	36.8	59.99	53.73	83.97	110.42	SCC	-1.71E+00	5.85E-09
ENSMUSG00000031465_Angpt2	0.67	0.49	1.77	1.1	4.97	4.11	SCC	-1.70E+00	4.84E-05
ENSMUSG00000029207_Apbb2	5.07	2.87	4.44	5.14	9.1	14.51	SCC	-1.69E+00	1.31E-07
ENSMUSG00000016487_Ppfibp1	26.94	18.08	29.75	32.09	51.71	64.44	SCC	-1.68E+00	3.53E-16
ENSMUSG00000003355_Fkbp11	8.82	9.07	18.54	14.23	20.85	32.78	SCC	-1.66E+00	6.01E-05
ENSMUSG00000031996_Aplp2	111.93	107.59	172.95	178.23	328.66	268.68	SCC	-1.66E+00	5.34E-13
ENSMUSG00000046223_Plaur	0.22	0.21	12.61	11.43	36.27	39.04	SCC	-1.65E+00	5.24E-13
ENSMUSG00000049439_Cyp20a1	5.01	4.33	7.42	7.64	11.47	13.48	SCC	-1.65E+00	1.03E-14
ENSMUSG00000050379_Sept6	4.24	3.8	6.45	6.54	10.78	14.66	SCC	-1.65E+00	3.49E-14
ENSMUSG00000016918_Sulf1	0.41	0.2	3.26	5.11	8.72	17.58	SCC	-1.65E+00	2.46E-03
ENSMUSG00000020357_Flt4	0.2	0.07	0.71	0.65	2.24	1.99	SCC	-1.65E+00	1.11E-02
ENSMUSG00000098557_Kctd12	6.95	4.78	3.05	2.49	6.07	12.24	SCC	-1.65E+00	1.20E-04
ENSMUSG00000106106_Rn18s-rs5	964.29	572.74	1189.92	885.37	1567.2	2605.1	SCC	-1.65E+00	9.27E-07
ENSMUSG00000026655_Fam107b	4.39	6.2	8.4	7.27	13.57	13.36	SCC	-1.64E+00	1.93E-08
ENSMUSG00000026193_Fn1	13.67	11.72	21.87	20.37	38.36	15.75	SCC	-1.64E+00	8.62E-03
ENSMUSG00000054321_Taf4b	5.57	3.91	7.45	5.54	10.73	14.2	SCC	-1.63E+00	2.85E-09
ENSMUSG00000035969_Rusc2	1.41	0.6	6.06	8.34	18.22	26.3	SCC	-1.62E+00	3.07E-07
ENSMUSG00000057722_Lepr	0.37	0.31	0.79	1.04	2.18	3.42	SCC	-1.62E+00	5.66E-05
ENSMUSG00000050212_Eva1b	3.99	3.24	5.51	5.07	9.61	10.97	SCC	-1.62E+00	1.02E-08

ENSMUSG00000089901_Gm8113	3.01	1.85	1.62	2.19	4.32	8.55	SCC	-1.62E+00	5.85E-04
ENSMUSG00000044211_Gm7887	17.47	14.45	21.02	11.96	59.21	39.55	SCC	-1.61E+00	5.15E-08
ENSMUSG00000071362_Gm10330	3.51	2.61	3.67	4.4	5.78	10.74	SCC	-1.60E+00	7.39E-04
ENSMUSG00000057335_Cep170	1.98	0.86	2.68	2.85	5.99	10.96	SCC	-1.60E+00	4.96E-04
ENSMUSG00000026435_Slc45a3	1.52	1.5	2.46	2.53	4.21	3.52	SCC	-1.59E+00	1.95E-06
ENSMUSG00000054942_Fam73a	13.32	6.34	9.15	16.85	22.2	27.27	SCC	-1.58E+00	1.76E-04
ENSMUSG00000040102_Klhl42	3.64	2.45	4.77	4.12	5.95	9.61	SCC	-1.58E+00	1.73E-07
ENSMUSG00000010047_Hyal2	24.14	25.35	38.8	41.04	60.4	76.13	SCC	-1.58E+00	6.76E-10
ENSMUSG00000063804_Lin28b	0	0.01	0.77	0.94	1.72	3.42	SCC	-1.57E+00	2.91E-02
ENSMUSG00000005107_Slc2a9	2.27	2	3.39	4.09	3.83	5.69	SCC	-1.57E+00	1.02E-05
ENSMUSG00000048644_Ctxn1	2.56	2.47	3.66	4.33	7.57	5.82	SCC	-1.55E+00	1.11E-04
ENSMUSG00000022074_Tnfrsf10b	7.38	5.85	9.76	10.23	14.4	19.18	SCC	-1.55E+00	8.23E-14
ENSMUSG00000042099_Kank3	4.63	2.75	6.67	5.21	9.43	10.78	SCC	-1.55E+00	1.85E-06
ENSMUSG00000030623_Prss23os	48.63	47.02	3.41	8.48	8.81	29.7	SCC	-1.54E+00	2.26E-02
ENSMUSG00000026259_Ngef	4.15	3.67	7.11	4.49	7.61	9.95	SCC	-1.54E+00	3.22E-06
ENSMUSG00000025608_Podxl	1.24	0.46	1.65	1.14	2.41	1.6	SCC	-1.54E+00	1.20E-02
ENSMUSG00000029468_P2rx7	4.6	3.07	2	1.48	3.95	7.85	SCC	-1.53E+00	8.46E-05
ENSMUSG00000060147_Serpinb6a	159.77	173.14	234.45	272.57	347.05	506.7	SCC	-1.53E+00	2.75E-07
ENSMUSG00000020848_Doc2b	0.46	0.32	1.22	1.76	4.48	4.08	SCC	-1.53E+00	2.44E-04
ENSMUSG00000057363_Uxs1	15.86	14.57	32.31	24.9	38.94	47.16	SCC	-1.53E+00	7.90E-10
ENSMUSG00000032064_Dixdc1	2.86	1.52	1.1	1.04	1.82	5.36	SCC	-1.52E+00	1.85E-02
ENSMUSG00000050578_Mmp13	0.04	0.19	15.89	22.59	51.38	59.32	SCC	-1.52E+00	6.36E-03
ENSMUSG00000030844_Rgs10	19.47	20.45	5.65	4.62	11.56	17.02	SCC	-1.51E+00	1.80E-03
ENSMUSG00000027669_Gnb4	0.49	0.24	3.19	3	8.95	10.71	SCC	-1.51E+00	6.89E-03
ENSMUSG00000009900_Wnt3a	14.04	15.49	8.96	5.23	16.27	24.19	SCC	-1.50E+00	2.69E-03
ENSMUSG00000039405_Prss23	67.18	84.85	16.12	11.23	33.93	43.88	SCC	-1.50E+00	2.95E-04
ENSMUSG00000078771_Evi2a	0.34	0.37	3.98	5.18	9.42	19.51	SCC	-1.50E+00	9.21E-03
ENSMUSG00000044258_Ctla2a	6.17	4.7	10.79	12.55	37.94	27.7	SCC	-1.49E+00	9.48E-06
ENSMUSG00000015533_Itga2	19.1	14.41	7.47	6.55	18.34	20.95	SCC	-1.48E+00	6.44E-15
ENSMUSG00000039236_Isg20	11.99	8.41	8.52	17.68	19.12	36.46	SCC	-1.48E+00	8.39E-03
ENSMUSG00000027199_Gatm	4.74	1.11	1.19	0.75	5.23	7.85	SCC	-1.48E+00	4.06E-02
ENSMUSG00000052430_Bmpr1b	0.73	0.84	1.78	1.24	2.68	5.76	SCC	-1.48E+00	3.83E-02
ENSMUSG00000000420_Galnt1	43.83	37.88	57.04	52.74	73.91	106.69	SCC	-1.47E+00	8.37E-11
ENSMUSG00000022434_Fam118a	2.52	1.14	2.57	3.52	3.72	4.81	SCC	-1.46E+00	1.64E-03
ENSMUSG00000031383_Dusp9	0.41	0.45	9.51	7.82	23.98	23.61	SCC	-1.46E+00	1.82E-07
ENSMUSG00000036564_Ndrg4	2.94	2.08	2.54	3.13	4.57	6.67	SCC	-1.46E+00	3.39E-05
ENSMUSG00000031438_Rnf128	0.34	0.31	1.83	1.84	4.06	6.1	SCC	-1.46E+00	1.21E-03
ENSMUSG00000063531_Sema3e	3.69	3.23	0.55	0.37	1.04	1.47	SCC	-1.45E+00	4.26E-04
ENSMUSG00000056121_Fez2	10.95	8.96	16.31	14.76	23.17	24.67	SCC	-1.45E+00	3.57E-17
ENSMUSG00000051431_Gpr87	45.71	41.15	65.28	72.24	87.51	119.33	SCC	-1.44E+00	5.13E-10
ENSMUSG00000002847_Pla1a	0	0.01	5.16	5.44	11.95	16.99	SCC	-1.44E+00	2.87E-04
ENSMUSG00000009687_Fxyd5	3.64	3.8	62.46	52.23	103.39	179.08	SCC	-1.44E+00	1.80E-03
ENSMUSG00000026930_Gpsm1	1.41	0.31	2.75	1.88	5.86	5.93	SCC	-1.44E+00	3.72E-02

ENSMUSG00000036273_Lrrk2	3.38	1.51	3.07	6.32	4.91	11.11	SCC	-1.44E+00	4.41E-04
ENSMUSG00000019923_Zwint	50.94	36.47	80.05	80.48	93.42	131.48	SCC	-1.43E+00	2.67E-08
ENSMUSG00000004655_Aqp1	6.72	3.64	11.22	8.89	32.7	21.08	SCC	-1.43E+00	3.83E-03
ENSMUSG00000071180_Smim15	36.81	24.48	48.29	48.96	52.19	91.91	SCC	-1.43E+00	1.13E-05
ENSMUSG00000040212_Emp3	2.82	2.92	43.5	39.56	87.5	131.95	SCC	-1.42E+00	8.39E-04
ENSMUSG00000017723_Wfdc2	0.4	1	58.88	47.05	96.12	181.71	SCC	-1.42E+00	2.49E-02
ENSMUSG00000030790_Adm	11.19	5.79	7.45	9.91	19.64	18.01	SCC	-1.42E+00	7.51E-05
ENSMUSG00000051166_Eml5	1.11	0.35	0.89	0.97	1.15	2.05	SCC	-1.42E+00	1.57E-02
ENSMUSG00000053702_Nebl	4.71	5.59	8.95	8.9	11.63	14.82	SCC	-1.42E+00	4.03E-07
ENSMUSG00000034055_Phka1	4.38	2.92	0.65	0.52	1.06	2.09	SCC	-1.41E+00	1.85E-02
ENSMUSG00000097554_Gm26825	476.68	594.18	717.08	1120.64	1022	1541.1	SCC	-1.41E+00	2.92E-04
ENSMUSG00000044303_Cdkn2a	0.04	0.13	33.2	41.73	90.43	110.59	SCC	-1.41E+00	6.17E-04
ENSMUSG00000033149_Phldb2	16.66	12.29	10.7	11.69	21.95	40.06	SCC	-1.41E+00	6.95E-06
ENSMUSG00000031278_Acsl4	10.44	10.14	13.85	15.22	19.89	28.01	SCC	-1.41E+00	3.05E-09
ENSMUSG00000020326_Ccng1	29.85	25.54	49.21	62.64	95.75	204.75	SCC	-1.41E+00	3.55E-03
ENSMUSG00000067787_Blcap	31.05	19.39	32.17	33.06	43.91	53.26	SCC	-1.40E+00	1.14E-15
ENSMUSG00000027828_Ssr3	97.21	88.24	152.23	156.4	174.8	250.05	SCC	-1.40E+00	1.49E-10
ENSMUSG00000030538_Cib1	51.29	61.92	83.66	103.23	100.01	146	SCC	-1.40E+00	1.06E-05
ENSMUSG00000054612_Mgmt	10.51	13.18	4.97	6.02	11.85	17.07	SCC	-1.39E+00	4.14E-02
ENSMUSG00000031570_Ppapdc1b	14.92	9.19	16.33	16.48	18.42	35.11	SCC	-1.39E+00	5.45E-05
ENSMUSG00000023905_Tnfrsf12a	127.73	168.74	208.57	190.25	307.03	416.28	SCC	-1.39E+00	5.76E-05
ENSMUSG00000038170_Pde4dip	9.05	6.43	5.53	3.78	10.22	17.48	SCC	-1.39E+00	9.34E-04
ENSMUSG00000040158_Tax1bp3	83.16	91.31	130.71	159.31	170.53	223.13	SCC	-1.38E+00	2.17E-08
ENSMUSG00000070436_Serpinh1	86.2	83.52	98.12	133.85	190.05	199.32	SCC	-1.38E+00	2.24E-08
ENSMUSG00000030592_Ryr1	0.46	0.35	0.21	0.23	0.44	0.7	SCC	-1.38E+00	2.63E-03
ENSMUSG00000035498_Cdcp1	45.84	37.53	61.89	64.07	86.77	93.23	SCC	-1.37E+00	1.54E-26
ENSMUSG00000020589_Fam49a	4.69	2.67	4.67	4.86	5.25	10.94	SCC	-1.37E+00	1.22E-03
ENSMUSG00000022844_Pdia5	2.09	2.17	3.94	4.06	9.72	10.96	SCC	-1.37E+00	3.83E-05
ENSMUSG00000024346_Pfdn1	55.12	53.19	92.98	101.11	114.12	141.67	SCC	-1.37E+00	2.82E-08
ENSMUSG00000026836_Acvr1	10.21	9.43	15.28	19.3	21.81	24.84	SCC	-1.37E+00	4.69E-10
ENSMUSG00000002233_Rhoc	5.07	1.77	36.78	49.46	90.87	142.03	SCC	-1.37E+00	1.07E-02
ENSMUSG00000102824_Gm3837	52.58	41.67	83.1	97.75	91.94	156.8	SCC	-1.36E+00	2.41E-02
ENSMUSG00000031367_Ap1s2	4.7	3.53	6.09	6.11	8.48	11.4	SCC	-1.36E+00	1.41E-08
ENSMUSG00000038648_Creb3l2	7.06	5.22	7.38	7.93	10.03	15.55	SCC	-1.36E+00	9.40E-08
ENSMUSG00000035372_1810055G02Rik	10.76	10.94	19.25	18.29	22.34	27.17	SCC	-1.36E+00	8.93E-09
ENSMUSG00000003948_Mmd	19.31	16.63	22.72	18.38	32.18	46.5	SCC	-1.36E+00	2.04E-07
ENSMUSG00000046798_Cldn12	10.49	8.31	13.51	13.37	19.68	23.14	SCC	-1.36E+00	1.72E-16
ENSMUSG00000106831_RP23-386C10.8	83.79	75.17	138.39	157.01	171.96	238.45	SCC	-1.35E+00	2.16E-03
ENSMUSG00000001020_S100a4	172.46	103.07	262.92	206.69	493.53	236.89	SCC	-1.35E+00	5.83E-05
ENSMUSG00000027808_Serp1	36.66	37.62	62.58	63.21	66.57	99.12	SCC	-1.35E+00	1.25E-07
ENSMUSG00000051615_Rap2a	12.32	8.88	14.12	16.98	19.11	26.24	SCC	-1.35E+00	3.84E-10
ENSMUSG00000030245_Golt1b	15.68	17.77	24.12	30.61	29.38	51.07	SCC	-1.35E+00	1.45E-05
ENSMUSG00000020032_Nuak1	15.39	22.73	2.84	3	7.68	7.11	SCC	-1.35E+00	2.47E-03

ENSMUSG00000004562_Arhgef40	23.45	10.66	10	22.31	15.48	36.05	SCC	-1.34E+00	3.61E-04
ENSMUSG00000030298_Sec13	76.06	77.98	120.06	118.42	147.31	201.9	SCC	-1.34E+00	8.76E-07
ENSMUSG00000019796_Lrp11	0.69	0.42	2.72	3.12	4.28	10.27	SCC	-1.34E+00	4.18E-02
ENSMUSG00000006931_P3h4	24.44	26.37	30.48	48.09	46.49	74.65	SCC	-1.34E+00	9.95E-07
ENSMUSG00000039997_Ifi203	1.94	1.16	2.29	2.21	2.23	4.61	SCC	-1.34E+00	5.62E-03
ENSMUSG00000098428_Gm2260	9.8	8.99	16.39	17.57	18.11	26.99	SCC	-1.33E+00	2.48E-03
ENSMUSG00000057506_Bloc1s2	37.67	39.63	65.47	71.2	81.15	100.4	SCC	-1.33E+00	5.78E-06
ENSMUSG00000028744_Pqlc2	4.37	4.92	8.69	7.28	12	10.72	SCC	-1.33E+00	1.54E-05
ENSMUSG00000067071_Hes6	10.24	8.32	13.71	13.61	21.66	19.7	SCC	-1.33E+00	6.16E-11
ENSMUSG00000019975_Ikbip	10.82	7.07	7.25	8.17	13.07	19.77	SCC	-1.32E+00	8.99E-07
ENSMUSG00000021306_Gpr137b	8.01	5.98	10.4	12.2	13.78	16.31	SCC	-1.32E+00	1.07E-10
ENSMUSG00000037855_Zfp365	5.51	6.5	1.84	1.71	2.95	5.85	SCC	-1.32E+00	4.11E-02
ENSMUSG00000018239_Zcchc10	10.43	9.15	19.04	15.66	20.46	22.65	SCC	-1.32E+00	3.94E-08
ENSMUSG00000001707_Eef1e1	34.64	38.26	66.49	63.45	80.85	87.02	SCC	-1.32E+00	1.14E-07
ENSMUSG00000028343_Erp44	50.44	39.72	46.97	66.17	71.61	129.46	SCC	-1.31E+00	2.02E-07
ENSMUSG00000029378_Areg	5.89	8.08	54.44	61.68	104.23	184.05	SCC	-1.31E+00	2.47E-02
ENSMUSG00000029672_Fam3c	32.3	17.88	8.34	6.04	14.11	23.69	SCC	-1.31E+00	2.03E-03
ENSMUSG00000040219_Ttc12	0.41	0.26	1.23	1.32	2.38	3.85	SCC	-1.31E+00	2.92E-02
ENSMUSG00000025289_Prdx4	19.22	22.87	38.63	36.04	47.76	49.34	SCC	-1.31E+00	4.55E-06
ENSMUSG00000056201_Cfl1	631.03	650.52	1141.43	1187.75	1284	1603	SCC	-1.30E+00	8.18E-08
ENSMUSG00000028385_Snx30	2.85	1.6	1.12	0.85	1.91	3.3	SCC	-1.30E+00	3.44E-02
ENSMUSG00000075602_Ly6a	493.97	573.24	920.5	937.1	923.01	1461.7	SCC	-1.30E+00	1.32E-04
ENSMUSG00000021822_Plau	17.67	21.05	99.54	121.82	255.12	289.77	SCC	-1.30E+00	7.07E-05
ENSMUSG00000026575_Nme7	12.39	10.93	17	21.64	20.38	31.33	SCC	-1.30E+00	4.89E-07
ENSMUSG00000060073_Psma3	137.28	123.76	270.73	202.24	300.67	271.78	SCC	-1.30E+00	9.28E-11
ENSMUSG00000066057_Gm1976	2.44	1.68	3.79	3.24	4.39	6.17	SCC	-1.29E+00	2.42E-04
ENSMUSG00000033960_9430020K01Rik	1.53	1.13	1.92	1.84	2.95	2.56	SCC	-1.29E+00	2.20E-06
ENSMUSG00000030102_Itpr1	0.78	1.07	1.09	1.11	0.92	1.44	SCC	-1.29E+00	4.87E-04
ENSMUSG00000036676_Tmtc3	17.52	11.1	18.18	15.39	24.35	32.55	SCC	-1.29E+00	1.80E-07
ENSMUSG00000001123_Lgals9	49.24	58.45	49.82	48.97	96.86	142.23	SCC	-1.29E+00	5.30E-05
ENSMUSG00000072623_Zfp9	1.55	1.1	1.37	1.13	2.02	3.43	SCC	-1.29E+00	1.83E-03
ENSMUSG00000060487_Samd5	1.88	1.07	3.37	4.03	7.56	10.65	SCC	-1.29E+00	3.55E-03
ENSMUSG00000021253_Tgfb3	3.08	2.14	14.99	19.31	33.11	51.36	SCC	-1.29E+00	2.05E-04
ENSMUSG00000042734_Ttc9	23.1	22.97	6.45	5.41	14.43	14.45	SCC	-1.29E+00	2.68E-06
ENSMUSG00000026827_Gpd2	7.97	7.83	12.32	12.69	15.41	17.95	SCC	-1.29E+00	3.00E-11
ENSMUSG00000034088_Hdlbp	95.33	89.96	146.29	147.81	176.22	210.04	SCC	-1.29E+00	1.49E-11
ENSMUSG00000030772_Dkk3	20.54	14.18	14.65	16.07	32.01	40.55	SCC	-1.29E+00	9.89E-11
ENSMUSG00000051124_Gimap9	5.27	4.95	7.03	6.12	10.52	11.75	SCC	-1.28E+00	1.57E-06
ENSMUSG00000021468_Sptlc1	30.61	31.08	47.51	48.55	59.64	72.39	SCC	-1.28E+00	1.12E-09
ENSMUSG00000025613_Cct8	192.32	163.73	279.69	279.87	315.65	395.68	SCC	-1.28E+00	6.83E-14
ENSMUSG00000039195_1110008P14Rik	25.48	30.71	56.73	56.05	71.69	71.06	SCC	-1.27E+00	5.19E-06
ENSMUSG00000052539_Magi3	1.74	1.05	1.11	1.1	1.35	1.94	SCC	-1.27E+00	1.13E-04
ENSMUSG00000003746_Man1a	8.62	7.52	12.88	11.84	14.88	18.32	SCC	-1.27E+00	4.48E-11

ENSMUSG00000051154_Commd3	105.89	81.99	135.9	138.77	154.93	222.17	SCC	-1.27E+00	5.60E-06
ENSMUSG00000032458_Copb2	66.39	61.79	89.11	95.54	106.82	132.11	SCC	-1.27E+00	1.01E-10
ENSMUSG00000032261_Sh3bgrl2	21.36	19.48	24.41	30.87	32.39	53.28	SCC	-1.27E+00	1.18E-05
ENSMUSG00000028656_Cap1	186.11	207.93	302.13	319.47	361.06	427.45	SCC	-1.26E+00	1.84E-06
ENSMUSG00000029364_Wsb2	40.89	35.46	55.01	61.81	65.75	79.81	SCC	-1.26E+00	3.96E-13
ENSMUSG00000030417_Pdcd5	45.89	37.92	83.66	53.06	103.21	84.88	SCC	-1.26E+00	8.57E-08
ENSMUSG00000027006_Dnajc10	21.46	19.35	25.55	24.64	27.68	44.4	SCC	-1.26E+00	7.87E-06
ENSMUSG00000048911_Rnf24	1.23	0.9	1.43	1.49	1.91	1.97	SCC	-1.26E+00	2.26E-06
ENSMUSG00000053094_Tmem248	12.74	11.19	20.69	19.58	22.67	26.78	SCC	-1.26E+00	1.30E-13
ENSMUSG00000037820_Tgm2	2.04	1.16	2.88	3.04	6.42	7.84	SCC	-1.26E+00	4.20E-04
ENSMUSG00000031068_Glrx3	81.08	107.48	137.85	160.73	170.15	238.99	SCC	-1.26E+00	3.48E-04
ENSMUSG00000028252_Ccnc	12.03	7.07	13.26	15.84	16.04	22.66	SCC	-1.25E+00	2.05E-05
ENSMUSG00000022261_Sdc2	15.63	10.76	13.14	15.68	29.15	41.38	SCC	-1.25E+00	1.23E-08
ENSMUSG00000073563_Csnk1g3	10.11	7.23	11.57	12.58	15.03	20.31	SCC	-1.25E+00	2.95E-09
ENSMUSG00000033880_Lgals3bp	5.92	6.53	4.15	2.94	9.07	7.24	SCC	-1.25E+00	9.58E-03
ENSMUSG00000020048_Hsp90b1	244.96	237.02	325.39	301.31	382.71	592.53	SCC	-1.25E+00	2.60E-06
ENSMUSG00000003228_Grk5	1.12	1.65	2.4	2.09	2.97	2.87	SCC	-1.25E+00	6.87E-03
ENSMUSG00000013698_Pea15a	33.2	32.35	37.84	41.15	54.17	80.51	SCC	-1.25E+00	3.80E-06
ENSMUSG00000024811_Tnks2	51.33	30.39	51.94	54.51	54.29	80.59	SCC	-1.25E+00	1.22E-06
ENSMUSG00000031513_Leprotl1	14.93	14.14	23.2	24.98	26.88	33.38	SCC	-1.24E+00	9.20E-10
ENSMUSG00000020736_Nt5c	54.68	59.08	89.31	103.76	109.65	123.11	SCC	-1.24E+00	2.80E-05
ENSMUSG00000045394_Epcam	97.61	105.27	144.55	170.77	219.83	206.04	SCC	-1.24E+00	5.22E-07
ENSMUSG00000025558_Dock9	17.44	10.23	21.34	17.09	26.02	28.73	SCC	-1.24E+00	2.92E-06
ENSMUSG00000052033_Pfdn4	36.57	37.32	70.42	64.92	76.96	89.38	SCC	-1.24E+00	1.40E-06
ENSMUSG00000025921_Rdh10	5.22	2.67	5.36	5.95	6.35	9.28	SCC	-1.24E+00	6.71E-04
ENSMUSG00000026922_Agpat2	21.26	21.04	26.84	26.61	36.55	49.25	SCC	-1.24E+00	7.04E-07
ENSMUSG00000024487_Yipf5	21.88	18.1	26.72	27.74	33.69	48.81	SCC	-1.24E+00	1.75E-07
ENSMUSG00000040220_Gas8	9.38	7.77	13.33	15.42	16.47	19.26	SCC	-1.24E+00	9.01E-08
ENSMUSG00000046718_Bst2	30.77	16.09	11.88	10.96	22.99	30.2	SCC	-1.24E+00	1.82E-02
ENSMUSG00000021866_Anxa11	27.9	27.48	44.48	43.14	53.65	60.85	SCC	-1.23E+00	9.36E-11
ENSMUSG00000031578_Mak16	32.02	24.65	47.26	45.56	56.12	60.53	SCC	-1.23E+00	2.51E-18
ENSMUSG00000028108_Ecm1	117.21	135.79	168.32	206.77	283.83	306.32	SCC	-1.23E+00	5.37E-05
ENSMUSG00000048807_Slc35e4	9.17	8.12	12.64	12.93	17.78	17.37	SCC	-1.23E+00	1.53E-11
ENSMUSG00000037119_D15Ertd621e	24.44	19.33	29.57	31.94	37.85	50.24	SCC	-1.23E+00	2.87E-12
ENSMUSG00000000184_Ccnd2	60.57	41.46	20.91	20.65	41.2	51.04	SCC	-1.23E+00	6.52E-08
ENSMUSG00000042367_Gjb3	58.46	75.07	33.22	33.92	68.02	90.69	SCC	-1.23E+00	1.52E-03
ENSMUSG00000026728_Vim	29	17.7	83.72	97.32	206.38	203.77	SCC	-1.23E+00	6.11E-06
ENSMUSG00000027663_Zmat3	5.7	4.78	7.47	7.78	8.56	14.96	SCC	-1.23E+00	2.41E-07
ENSMUSG00000038604_Fam65a	5.34	4.16	7.42	7.8	10.43	8.47	SCC	-1.23E+00	9.24E-07
ENSMUSG00000060935_Tmem263	6.11	5.1	3.2	3.96	5.74	11.23	SCC	-1.22E+00	1.85E-02
ENSMUSG00000029469_Ift81	2.27	1.31	2.43	3.26	2.6	5.16	SCC	-1.22E+00	1.37E-02
ENSMUSG00000027800_Tm4sf1	10.99	9.12	50.9	67.43	120.79	159.71	SCC	-1.22E+00	9.05E-07
ENSMUSG00000022297_Fzd6	31.36	24.86	47.3	45.55	58.03	54.03	SCC	-1.22E+00	6.93E-13

ENSMUSG00000027698_Nceh1	1.04	0.73	6.61	4.98	10.58	15.32	SCC	-1.22E+00	1.11E-03
ENSMUSG00000032803_Cdv3	72.89	54.31	106.64	96.82	116.73	155.4	SCC	-1.22E+00	5.73E-10
ENSMUSG00000020023_Tmcc3	10.56	9.21	9.5	11.69	15.67	23.85	SCC	-1.22E+00	9.54E-06
ENSMUSG00000042747_Krtcap2	76.59	73.72	121.79	114.22	138.59	186.18	SCC	-1.22E+00	4.97E-06
ENSMUSG00000003873_Bax	57.04	55.93	97.91	90.33	97.76	146.33	SCC	-1.22E+00	1.26E-04
ENSMUSG00000027714_Exosc9	28.71	27.37	38.01	47.41	36.04	68.77	SCC	-1.22E+00	1.40E-06
ENSMUSG00000063362_Alg11	4.75	3.69	4.95	5.97	6.6	9.65	SCC	-1.22E+00	1.52E-04
ENSMUSG00000064080_Fbln2	2.76	2.75	72.58	142.84	238.55	260.84	SCC	-1.21E+00	1.96E-02
ENSMUSG00000034593_Myo5a	23.24	13.82	33.77	25.56	35.5	36.06	SCC	-1.21E+00	3.26E-07
ENSMUSG00000061132_Blnk	3.45	3.65	5.93	5.79	7.56	7.69	SCC	-1.21E+00	1.30E-05
ENSMUSG00000020677_Ddx52	19.46	15.99	24.52	21.58	27.6	34.3	SCC	-1.21E+00	1.84E-09
ENSMUSG00000039361_Picalm	65.63	50.39	92.53	104.47	97.35	133	SCC	-1.21E+00	7.30E-10
ENSMUSG00000025330_Padi4	0.04	0.14	47.39	54.81	112.47	123.38	SCC	-1.21E+00	3.16E-06
ENSMUSG00000026675_Hsd17b7	20.86	24.06	25.3	20.1	39.08	43.84	SCC	-1.21E+00	4.42E-06
ENSMUSG00000021929_Kpna3	19.69	16.9	29.32	28.39	31.97	40.91	SCC	-1.20E+00	8.26E-12
ENSMUSG00000022474_Pmm1	26.77	31.38	47.86	54.03	47.6	69.85	SCC	-1.20E+00	4.25E-04
ENSMUSG00000043421_Hilpda	9.61	11.62	16.74	22.12	28.1	17.77	SCC	-1.20E+00	6.67E-03
ENSMUSG00000033278_Ptprm	0.97	0.87	0.79	0.45	1.88	1.74	SCC	-1.20E+00	1.07E-02
ENSMUSG00000027907_S100a11	2416.56	2297.29	4786.87	4197.46	5663.7	5354.4	SCC	-1.20E+00	6.82E-08
ENSMUSG00000026249_Serpine2	7.67	11.74	8.03	7.21	19.27	23.01	SCC	-1.20E+00	1.14E-03
ENSMUSG00000074577_Fam65c	1.86	1.17	2.05	1.49	2.26	3.67	SCC	-1.20E+00	1.22E-02
ENSMUSG00000033446_Lpar6	3.58	2.49	4.05	4.08	5.01	6.86	SCC	-1.20E+00	6.94E-07
ENSMUSG00000000530_Acvrl1	7.26	7.06	4.19	6.9	11.64	11.65	SCC	-1.20E+00	1.35E-05
ENSMUSG00000020152_Actr2	97.6	82.26	129.62	119.79	146.84	207.96	SCC	-1.19E+00	1.49E-08
ENSMUSG00000032562_Gnai2	134.04	141.88	228.14	230.01	272.84	262.58	SCC	-1.19E+00	1.58E-07
ENSMUSG00000031422_Morf4l2	206.29	163.21	257.32	267.13	295.42	420.79	SCC	-1.19E+00	6.37E-10
ENSMUSG00000002332_Dhrs1	33.86	31.4	52.3	58.7	58.27	69.45	SCC	-1.19E+00	6.38E-07
ENSMUSG00000001674_Ddx18	39.88	41.61	65.36	62.12	69.42	87.55	SCC	-1.19E+00	1.26E-07
ENSMUSG00000020986_Sec23a	12.45	10.1	11.61	10.91	15.34	29.27	SCC	-1.18E+00	1.56E-04
ENSMUSG00000024664_Fads3	0.37	0.22	43.27	41.72	80.43	113.54	SCC	-1.18E+00	1.61E-05
ENSMUSG00000035020_Epgn	75.07	86.27	72.86	58.34	86.81	242.34	SCC	-1.18E+00	2.93E-02
ENSMUSG00000001833_Sept7	69.7	55.18	93.61	94.01	103.03	143.51	SCC	-1.18E+00	9.20E-09
ENSMUSG00000049128_Ivl	5.45	6.81	22.9	26.42	39.27	73.25	SCC	-1.18E+00	4.42E-02
ENSMUSG00000025823_Pdia4	70.05	81.55	117.64	117.36	134.19	171.03	SCC	-1.18E+00	8.35E-06
ENSMUSG00000032349_Elovl5	14.14	10.08	17.45	17.1	20.83	26.02	SCC	-1.18E+00	3.38E-09
ENSMUSG00000022246_Rai14	23.8	22.8	28.91	26.67	36.3	55.38	SCC	-1.18E+00	5.87E-06
ENSMUSG00000070305_Mpzl3	11.61	11.34	16.93	19.25	20.28	23.52	SCC	-1.17E+00	2.02E-07
ENSMUSG00000019579_Mydgf	40.21	50.52	60.51	68.09	62.53	109.97	SCC	-1.17E+00	2.73E-03
ENSMUSG00000047735_Samd9l	2.83	1.39	0.96	1.36	2.76	5.26	SCC	-1.17E+00	1.81E-02
ENSMUSG00000081752_Gm14680	6.38	5.18	8.31	5.17	10.76	12.85	SCC	-1.17E+00	1.52E-03
ENSMUSG00000022013_Dnajc15	31.33	34.17	64.4	62.23	65.54	77.87	SCC	-1.17E+00	2.80E-04
ENSMUSG00000044645_Gm7334	46.61	55.73	22.11	27.75	43.69	69.08	SCC	-1.17E+00	2.56E-02
ENSMUSG00000008167_Fbxw9	23.82	19.89	34.58	33.58	36.82	50.52	SCC	-1.17E+00	2.26E-06

ENSMUSG00000048550_Thnsl1	1.19	1.11	1.75	1.97	1.56	2.83	SCC	-1.17E+00	1.08E-02
ENSMUSG00000032440_Tgfbr2	24.26	25	35.77	34.97	40.14	56.49	SCC	-1.17E+00	1.85E-06
ENSMUSG00000048076_Arf1	281.05	303.15	464.02	480.88	535.77	636.6	SCC	-1.17E+00	4.41E-07
ENSMUSG00000014504_Srp19	54.12	38.38	83.67	80.73	98.6	110.83	SCC	-1.16E+00	1.39E-08
ENSMUSG00000026639_Lamb3	208.54	211.18	118.09	131.16	397.75	416.21	SCC	-1.16E+00	4.21E-09
ENSMUSG00000030123_Plxnd1	3.35	3.7	5.79	4.44	11.65	4.27	SCC	-1.16E+00	2.45E-02
ENSMUSG00000022607_Ptk2	17.65	14.54	19.69	20.9	25.02	36.32	SCC	-1.16E+00	1.55E-07
ENSMUSG00000029767_Calu	111.76	109.4	119.67	114.15	170.78	248.4	SCC	-1.16E+00	7.21E-06
ENSMUSG00000031521_Aga	21.28	18.9	5.2	7.03	11.36	16.2	SCC	-1.16E+00	1.63E-02
ENSMUSG00000027364_Usp50	79.88	92.11	200.72	169.42	184.82	232.59	SCC	-1.16E+00	8.77E-03
ENSMUSG00000041957_Pkp2	0.11	0.03	2.04	2.27	4.49	5.18	SCC	-1.16E+00	2.45E-02
ENSMUSG00000055561_Spink5	11.79	17.52	20.18	27.23	32.73	24.65	SCC	-1.16E+00	6.10E-03
ENSMUSG00000028745_Capzb	178.86	198.57	293.42	322.62	346.29	402.32	SCC	-1.16E+00	7.38E-06
ENSMUSG00000021771_Vdac2	152.16	141.78	252.13	224.14	262.45	310.2	SCC	-1.16E+00	2.62E-09
ENSMUSG00000026110_Mgat4a	1.92	1.35	0.95	0.89	1.57	2.59	SCC	-1.16E+00	1.20E-02
ENSMUSG00000078453_Abracl	124.43	115.78	186.67	193.54	230.58	271.28	SCC	-1.16E+00	1.95E-06
ENSMUSG00000004317_Clcn5	3.06	2.56	4.17	3.26	6.65	8.03	SCC	-1.16E+00	4.50E-05
ENSMUSG00000034543_Morc2a	34.21	21.93	29.77	31.21	29.3	34.67	SCC	-1.15E+00	2.61E-13
ENSMUSG00000054814_Usp46	9.95	7.56	11.69	10.47	12.74	14.44	SCC	-1.15E+00	5.78E-09
ENSMUSG00000029918_Mrps33	56.21	56.35	73.76	94.52	86.79	115.58	SCC	-1.15E+00	1.80E-08
ENSMUSG00000074656_Eif2s2	85.35	84.83	146.41	134.6	162.5	159.7	SCC	-1.15E+00	1.78E-08
ENSMUSG00000029447_Cct6a	246.83	206.37	353.21	442.76	384.67	546.33	SCC	-1.15E+00	1.47E-09
ENSMUSG00000028780_Sema3c	173.45	165.6	23.7	17.45	39.83	58.2	SCC	-1.15E+00	4.82E-04
ENSMUSG00000022747_St3gal6	12.35	14.44	17.02	13.85	18.49	21.68	SCC	-1.15E+00	1.53E-03
ENSMUSG00000019837_Gtf3c6	25.75	21.42	39.12	37.82	42.57	52.66	SCC	-1.15E+00	5.81E-07
ENSMUSG00000038780_Smurf1	17.07	13.72	22.53	27.98	30.32	27.44	SCC	-1.15E+00	2.11E-07
ENSMUSG00000054693_Adam10	37.44	31.94	52.45	52.71	59.39	68.56	SCC	-1.15E+00	1.08E-16
ENSMUSG00000039756_Dnttip2	40.32	28.8	51.29	54.47	48.57	67.6	SCC	-1.15E+00	4.47E-11
ENSMUSG00000078941_Ak6	76.1	71.9	125.8	129.73	139.56	151.61	SCC	-1.14E+00	9.49E-10
ENSMUSG00000001555_Fkbp10	1.26	1.01	5.43	4.49	12.25	9.36	SCC	-1.14E+00	4.66E-03
ENSMUSG00000002365_Snx9	17.37	16.02	24.92	28.72	33.78	30.62	SCC	-1.14E+00	1.71E-07
ENSMUSG00000020000_Moxd1	112.5	107.91	62.2	65.04	121.53	160.37	SCC	-1.14E+00	1.56E-06
ENSMUSG00000017734_Dbndd2	29.95	32.97	53.72	58.89	51.57	83.2	SCC	-1.14E+00	1.13E-03
ENSMUSG00000068196_Col8a1	1.74	1.15	6.82	5.87	14.84	13.05	SCC	-1.14E+00	2.33E-04
ENSMUSG00000039899_Fgl2	2.02	1.29	0.97	0.99	2.73	3.48	SCC	-1.14E+00	4.15E-04
ENSMUSG00000021892_Sh3bp5	3.97	3.67	6.04	6.24	7.18	7.26	SCC	-1.13E+00	1.47E-06
ENSMUSG00000020803_Txndc17	336.23	336.27	519.13	538.01	588.13	757.08	SCC	-1.13E+00	1.38E-05
ENSMUSG00000026566_Mpzl1	17.6	14.37	20.76	18.91	26.76	31.52	SCC	-1.13E+00	1.74E-10
ENSMUSG00000002227_Mov10	3.3	2.07	3.43	4.09	4.65	5.41	SCC	-1.13E+00	1.30E-04
ENSMUSG00000034424_Gcsh	23.54	25.41	39.01	39.38	46.24	42.25	SCC	-1.13E+00	1.95E-05
ENSMUSG00000027506_Tpd52	100.06	85.16	152.93	159.85	172.27	213.5	SCC	-1.13E+00	1.42E-08
ENSMUSG00000043391_2510009E07Rik	6.84	4.63	2.29	2.96	4.46	7.13	SCC	-1.13E+00	7.05E-03
ENSMUSG00000052727_Map1b	0.86	0.51	3.32	2.72	5.67	7.64	SCC	-1.13E+00	1.74E-03

ENSMUSG00000029344_Tpst2	24.68	22.34	29.96	29.83	36.49	45.31	SCC	-1.13E+00	2.90E-07
ENSMUSG00000028459_Cd72	1.44	1.94	2.17	2.91	3.56	3.59	SCC	-1.13E+00	3.31E-02
ENSMUSG00000025498_Irf7	5.42	5.58	3.32	2.8	8.05	5.42	SCC	-1.13E+00	4.86E-03
ENSMUSG00000038991_Txndc5	43.49	52.95	77.88	77.44	93.05	93.59	SCC	-1.13E+00	3.79E-05
ENSMUSG00000041886_Macc1	10.41	8.84	15.54	17.09	13.82	22.68	SCC	-1.12E+00	7.95E-05
ENSMUSG00000046618_Olfml2a	0.69	0.41	0.86	1.11	2.28	2.01	SCC	-1.12E+00	3.20E-02
ENSMUSG00000028776_Tinagl1	3.71	3.24	55.85	58.95	121.13	127.26	SCC	-1.12E+00	3.23E-11
ENSMUSG00000025066_Sfr1	150.98	123.05	167.25	201.2	235.23	293.5	SCC	-1.12E+00	3.12E-07
ENSMUSG00000058927_Gm10053	100.05	120.9	218.52	194	226.52	224.66	SCC	-1.12E+00	3.33E-05
ENSMUSG00000018965_Ywhah	104.19	103.47	139.9	156.77	180.34	226.39	SCC	-1.12E+00	6.73E-07
ENSMUSG00000037824_Tspan14	38.07	35.93	52.72	57.97	65.35	75.87	SCC	-1.12E+00	2.40E-09
ENSMUSG00000028273_Pdlim5	39.05	28.72	44.36	49.46	50.23	62.57	SCC	-1.12E+00	1.06E-11
ENSMUSG00000021270_Hsp90aa1	260.02	235.08	232.76	236.18	304.74	469.56	SCC	-1.11E+00	1.25E-05
ENSMUSG00000006599_Gtf2h1	29.81	23.85	39.1	37.42	43.53	56.24	SCC	-1.11E+00	2.92E-09
ENSMUSG00000028413_B4galt1	40.63	41.07	59.98	70.66	75.73	74.58	SCC	-1.11E+00	4.41E-07
ENSMUSG00000036323_Srp72	68.48	56.94	86.3	90.53	99.24	110.93	SCC	-1.11E+00	4.51E-10
ENSMUSG00000049299_Trappc1	40.65	38.09	61.65	69.14	75.25	83.12	SCC	-1.11E+00	6.01E-05
ENSMUSG00000079523_Tmsb10	66.69	73.32	599.09	527.13	1061.9	1321.5	SCC	-1.11E+00	6.49E-03
ENSMUSG00000022037_Clu	57.57	64.82	27.7	44.58	144.25	89.98	SCC	-1.11E+00	1.04E-02
ENSMUSG00000030612_Mrpl46	17.76	18.07	30.95	31.37	32.25	38.31	SCC	-1.11E+00	2.55E-05
ENSMUSG00000037656_Slc20a2	22.38	16.14	32.21	29.97	34.01	37.04	SCC	-1.11E+00	7.38E-12
ENSMUSG00000014959_Gorasp2	54.74	54.84	85.87	83.31	97.94	106.5	SCC	-1.11E+00	8.05E-08
ENSMUSG00000091243_Vgll3	3	2.57	2.22	2.69	4.62	5.79	SCC	-1.11E+00	5.26E-05
ENSMUSG00000024516_Sec11c	36.82	34.06	64.61	49.92	71.8	94.89	SCC	-1.11E+00	5.34E-05
ENSMUSG00000032002_Dcun1d5	49.41	49.21	77.94	74.04	88.45	104.55	SCC	-1.11E+00	5.68E-07
ENSMUSG00000009376_Met	23.25	23.56	26.7	20.22	36.88	53.04	SCC	-1.10E+00	1.15E-04
ENSMUSG00000032306_Mpi	10.55	9.32	14.82	15.23	16.6	17.36	SCC	-1.10E+00	1.66E-06
ENSMUSG00000096199_Ptrhd1	1.48	1.76	2.77	2.74	2.6	3.51	SCC	-1.10E+00	2.35E-03
ENSMUSG00000039328_Rnf122	4.28	2.87	5.22	6.37	5.66	7.71	SCC	-1.10E+00	1.15E-04
ENSMUSG00000022769_Sdf2l1	15.62	21.96	30.15	26.63	29.04	45.97	SCC	-1.10E+00	1.13E-02
ENSMUSG00000020580_Rock2	14.46	11.37	16.8	14.19	17.59	30.01	SCC	-1.10E+00	2.13E-04
ENSMUSG00000026999_Nup35	16.25	15.34	26.59	28.17	26.14	32.84	SCC	-1.10E+00	2.25E-05
ENSMUSG00000015759_Cnih1	52.73	60.39	85.16	88.26	95.71	123.37	SCC	-1.10E+00	9.28E-05
ENSMUSG00000022144_Gdnf	10.03	8.29	3.9	3.97	7.22	9.72	SCC	-1.10E+00	2.68E-05
ENSMUSG00000020717_Pecam1	7.96	4.82	12.58	13.64	27.69	27.6	SCC	-1.10E+00	1.01E-04
ENSMUSG00000032215_Rsl24d1	38.06	36.35	65.15	61.53	62.52	82.96	SCC	-1.10E+00	2.13E-07
ENSMUSG00000027777_Schip1	10.2	10.17	10.33	13.5	16.37	21.98	SCC	-1.10E+00	1.01E-04
ENSMUSG00000016024_Lbp	1.83	2.68	2.67	2.46	3.95	2.62	SCC	-1.10E+00	3.00E-02
ENSMUSG00000050088_1600012H06Rik	19.29	13.25	22.11	25.44	26.37	39.34	SCC	-1.10E+00	1.06E-04
ENSMUSG00000024070_Prkd3	7.37	4.96	9.48	10.28	10.52	11.13	SCC	-1.09E+00	1.19E-09
ENSMUSG00000018102_Hist1h2bc	19.1	29.49	50.4	39.24	63.91	38.73	SCC	-1.09E+00	1.54E-02
ENSMUSG00000021737_Psmd6	82.66	75.64	122.46	118.7	132.92	157.84	SCC	-1.09E+00	4.49E-08
ENSMUSG00000020368_Canx	120.92	121.75	197.02	192.75	214.69	281.61	SCC	-1.09E+00	6.94E-06

ENSMUSG00000004070_Hmox2	22.16	25.2	38.81	43.92	42.31	53.19	SCC	-1.09E+00	1.64E-05
ENSMUSG00000034343_Ube2f	35.19	31.22	52.89	56.68	64.02	73.23	SCC	-1.09E+00	2.21E-08
ENSMUSG00000021178_Psmc1	93.96	88.29	158.13	154.43	166.24	180.75	SCC	-1.09E+00	1.54E-10
ENSMUSG00000073676_Hspe1	169.87	210	353.23	320.79	361.98	414.73	SCC	-1.09E+00	3.02E-04
ENSMUSG00000051232_Tmem199	16.67	17.16	29.13	25.23	29.67	30.89	SCC	-1.09E+00	2.29E-05
ENSMUSG00000020388_Pdlim4	14.79	15.02	2.34	2.67	5.83	4.61	SCC	-1.09E+00	3.11E-02
ENSMUSG00000041763_Tpp2	24.51	18.62	27.47	24.71	27.3	36.32	SCC	-1.09E+00	3.75E-09
ENSMUSG00000022808_Snx4	23.74	18.8	31.29	34.66	38.14	40.24	SCC	-1.09E+00	7.62E-12
ENSMUSG00000019920_Lims1	20.99	16.56	21.83	23.62	28.45	37.36	SCC	-1.08E+00	1.18E-08
ENSMUSG00000027429_Sec23b	29.12	28.01	49.45	46.78	50.82	61.66	SCC	-1.08E+00	2.67E-06
ENSMUSG00000068749_Psma5	85.92	90.1	153.5	155.18	159.86	177.77	SCC	-1.08E+00	1.28E-06
ENSMUSG00000026036_Nif3l1	12.4	12.26	20.4	21.04	22.1	25.84	SCC	-1.08E+00	4.74E-07
ENSMUSG00000037287_Tbcel	3.92	2.29	4.04	4.24	4.9	6.17	SCC	-1.08E+00	1.08E-04
ENSMUSG00000100153_Gm5601	27.55	42.98	52.16	77.75	59.03	81.92	SCC	-1.08E+00	2.99E-02
ENSMUSG00000001424_Snd1	41.74	49.15	79.09	81.27	86.84	80.05	SCC	-1.08E+00	1.11E-04
ENSMUSG00000032575_Manf	130.81	158.68	228.69	181.62	227.18	324.53	SCC	-1.08E+00	3.30E-03
ENSMUSG00000031885_Cbfb	55.52	42.05	71.24	72.85	73.67	94.97	SCC	-1.08E+00	8.62E-11
ENSMUSG00000052997_Uba2	101.95	97.91	149.55	152.29	154.59	193.42	SCC	-1.08E+00	2.26E-07
ENSMUSG00000014867_Surf4	63.03	72.9	102.48	97.77	116.62	129.43	SCC	-1.07E+00	2.32E-05
ENSMUSG00000030000_Add2	0	0.01	6.58	7.84	12.76	18.26	SCC	-1.07E+00	4.98E-03
ENSMUSG00000029082_Bst1	1.92	0.87	13.51	25.06	28.09	52.15	SCC	-1.07E+00	7.21E-03
ENSMUSG00000028691_Prdx1	572.94	716.83	877.28	1132.91	1086.8	1349.1	SCC	-1.07E+00	3.92E-04
ENSMUSG00000012422_Tmem167	14.93	11.83	13.6	21.57	14.43	37.41	SCC	-1.07E+00	1.25E-06
ENSMUSG00000024145_Pigf	28.47	30.7	40.34	37.76	44.28	70.68	SCC	-1.07E+00	3.37E-03
ENSMUSG00000018593_Sparc	82.35	82.04	252.87	254.3	543.39	518.64	SCC	-1.07E+00	2.23E-06
ENSMUSG00000047126_Cltc	76.97	63.7	94.24	101.84	105.04	163.27	SCC	-1.07E+00	1.20E-09
ENSMUSG00000046410_Kcnk6	5.69	4.61	8.78	7.75	8.37	10.22	SCC	-1.07E+00	1.96E-07
ENSMUSG00000029171_Pgm1	10.02	11.09	13.1	16.39	16.49	19.92	SCC	-1.07E+00	8.93E-05
ENSMUSG00000037376_Trmt6	20.17	17.3	28.69	22.87	28.33	29.29	SCC	-1.07E+00	8.34E-08
ENSMUSG00000026737_Pip4k2a	9.19	5.93	11.54	8.56	11.41	14.77	SCC	-1.06E+00	2.39E-05
ENSMUSG00000025626_Phf6	11.08	8.83	11.84	11.81	11.33	16.37	SCC	-1.06E+00	5.83E-06
ENSMUSG00000030120_Mlf2	156.14	161.94	266.5	253.44	281.1	320.93	SCC	-1.06E+00	6.43E-07
ENSMUSG00000032366_Tpm1	132.86	97.05	405.87	418.23	595.59	1132.8	SCC	-1.06E+00	1.86E-02
ENSMUSG00000003444_Med29	14.81	16.45	22.49	23.08	23.87	35.57	SCC	-1.06E+00	2.24E-03
ENSMUSG00000028247_Coq3	7.71	6.06	10.18	10.7	10.78	10.65	SCC	-1.06E+00	1.07E-07
ENSMUSG00000029186_Pi4k2b	16.48	12.93	15.32	14.55	18.66	29.41	SCC	-1.06E+00	1.39E-04
ENSMUSG00000021891_Mettl6	12.69	8.4	15.52	14.79	16.18	21.72	SCC	-1.06E+00	1.74E-05
ENSMUSG00000028789_Azin2	4.22	3.55	4.81	7.1	7.27	8.39	SCC	-1.06E+00	6.81E-03
ENSMUSG00000076432_Ywhaq	197.93	200.8	294.35	370.17	375.71	381.84	SCC	-1.06E+00	2.14E-05
ENSMUSG00000044042_Fmn1	3.4	2.62	3.81	3.17	5.57	4.23	SCC	-1.05E+00	5.47E-06
ENSMUSG00000011958_Bnip2	71.81	54.36	73.72	73.87	86.07	118.24	SCC	-1.05E+00	2.96E-08
ENSMUSG00000007721_Ccdc124	65.37	72.26	123.41	111.87	124.59	142.6	SCC	-1.05E+00	5.35E-05
ENSMUSG00000022621_Rabl2	8.93	6.12	13.15	12.61	12.55	13.29	SCC	-1.05E+00	2.87E-06

ENSMUSG00000003062_Stard3nl	18.9	18.8	25.52	34.17	26.62	37.56	SCC	-1.05E+00	1.86E-05
ENSMUSG00000064181_Rab3ip	5.36	4.66	7.36	7.68	8.44	9.63	SCC	-1.05E+00	2.91E-07
ENSMUSG00000032966_Fkbp1a	70.91	68.99	93.04	95.64	122.36	140.51	SCC	-1.05E+00	1.68E-07
ENSMUSG00000020956_Dtd2	5.63	4.51	9.69	8.13	8.45	11.01	SCC	-1.05E+00	2.49E-05
ENSMUSG00000001305_Rrp15	23.43	20.55	46.39	40.69	43.95	51.92	SCC	-1.05E+00	2.82E-08
ENSMUSG00000027611_Procr	0.64	0.73	73.19	74.64	113.11	180.99	SCC	-1.05E+00	1.02E-02
ENSMUSG00000032845_Alpk2	8.48	4.37	13.55	7.18	14.53	9.96	SCC	-1.05E+00	3.93E-02
ENSMUSG00000029394_Cdk2ap1	127.21	140.92	231.62	241.13	245.76	255.84	SCC	-1.05E+00	6.59E-07
ENSMUSG00000029790_Cep41	3.54	3.88	4.91	5.38	4.69	7.69	SCC	-1.05E+00	6.10E-03
ENSMUSG00000029066_Mrpl20	81.07	91.93	148.73	148.77	151.64	169.08	SCC	-1.05E+00	5.04E-04
ENSMUSG00000026483_Fam129a	1.08	1.22	1.58	1.73	2.26	2.47	SCC	-1.05E+00	1.24E-02
ENSMUSG00000020392_Cdkn2aipnl	24.02	31.32	45.84	48.13	45.27	57.19	SCC	-1.04E+00	1.46E-03
ENSMUSG00000021114_Atp6v1d	47.98	39.87	59.49	63.45	64.21	97.64	SCC	-1.04E+00	2.16E-04
ENSMUSG00000073771_Btbd19	20.65	15.45	28.6	33.25	32.95	39.26	SCC	-1.04E+00	6.95E-05
ENSMUSG00000021276_Cinp	17.09	20.39	29.98	32.84	28.5	40.82	SCC	-1.04E+00	1.41E-03
ENSMUSG00000031971_Ccsap	2.37	2.44	3.67	3.49	4.15	4.65	SCC	-1.04E+00	7.04E-04
ENSMUSG00000033031_C330027C09Rik	13.86	13.73	21.64	20.06	18.37	25.64	SCC	-1.04E+00	3.80E-05
ENSMUSG00000006390_Elovl1	83.26	97.61	134.45	129.94	154.01	168.64	SCC	-1.04E+00	2.50E-04
ENSMUSG00000028641_P3h1	2.4	2.83	5.73	7	11.78	12.61	SCC	-1.04E+00	6.94E-03
ENSMUSG00000022205_Sub1	205.55	163.29	313.02	283.88	332.59	392.88	SCC	-1.04E+00	5.33E-07
ENSMUSG00000026520_Pycr2	27.08	31.93	43.24	35.44	45.15	65.71	SCC	-1.04E+00	1.85E-03
ENSMUSG00000030423_Pop4	26.52	22.03	37.85	38.68	42.81	47.13	SCC	-1.04E+00	1.57E-08
ENSMUSG00000032596_Uba7	2.71	1.78	1.69	2.2	3.52	4.97	SCC	-1.04E+00	2.14E-02
ENSMUSG00000031568_Rwdd4a	15.23	11.46	19.57	19.87	20.88	28.17	SCC	-1.04E+00	9.22E-07
ENSMUSG00000031467_Agpat5	8.97	8.64	14.81	13.6	14.09	18.76	SCC	-1.04E+00	9.22E-06
ENSMUSG00000043207_Zmpste24	21.44	16.91	23.36	23.92	28.77	39.82	SCC	-1.04E+00	3.15E-08
ENSMUSG00000031605_Klhl2	8	6.11	11.2	10.26	12.12	12.84	SCC	-1.04E+00	1.24E-08
ENSMUSG00000015745_Plekho1	3.13	1.87	5.58	5	11.21	12.95	SCC	-1.04E+00	5.61E-03
ENSMUSG00000033917_Gde1	19.17	16.79	32.12	32.16	32.4	33.18	SCC	-1.04E+00	1.36E-09
ENSMUSG00000044573_Acp1	23.87	22.4	37.97	36.44	37.81	45.03	SCC	-1.04E+00	1.72E-08
ENSMUSG00000017670_Elmo2	34.6	31.22	46.78	40.95	47.58	53.36	SCC	-1.04E+00	1.63E-07
ENSMUSG00000030104_Edem1	22.23	14.36	25.7	31.5	26.56	62.78	SCC	-1.04E+00	3.25E-06
ENSMUSG00000030471_Zdhhc13	14.45	13.39	22.76	21.99	24.33	26.24	SCC	-1.04E+00	8.00E-09
ENSMUSG00000043587_Pxylp1	1.85	1.67	2.37	2.74	4.19	3.2	SCC	-1.03E+00	1.80E-02
ENSMUSG00000027523_Gnas	215.16	169.84	320.45	241.69	391.62	269.62	SCC	-1.03E+00	5.19E-04
ENSMUSG00000073643_Wdfy1	8.16	5.85	10.37	12.63	16.32	16.72	SCC	-1.03E+00	1.53E-06
ENSMUSG00000075702_Selm	5.16	3.5	17.55	17.67	33.25	38.82	SCC	-1.03E+00	1.50E-02
ENSMUSG00000026107_Nabp1	22.34	14.6	23.53	19.75	31.03	42.45	SCC	-1.03E+00	7.90E-04
ENSMUSG00000063273_Naa15	39.13	24.32	40.08	33.45	35.28	46.57	SCC	-1.03E+00	1.41E-04
ENSMUSG00000007458_M6pr	75.61	71.31	130.08	117.8	131.42	132.33	SCC	-1.03E+00	8.84E-09
ENSMUSG00000009894_Snap47	16.68	17.13	21.79	28.14	25.86	35.29	SCC	-1.03E+00	1.32E-03
ENSMUSG00000031954_Cfdp1	79.39	73.66	114.23	121.84	119.06	163.71	SCC	-1.03E+00	7.88E-05
ENSMUSG00000041773_Enc1	5.6	4.78	4.96	4.71	8.98	9.18	SCC	-1.03E+00	3.80E-08

ENSMUSG00000025521_Tmem192	14.35	14.71	22.12	22.54	24.84	29.3	SCC	-1.03E+00	1.83E-04
ENSMUSG00000007867_Ift43	37.42	32.84	53.15	61.11	57.3	76.81	SCC	-1.03E+00	1.91E-03
ENSMUSG00000029621_Arpc1a	88.27	68.64	110.74	124.11	118.6	143.3	SCC	-1.03E+00	1.64E-06
ENSMUSG00000031875_Cmtm3	4.55	2.67	10	11.07	19.72	23.31	SCC	-1.03E+00	4.82E-03
ENSMUSG00000061104_Gm10094	100.16	107.59	182.97	168.74	198.13	204.54	SCC	-1.03E+00	1.86E-05
ENSMUSG00000038299_Wdr36	29.39	25.7	47.19	44.7	49.21	49.33	SCC	-1.03E+00	4.40E-10
ENSMUSG00000034024_Cct2	204.9	220.64	349.65	342.08	369.52	402.38	SCC	-1.03E+00	2.90E-06
ENSMUSG00000021877_Arf4	135.48	122.21	149.12	160.31	187.69	259.34	SCC	-1.03E+00	9.66E-08
ENSMUSG00000026019_Wdr12	20.82	17.82	34.92	28.15	33.38	31.65	SCC	-1.03E+00	2.16E-07
ENSMUSG00000022469_Rapgef3	1.54	0.89	24.37	20.65	40.24	51.1	SCC	-1.02E+00	2.59E-03
ENSMUSG00000063506_Arhgap22	7.38	9.49	10.33	9.04	13.27	13.2	SCC	-1.02E+00	3.21E-03
ENSMUSG00000018906_P4ha2	18.71	15.68	19.13	27.06	25.8	29.78	SCC	-1.02E+00	5.12E-04
ENSMUSG00000035365_Parpbp	3.33	3.42	6.06	5.33	5.96	6.67	SCC	-1.02E+00	3.84E-04
ENSMUSG00000032322_Pstpip1	0.26	0.22	10.49	10.78	18.55	26.34	SCC	-1.02E+00	1.18E-02
ENSMUSG00000026627_Tmem206	2.84	2.43	2.95	2.65	3.88	5.53	SCC	-1.02E+00	2.76E-03
ENSMUSG00000024754_Tmem2	7.18	4.49	7.72	9.31	9.49	10.37	SCC	-1.02E+00	1.14E-05
ENSMUSG00000042331_Specc1	3.16	2.76	7.91	7.73	15.09	17.65	SCC	-1.02E+00	1.31E-05
ENSMUSG00000032059_Alg9	17.06	19.78	21.71	31.65	27.32	32.75	SCC	-1.02E+00	2.27E-04
ENSMUSG00000075122_Cd80	0.09	0.17	17.25	17.68	29.02	41.95	SCC	-1.02E+00	1.74E-02
ENSMUSG00000031217_Efnb1	41.87	39.87	60.31	65.49	75.65	66.51	SCC	-1.02E+00	2.78E-06
ENSMUSG00000030082_Sec61a1	79.96	80.5	123.4	114.5	134.22	113.74	SCC	-1.02E+00	2.87E-04
ENSMUSG00000032640_Chsy1	1.93	1.33	10.01	13.08	18.44	28.67	SCC	-1.02E+00	1.00E-02
ENSMUSG00000031328_Flna	290.97	249.73	467.76	541.85	497.95	530.47	SCC	-1.02E+00	1.79E-07
ENSMUSG00000079555_Haus3	9.92	7.7	13.76	14.66	11.71	21.92	SCC	-1.02E+00	3.24E-04
ENSMUSG00000072235_Tuba1a	155.92	187.58	120.4	137.01	232.89	281.71	SCC	-1.02E+00	7.62E-03
ENSMUSG00000022799_Arhgap31	2.15	1.23	1.16	1.03	1.73	1.49	SCC	-1.02E+00	1.31E-02
ENSMUSG00000056737_Capg	361.97	431.56	604.66	686.19	713.69	808.51	SCC	-1.01E+00	1.65E-03
ENSMUSG00000021477_Ctsl	76.69	53.6	203.42	196.51	346.84	460.83	SCC	-1.01E+00	2.68E-05
ENSMUSG00000040339_Fam102b	8.68	4.99	8.19	8.25	9.2	14.12	SCC	-1.01E+00	1.06E-03
ENSMUSG00000025872_Thoc3	18.84	19.65	32.37	29.36	32.21	30.64	SCC	-1.01E+00	7.88E-06
ENSMUSG00000018882_Mrpl45	13.9	14.84	21.55	24.14	22.95	30.01	SCC	-1.01E+00	8.19E-05
ENSMUSG00000028410_Dnaja1	141.59	95.66	141.49	122.15	159	266	SCC	-1.01E+00	8.77E-05
ENSMUSG00000090136_Gm10177	209.89	252.91	320.06	361.95	404.69	547.89	SCC	-1.01E+00	6.88E-03
ENSMUSG00000019802_Sec63	29.74	21.36	45.38	41.06	50.66	64.78	SCC	-1.01E+00	1.18E-09
ENSMUSG00000002797_Ggct	74.67	70.3	126.52	165.69	144.89	168.04	SCC	-1.01E+00	1.09E-06
ENSMUSG00000021905_Dph3	31.97	36.25	58.13	58.62	63.79	72.74	SCC	-1.01E+00	2.23E-04
ENSMUSG00000079426_Arpc4	126.29	164.41	223.18	255.14	273.64	272.3	SCC	-1.01E+00	1.01E-03
ENSMUSG00000022443_Myh9	119.08	99.78	170.25	171.25	191.71	170.49	SCC	-1.01E+00	1.47E-07
ENSMUSG00000033021_Gmppa	50.06	51.7	78.48	75.04	72.41	111.99	SCC	-1.00E+00	6.72E-04
ENSMUSG00000068039_Tcp1	189.06	177.5	256.97	260.71	271.72	349.32	SCC	-1.00E+00	5.70E-07
ENSMUSG00000068798_Rap1a	46.61	30.15	52.15	55.9	57.38	81.61	SCC	-1.00E+00	1.13E-05
ENSMUSG00000019797_1700021F05Rik	21.39	16.29	29.9	28.25	30.31	35.84	SCC	-1.00E+00	3.85E-05
ENSMUSG00000024772_Ehd1	34.08	43.43	26.6	46.82	44.71	67.91	SCC	-1.00E+00	1.63E-03

ENSMUSG00000028452_Vcp	169.41	162.87	236.9	241.45	270.05	290.64	SCC	-1.00E+00	5.50E-08
ENSMUSG00000059900_Tmem40	43.45	50.66	59.33	73.27	75.85	100.94	SCC	-1.00E+00	2.29E-03
ENSMUSG00000005233_Spc25	9.98	12.98	20.62	21.52	17.72	29.29	SCC	-1.00E+00	1.25E-02
ENSMUSG00000022538_Lsg1	27.39	21.88	41.34	39.29	41.05	47.05	SCC	-1.00E+00	1.44E-09
ENSMUSG00000000776_Polr3d	15.45	14.51	24.36	23.09	26.03	26.7	SCC	-1.00E+00	1.29E-07
ENSMUSG00000021149_Gtpbp4	27.97	23.69	46.64	42.48	45.66	43.73	SCC	-1.00E+00	8.30E-09
ENSMUSG00000039787_Cercam	3.55	2.4	1.74	2.01	3.09	3.35	SCC	-1.00E+00	2.91E-02
ENSMUSG00000026095_Asnsd1	29.69	29.68	37.24	45.09	40.81	51.89	SCC	-1.00E+00	1.92E-04
ENSMUSG00000025431_Crisp1	0	0	21.75	11.16	0	0.04	Papilloma	1.22E+01	1.46E-08
ENSMUSG00000096278_Dcpp2	0	0	36.64	41.15	0	0.05	Papilloma	1.21E+01	2.77E-14
ENSMUSG00000094186_Gm1553	0	0	50.74	21.66	0	0.1	Papilloma	1.21E+01	6.49E-08
ENSMUSG00000062556_Scgb1b2	0	0	76.15	37.06	0	0.16	Papilloma	1.18E+01	1.38E-13
ENSMUSG00000082029_H3f3c	80.06	256.57	0.28	33.1	0	0	Papilloma	1.03E+01	3.06E-02
ENSMUSG00000079521_Gm5938	0	0.13	8.74	36.72	0	0.15	Papilloma	8.72E+00	8.43E-04
ENSMUSG00000067684_Obp1a	0	0.26	26.56	83.85	0	0.15	Papilloma	8.72E+00	2.97E-03
ENSMUSG00000036925_Spt1	0	0.27	39.59	71.8	0.04	0.05	Papilloma	8.66E+00	1.99E-21
ENSMUSG00000036521_Scgb2b2	0.06	0.22	72.5	29.74	0	0.13	Papilloma	8.31E+00	1.47E-21
ENSMUSG00000005980_Dnase1	3.23	2.93	238.3	119.53	1.14	0.88	Papilloma	6.79E+00	3.87E-49
ENSMUSG00000095427_Rps2-ps6	0.18	7.24	0.89	738.42	136.91	238.29	Papilloma	6.68E+00	2.59E-02
ENSMUSG00000009356_Lpo	0.43	0.82	8.41	4.31	0.19	0	Papilloma	5.95E+00	3.39E-02
ENSMUSG00000073940_Hbb-bt	0	1.08	26.94	13.05	13.01	2.56	Papilloma	5.06E+00	3.56E-02
ENSMUSG00000097770_Gm26776	20.27	27.51	0.77	1.33	0.11	0	Papilloma	4.17E+00	4.39E-06
ENSMUSG00000028150_Rorc	9.79	6.31	2.63	0.88	0.47	0.07	Papilloma	2.67E+00	4.86E-02
ENSMUSG00000074489_Bglap3	1.35	0.92	14.55	11.51	2.76	2.06	Papilloma	2.62E+00	4.02E-09
ENSMUSG00000024222_Fkbp5	7.27	5.72	32.26	23.26	13.37	7.17	Papilloma	2.38E+00	1.71E-07
ENSMUSG00000058135_Gstm1	83.67	68.11	35.03	46.28	14.9	3.34	Papilloma	2.08E+00	1.68E-02
ENSMUSG00000012350_Ehf	7.8	13.31	19.87	28.14	13.35	9.39	Papilloma	2.08E+00	1.20E-04
ENSMUSG00000020838_Slc6a4	63.14	46.49	8.46	4.83	2.52	0.92	Papilloma	2.04E+00	2.67E-02
ENSMUSG00000092274_Neat1	875.21	277.55	552.95	327.25	116.63	94.11	Papilloma	2.01E+00	1.87E-03
ENSMUSG00000028539_Artn	2.02	2.34	9.19	6.02	4.54	1.82	Papilloma	1.98E+00	5.40E-04
ENSMUSG00000024379_Tslp	5.41	2.83	8.63	19.62	12.33	2.06	Papilloma	1.98E+00	3.94E-02
ENSMUSG00000023367_Tmem176a	17.29	19.33	62.08	70.43	58.37	13.52	Papilloma	1.92E+00	5.22E-03
ENSMUSG00000068101_Cenpm	4.84	8.77	17.99	27.64	11.61	11.29	Papilloma	1.85E+00	4.32E-04
ENSMUSG00000046295_Ankle1	4.18	2.69	13.78	9.49	3.65	4.15	Papilloma	1.80E+00	1.02E-09
ENSMUSG00000026494_Kif26b	1.37	1.32	2.97	3.74	2.65	1.55	Papilloma	1.76E+00	3.17E-04
ENSMUSG00000070509_Rgma	14	15.22	14.98	20.78	7.5	2.94	Papilloma	1.74E+00	1.67E-02
ENSMUSG00000037580_Gch1	1.3	1.98	2.87	6.79	2.47	1.33	Papilloma	1.72E+00	1.52E-02
ENSMUSG00000032788_Pdxk	3.3	2.86	9.25	7.8	6.07	4.1	Papilloma	1.66E+00	4.80E-06
ENSMUSG00000059326_Csf2ra	2.41	0.76	3.64	4.63	3.46	2.23	Papilloma	1.64E+00	1.29E-02
ENSMUSG00000018740_Slc25a35	3.55	1.93	7.32	7.54	4.38	3.57	Papilloma	1.63E+00	5.03E-05
ENSMUSG00000048402_Gli2	2.29	0.92	5.02	2.93	2.62	1.92	Papilloma	1.58E+00	4.52E-03
ENSMUSG00000001517_Foxm1	11.15	12.58	28.72	24.27	16.98	14.23	Papilloma	1.57E+00	2.44E-06
ENSMUSG00000040945_Rcc2	61.82	70.22	155.06	162.82	126.76	90.01	Papilloma	1.56E+00	2.14E-05

ENSMUSG00000079025_Gsdmc	5.42	20.45	27	35.1	28.19	20.1	Papilloma	1.55E+00	3.12E-02
ENSMUSG00000040010_Slc7a5	28.81	28.65	77.66	51.52	48.52	25.87	Papilloma	1.55E+00	4.00E-04
ENSMUSG00000031958_Ldhd	3.75	3.61	8.02	10.56	5.41	5.54	Papilloma	1.54E+00	2.56E-07
ENSMUSG00000038217_Tlcd2	10.32	9.41	22.78	27.7	20.78	11.54	Papilloma	1.54E+00	1.53E-04
ENSMUSG00000022325_Pop1	5.03	5.31	9.13	12.3	8.38	6.7	Papilloma	1.54E+00	1.82E-07
ENSMUSG00000033161_Atp1a1	237.54	284.75	649.65	680.27	573.29	292.11	Papilloma	1.54E+00	5.51E-04
ENSMUSG00000003526_Prodh	46.94	38.39	13.07	8.48	5.84	2.29	Papilloma	1.53E+00	4.40E-02
ENSMUSG00000063130_Calml3	55.51	52.1	83.32	190.33	93.57	44.39	Papilloma	1.52E+00	7.75E-03
ENSMUSG00000044313_Mab21l3	5.4	5.14	12.22	13.61	9.67	6.26	Papilloma	1.51E+00	3.64E-05
ENSMUSG00000029810_Tmem176b	44.42	61.26	130.97	147.42	115.73	27.25	Papilloma	1.50E+00	3.02E-02
ENSMUSG00000097164_Cep83os	3.7	3.13	1.28	1.01	0.49	0.31	Papilloma	1.49E+00	9.57E-03
ENSMUSG00000030346_Rad51ap1	5.53	5.83	15.66	12.28	10.86	8.15	Papilloma	1.49E+00	1.31E-06
ENSMUSG00000025321_Itgb8	2.74	1.85	4.5	5.78	3.67	2.9	Papilloma	1.48E+00	7.59E-07
ENSMUSG00000018983_E2f2	4.2	3.05	7.01	7.27	4.23	2.48	Papilloma	1.45E+00	9.75E-05
ENSMUSG00000029591_Ung	5.95	8.31	20.91	16	14.01	7.78	Papilloma	1.45E+00	3.36E-03
ENSMUSG00000020211_Sf3a2	28.48	33.98	71.08	67.69	53.63	43.92	Papilloma	1.44E+00	2.09E-06
ENSMUSG00000018566_Slc2a4	2.46	1.57	4.03	5.47	3.29	2.78	Papilloma	1.43E+00	1.41E-03
ENSMUSG00000020547_Bzw2	44.65	45.94	101.8	113.41	79.21	66.32	Papilloma	1.42E+00	9.64E-09
ENSMUSG00000007817_Zmiz1	21.21	11.17	38	35.27	30.16	21.29	Papilloma	1.40E+00	1.48E-04
ENSMUSG00000020471_Pold2	22.88	30.55	77.68	56.78	47.93	52.74	Papilloma	1.39E+00	2.72E-05
ENSMUSG00000038539_Atf5	20.65	28.64	54.91	59.38	41.16	23.7	Papilloma	1.36E+00	2.11E-03
ENSMUSG00000031706_Rfx1	6.63	2.04	8.88	9.23	7.05	6.07	Papilloma	1.35E+00	9.96E-03
ENSMUSG00000023147_Wrb	5.89	3.14	9.02	9.17	7.61	3.64	Papilloma	1.35E+00	6.35E-03
ENSMUSG00000017764_Zswim1	2.71	2.53	5.99	5.67	4.82	4	Papilloma	1.35E+00	5.15E-06
ENSMUSG00000024640_Psat1	95.58	100.59	217.76	203.51	178.38	140.43	Papilloma	1.35E+00	2.33E-06
ENSMUSG00000028862_Map3k6	19.66	20.77	52.18	47.24	38.94	31.66	Papilloma	1.34E+00	2.71E-05
ENSMUSG00000041700_Lhfpl1	4.73	3.67	7.83	10.71	6.41	9.15	Papilloma	1.34E+00	2.71E-05
ENSMUSG00000038291_Snx25	9.24	5.12	12.03	13.39	8.61	8.76	Papilloma	1.33E+00	4.07E-09
ENSMUSG00000025227_Tmem180	1.51	0.98	6.71	7.44	3.38	2.11	Papilloma	1.33E+00	1.63E-02
ENSMUSG00000079553_Kifc1	16.05	18.57	39.24	38.34	27.49	26.76	Papilloma	1.32E+00	1.32E-05
ENSMUSG00000024312_Wdr46	19.53	20.77	46.75	42.34	36.88	33.87	Papilloma	1.32E+00	1.12E-07
ENSMUSG00000027540_Ptpn1	33.55	34.91	68.62	72.64	54.74	46.84	Papilloma	1.31E+00	1.05E-07
ENSMUSG00000036306_Lzts1	1.99	1.28	6.28	7.99	3.34	2.18	Papilloma	1.31E+00	1.19E-02
ENSMUSG00000007670_Khsrp	35.61	25.85	68.08	61.92	54.9	45.33	Papilloma	1.31E+00	9.42E-09
ENSMUSG00000048922_Cdca2	5.42	5.55	11.31	9.9	7.4	9.97	Papilloma	1.31E+00	1.26E-07
ENSMUSG00000033955_Tnks1bp1	79.64	71.4	168.45	151.12	143.33	87.03	Papilloma	1.30E+00	5.68E-06
ENSMUSG00000026196_Bard1	1.18	1.09	2.73	2.06	1.7	1.51	Papilloma	1.30E+00	1.86E-04
ENSMUSG00000032033_Barx2	46.39	38.48	53.9	63.54	32.54	14.63	Papilloma	1.30E+00	4.13E-02
ENSMUSG00000022422_Dscc1	2.44	2.31	6.19	5.12	4.8	3.44	Papilloma	1.30E+00	1.26E-03
ENSMUSG00000001436_Slc19a1	11.34	12.13	26.87	22.03	21.2	12.05	Papilloma	1.30E+00	3.18E-03
ENSMUSG00000018677_Slc25a39	58.39	78.19	143.72	157.47	119.4	118.59	Papilloma	1.30E+00	1.89E-05
ENSMUSG00000028010_Gar1	49.98	44.44	120.29	94.46	90.27	79.22	Papilloma	1.30E+00	1.23E-09
ENSMUSG00000036731_Cysrt1	14.5	14.99	29.72	37.55	33.37	18.53	Papilloma	1.29E+00	2.57E-03

ENSMUSG00000013155_Enkd1	4.99	4.47	11.41	9.47	8.18	7.09	Papilloma	1.28E+00	6.44E-06
ENSMUSG00000070003_Ssbp4	25.03	28.77	67.1	51.72	50.51	46.66	Papilloma	1.28E+00	7.20E-06
ENSMUSG00000002055_Spag5	17.4	13.09	21.69	20.66	14.02	19.31	Papilloma	1.28E+00	2.24E-06
ENSMUSG00000049600_Zbtb45	6.14	4.64	11.25	10.7	9.4	5.38	Papilloma	1.28E+00	3.18E-04
ENSMUSG00000031077_Fadd	2.67	3.17	5.77	6.58	5.38	4.35	Papilloma	1.27E+00	2.96E-04
ENSMUSG00000044646_Zbtb7c	9.01	7.31	13.65	17.73	8.3	3.03	Papilloma	1.26E+00	2.84E-02
ENSMUSG00000098678_Mroh6	2.98	2.16	5.72	4.96	3.46	2.01	Papilloma	1.26E+00	5.18E-03
ENSMUSG00000013629_Cad	16.89	21.31	47.97	44.15	37.17	30.43	Papilloma	1.26E+00	2.71E-03
ENSMUSG00000058248_Kcnh1	0.9	0.85	2.34	1.49	1.18	0.57	Papilloma	1.26E+00	4.53E-02
ENSMUSG00000054252_Fgfr3	187.06	134.52	58.11	40.45	23.99	17.13	Papilloma	1.26E+00	1.87E-03
ENSMUSG00000041716_Gm20604	3.18	2.8	7.3	5.05	5.53	3.67	Papilloma	1.25E+00	2.92E-03
ENSMUSG00000032218_Ccnb2	21.06	30.16	58.89	52.03	44.41	43.83	Papilloma	1.24E+00	4.06E-04
ENSMUSG00000074643_Cpne1	30.15	27.45	48.3	51.28	42.42	47.21	Papilloma	1.24E+00	2.53E-08
ENSMUSG00000012443_Kif11	8.55	10.57	20.18	19.34	13.73	17.48	Papilloma	1.24E+00	3.02E-05
ENSMUSG00000040852_Plekhh2	2.06	1.41	1.02	1.33	0.56	0.42	Papilloma	1.24E+00	1.67E-02
ENSMUSG00000054871_Tmem158	4.34	5.76	12.45	9.18	8.92	6.44	Papilloma	1.24E+00	5.00E-03
ENSMUSG00000028933_Xrcc2	2.66	1.87	4.53	3.38	3.4	2.66	Papilloma	1.23E+00	3.91E-04
ENSMUSG00000006476_Nsmf	12.58	8.61	20.94	20.48	15.91	14.88	Papilloma	1.23E+00	2.88E-10
ENSMUSG00000034295_Fhod3	1.39	1.23	2.45	2.82	1.51	1.78	Papilloma	1.23E+00	2.08E-06
ENSMUSG00000022177_Haus4	7.91	9.6	17.82	19.26	16.18	14.09	Papilloma	1.23E+00	1.70E-04
ENSMUSG00000061048_Cdh3	41.29	44.28	80.36	94.17	85.59	48.72	Papilloma	1.22E+00	2.04E-03
ENSMUSG00000078773_Rad54b	4.23	3.95	8.19	7.3	5.01	3.56	Papilloma	1.22E+00	1.19E-04
ENSMUSG00000046027_Stard5	41.51	37.22	65.69	76.14	54.33	37.48	Papilloma	1.22E+00	2.12E-04
ENSMUSG00000025507_Pidd1	3.42	1.89	7.3	4.15	3.78	1.68	Papilloma	1.22E+00	3.02E-02
ENSMUSG00000035504_Reep6	2.8	2.23	5.3	4.85	3.97	3.19	Papilloma	1.22E+00	8.04E-03
ENSMUSG00000038644_Pold1	17.34	21.95	53.34	41.07	30.34	35.94	Papilloma	1.21E+00	7.61E-04
ENSMUSG00000005198_Polr2a	23.72	19.36	43.04	42.32	34.24	22.47	Papilloma	1.21E+00	1.11E-04
ENSMUSG00000041632_Mrps27	15.91	19.43	35.91	37.49	30.03	30.14	Papilloma	1.21E+00	2.93E-05
ENSMUSG00000007029_Vars	59.88	70.35	125.5	137.46	102.04	77.37	Papilloma	1.20E+00	5.43E-03
ENSMUSG00000027639_Samhd1	28.49	19.66	52.74	57.93	42.71	30.5	Papilloma	1.19E+00	1.47E-06
ENSMUSG00000018921_Pelp1	16.64	16.24	33.52	29.43	28.38	18.79	Papilloma	1.19E+00	3.95E-04
ENSMUSG00000001082_Mfsd10	49.43	44.05	100.18	87.54	73.34	62.34	Papilloma	1.19E+00	6.63E-07
ENSMUSG00000071757_Zhx2	4.34	4.67	8.67	9.11	5.65	4.15	Papilloma	1.18E+00	4.23E-04
ENSMUSG00000074622_Mafb	31.07	37.62	63.75	73.4	44.49	32.31	Papilloma	1.18E+00	6.35E-04
ENSMUSG00000041037_Irgq	7.14	6.52	11.82	14.7	12.81	9.13	Papilloma	1.18E+00	1.94E-04
ENSMUSG00000026683_Nuf2	9.96	12.67	24.44	21.85	18.11	20.58	Papilloma	1.18E+00	4.98E-04
ENSMUSG00000072980_Oip5	2.38	3.8	7.09	5.36	5.45	5.76	Papilloma	1.17E+00	1.43E-02
ENSMUSG00000000811_Txnrd3	12.15	10.55	23.25	21.17	20.01	13.96	Papilloma	1.17E+00	1.02E-04
ENSMUSG00000034889_Cactin	18.66	15.31	36.09	30.38	27.5	23.81	Papilloma	1.17E+00	1.53E-07
ENSMUSG00000027459_Fam110a	13.4	15.25	26.02	31.29	24.68	25.07	Papilloma	1.17E+00	4.94E-05
ENSMUSG00000029310_Nudt9	24.83	27.66	53.61	53.99	47.78	48.12	Papilloma	1.17E+00	3.39E-06
ENSMUSG00000043286_Pnpla1	3.12	2.26	4.63	5.65	4.46	3.63	Papilloma	1.17E+00	8.52E-05
ENSMUSG00000035842_Ddx11	3.96	2.68	6.51	6.14	4.62	4.11	Papilloma	1.16E+00	6.02E-06

ENSMUSG00000041346_Wrap53	8.96	7.5	14.34	15.21	12.17	12.17	Papilloma	1.16E+00	3.92E-07
ENSMUSG00000032123_Dpagt1	14.59	14.84	28.98	29.32	27.27	23.43	Papilloma	1.16E+00	2.63E-06
ENSMUSG00000032114_Slc37a4	5.78	5.33	11.2	10.58	8.59	7.89	Papilloma	1.15E+00	1.19E-06
ENSMUSG00000056999_Ide	46.33	28.98	78.81	60.42	49.17	39.02	Papilloma	1.15E+00	1.90E-04
ENSMUSG00000028792_Ak2	79.92	84.77	159.9	157.86	137.4	115.6	Papilloma	1.15E+00	4.71E-06
ENSMUSG00000020808_Fam64a	9.58	9.62	20.99	18.31	13.41	12.98	Papilloma	1.15E+00	3.67E-06
ENSMUSG00000020549_Elac2	20.3	17.81	36.37	31.96	30.92	27.32	Papilloma	1.15E+00	3.01E-07
ENSMUSG00000028884_Rpa2	16.68	17.98	37	29.08	26.17	27.43	Papilloma	1.15E+00	3.68E-05
ENSMUSG00000034330_Plcg2	9.17	9.52	16.14	19.98	16.34	10.08	Papilloma	1.15E+00	2.85E-03
ENSMUSG00000020918_Kat2a	28.34	24.9	51.88	50.43	42.02	32.39	Papilloma	1.15E+00	4.91E-06
ENSMUSG00000029415_Sdad1	17.88	10.9	25.16	20.08	21.96	23.93	Papilloma	1.14E+00	1.08E-06
ENSMUSG00000057531_Dtnbp1	17.1	18.03	35.29	34.95	31.14	22.47	Papilloma	1.14E+00	1.91E-04
ENSMUSG00000053293_Pom121	12.34	11.16	23.62	20.73	18.7	11.8	Papilloma	1.14E+00	1.25E-03
ENSMUSG00000004929_Thop1	19.26	22.53	37.04	37.45	29.56	30.84	Papilloma	1.13E+00	3.96E-04
ENSMUSG00000030677_Kif22	14.19	21.52	35.43	35.38	27.18	26.15	Papilloma	1.13E+00	2.96E-03
ENSMUSG00000049734_Trex1	18.58	22.94	43.33	41.81	37.21	34.96	Papilloma	1.13E+00	2.02E-04
ENSMUSG00000052488_Cherp	27.02	19.98	45.22	42.5	35.6	27.42	Papilloma	1.13E+00	8.76E-06
ENSMUSG00000027952_Pmvk	33.79	26	58.34	56.8	35.49	64.79	Papilloma	1.13E+00	2.24E-03
ENSMUSG00000041498_Kif14	2.82	2.72	4.07	3.28	3.05	3.42	Papilloma	1.12E+00	1.43E-06
ENSMUSG00000050295_Foxc1	4.49	3.33	7.16	7.41	5.67	3.77	Papilloma	1.12E+00	1.22E-03
ENSMUSG00000033706_Smyd5	17.12	15.25	29.77	29.82	30.12	25.13	Papilloma	1.12E+00	1.56E-05
ENSMUSG00000016494_Cd34	43.62	27.56	64.88	68.6	47.94	23.15	Papilloma	1.12E+00	1.12E-02
ENSMUSG00000041219_Arhgap11a	8.17	8.14	16.84	13.35	11.85	14.07	Papilloma	1.12E+00	3.39E-06
ENSMUSG00000002608_Ccdc97	25.98	20.15	38.31	41.44	32.23	25.53	Papilloma	1.12E+00	8.21E-07
ENSMUSG00000045538_Ddx28	5.39	6.04	11.08	10.98	8.81	8.74	Papilloma	1.12E+00	7.75E-05
ENSMUSG00000028560_Usp1	18.06	15.97	35.57	27.82	26.84	25.88	Papilloma	1.12E+00	4.11E-07
ENSMUSG00000031004_Mki67	22.61	22.03	50.32	32.47	29.94	34.27	Papilloma	1.12E+00	3.50E-04
ENSMUSG00000061458_Nol10	12.62	12.38	25.26	22.13	21.87	18.51	Papilloma	1.12E+00	1.22E-05
ENSMUSG00000034789_Rab24	36.79	26.29	54.55	64.82	53.78	52.61	Papilloma	1.12E+00	4.58E-08
ENSMUSG00000022881_Rfc4	12.7	15.14	29.3	29.76	21.24	26.41	Papilloma	1.12E+00	2.39E-04
ENSMUSG00000024891_Slc29a2	6.86	6.48	15.59	9.81	10.47	5.44	Papilloma	1.12E+00	2.65E-02
ENSMUSG00000027551_Zfp64	14.45	13.53	31.18	24.67	26.03	23.49	Papilloma	1.12E+00	4.87E-07
ENSMUSG00000053128_Rnf26	12.56	15.87	26.78	27.12	18.15	15.79	Papilloma	1.12E+00	4.46E-04
ENSMUSG00000028333_Anp32b	141.53	147.36	288.43	271.26	243.63	210.78	Papilloma	1.11E+00	1.27E-06
ENSMUSG00000037461_Ints7	11.2	6.35	14.69	14.53	11.11	10.48	Papilloma	1.11E+00	3.63E-05
ENSMUSG00000024121_Atp6v0c	185.57	194.52	414.46	342.19	395.74	270.67	Papilloma	1.11E+00	1.61E-04
ENSMUSG00000037519_Ppfia1	40.24	26.28	53.61	53.97	45.43	50.02	Papilloma	1.11E+00	1.47E-07
ENSMUSG00000024856_Cdk2ap2	69.75	69.93	129.45	144.06	115.49	113.84	Papilloma	1.11E+00	2.21E-07
ENSMUSG00000054662_Ano9	34.18	24.75	14.29	8.59	5.73	4.83	Papilloma	1.11E+00	2.16E-02
ENSMUSG00000029507_Pus1	26.5	33.93	63.15	57.4	56.96	52.63	Papilloma	1.11E+00	3.49E-04
ENSMUSG00000014837_4931428F04Rik	2.59	1.18	2.81	4.29	2.63	3.44	Papilloma	1.11E+00	2.17E-02
ENSMUSG00000041605_5730559C18Rik	30.29	24.92	48.17	55.16	49.79	32.87	Papilloma	1.11E+00	5.57E-05
ENSMUSG00000040688_Tbl3	32.26	31.56	57.96	58.39	46.7	50.39	Papilloma	1.11E+00	1.43E-05

ENSMUSG00000045983_Eif4g1	143.36	130.57	276.9	238.16	257.25	199.84	Papilloma	1.10E+00	1.31E-04
ENSMUSG00000020935_Dcakd	24.91	27.3	43.09	49.15	39.23	41.41	Papilloma	1.10E+00	1.99E-04
ENSMUSG00000026622_Nek2	7.34	8.5	14.58	14.53	10.56	10.08	Papilloma	1.10E+00	3.86E-04
ENSMUSG00000035378_Shq1	6.82	6.38	12.82	12.64	12.32	10.59	Papilloma	1.10E+00	8.67E-07
ENSMUSG00000027395_Polr1b	22.1	16.48	33.95	26.13	26.99	18.02	Papilloma	1.10E+00	2.74E-04
ENSMUSG00000028760_Eif4g3	24.91	17.18	37.6	30.23	31.2	27.33	Papilloma	1.10E+00	3.18E-05
ENSMUSG00000018446_C1qbp	94.73	115.96	239.63	217.24	215.58	191.26	Papilloma	1.10E+00	6.74E-05
ENSMUSG00000002728_Naa20	60.91	51.17	120.54	105.89	106.51	101.43	Papilloma	1.10E+00	1.12E-14
ENSMUSG00000029036_Atad3a	55.69	39.66	82.31	68.49	64.35	51.25	Papilloma	1.09E+00	2.23E-06
ENSMUSG00000032012_Pvrl1	37.75	31.62	61.97	64.9	53.67	34.65	Papilloma	1.09E+00	6.77E-04
ENSMUSG00000001156_Mxd1	5.05	5.13	7.97	10.12	6.7	9.05	Papilloma	1.09E+00	1.89E-06
ENSMUSG00000064120_Mocs1	19.58	14.16	23.63	28.93	17.66	12.14	Papilloma	1.09E+00	6.55E-04
ENSMUSG00000010080_Epn3	13.11	15.85	23.76	23.6	26.1	15.89	Papilloma	1.09E+00	2.60E-03
ENSMUSG00000022960_Donson	6.52	4.67	9.8	9.75	8.37	8.76	Papilloma	1.08E+00	4.80E-06
ENSMUSG00000042029_Ncapg2	5.43	5.76	11.23	9.25	8.47	9	Papilloma	1.08E+00	4.08E-05
ENSMUSG00000051977_Prdm9	15.7	10.19	4.07	2.77	1.78	0.97	Papilloma	1.08E+00	2.17E-02
ENSMUSG00000037894_H2afz	287.34	396.44	1012.96	575.02	746.88	582.25	Papilloma	1.08E+00	2.43E-03
ENSMUSG00000098923_Tmem185b	6.97	6.35	11.58	8.05	11.02	8.21	Papilloma	1.08E+00	1.69E-02
ENSMUSG00000006576_Slc4a3	3.66	2.74	4.57	4.25	5.6	2.26	Papilloma	1.08E+00	9.18E-03
ENSMUSG00000034311_Kif4	6.64	8.28	10.88	13.39	9.53	13.63	Papilloma	1.08E+00	3.42E-04
ENSMUSG00000021670_Hmgcr	34.5	35.76	59.41	44.14	53.98	50.68	Papilloma	1.08E+00	3.87E-04
ENSMUSG00000028433_Ubap2	37.01	26.35	53.19	51.95	48.04	40.84	Papilloma	1.08E+00	8.99E-08
ENSMUSG00000026155_Smap1	39.41	35	54.92	67.51	53.23	50.71	Papilloma	1.07E+00	5.14E-08
ENSMUSG00000019312_Grb7	18.07	12.79	25.07	27.31	22.59	22.27	Papilloma	1.07E+00	2.81E-09
ENSMUSG00000070462_Mesdc1	5.6	5.29	9.88	9.92	9.64	8.59	Papilloma	1.07E+00	4.01E-06
ENSMUSG00000007050_Lsm2	26.5	31.68	59.23	69.92	59.71	68.42	Papilloma	1.07E+00	2.57E-04
ENSMUSG00000028948_Nol9	16.34	12.74	26.21	24.12	24.29	21	Papilloma	1.07E+00	6.89E-07
ENSMUSG00000020413_Hus1	5.25	3.14	7.21	6.62	6.7	5.87	Papilloma	1.07E+00	4.88E-05
ENSMUSG00000076498_Trbc2	47.76	47.92	89.09	103.24	76.23	90.54	Papilloma	1.07E+00	1.21E-03
ENSMUSG00000043336_Filip1l	20.74	13.59	28.15	33.34	26.09	25.85	Papilloma	1.07E+00	1.12E-06
ENSMUSG00000010205_Raver1	29.13	30.22	54.8	53.66	45.55	30.62	Papilloma	1.07E+00	1.27E-03
ENSMUSG00000059208_Hnrnpm	168.92	111.84	226.99	235.93	190.5	203.11	Papilloma	1.06E+00	5.87E-08
ENSMUSG00000052040_Klf13	42.07	34.37	37.29	42.32	22.78	15	Papilloma	1.06E+00	9.58E-03
ENSMUSG00000062510_Nsl1	1.96	2.56	5.21	4.29	3.85	3.53	Papilloma	1.06E+00	4.85E-03
ENSMUSG00000073434_Wdr90	5.23	5.53	10.23	9.41	4.35	2.48	Papilloma	1.06E+00	2.81E-03
ENSMUSG00000029414_Kntc1	4.23	6.05	10.6	9.08	6.71	9.04	Papilloma	1.06E+00	1.26E-02
ENSMUSG00000038332_Sesn1	42.67	34.05	20.47	18.94	10.81	7.62	Papilloma	1.06E+00	3.76E-03
ENSMUSG00000031984_2810004N23Rik	22.42	25.87	45.25	46.12	43.08	43.11	Papilloma	1.06E+00	9.03E-05
ENSMUSG00000034674_Tdg	40.44	32.86	52.73	66.79	35.91	49.52	Papilloma	1.06E+00	2.92E-05
ENSMUSG00000024764_Naa40	11.95	8.33	19.49	16.55	13.98	12.29	Papilloma	1.06E+00	1.50E-05
ENSMUSG00000003808_Farsa	40.16	40.77	82.82	68.19	67.21	60.57	Papilloma	1.06E+00	7.07E-06
ENSMUSG00000021368_Tbc1d7	8.43	6.25	13.72	13.63	12.97	12.38	Papilloma	1.05E+00	4.01E-06
ENSMUSG00000030216_Wbp11	39.25	30.76	61.02	55.86	51.2	41.36	Papilloma	1.05E+00	6.06E-06

ENSMUSG00000033970_Rfc3	19.42	18.6	35.17	29.72	31.49	31.6	Papilloma	1.05E+00	6.63E-06
ENSMUSG00000032350_Gclc	17.67	13.1	29.11	25.54	22.47	26.96	Papilloma	1.05E+00	2.25E-08
ENSMUSG00000043987_Cep164	12.62	6.89	16.06	16.65	16.11	11.67	Papilloma	1.05E+00	1.63E-03
ENSMUSG00000021258_Ccnk	14.15	10.31	21.81	21.9	18.73	17.69	Papilloma	1.05E+00	1.46E-08
ENSMUSG00000049950_Rpp38	10.69	7.75	18.62	16.13	15.18	13.93	Papilloma	1.05E+00	5.62E-06
ENSMUSG00000095567_Noc2l	50.91	51.07	88.72	96.38	85.51	65.44	Papilloma	1.05E+00	1.25E-04
ENSMUSG00000032834_Pwp2	10.95	12.59	23.49	19.16	22.05	14.27	Papilloma	1.05E+00	7.76E-03
ENSMUSG00000019773_Fbxo5	8.64	7.62	15.97	13.68	11.07	11.11	Papilloma	1.05E+00	2.95E-06
ENSMUSG00000073705_Apitd1	9.82	11.42	20.24	19.8	14.2	21.21	Papilloma	1.05E+00	3.92E-03
ENSMUSG00000020422_Tns3	12.5	7.45	16.25	15.93	16.64	11.17	Papilloma	1.04E+00	7.89E-04
ENSMUSG00000024493_Lars	30.02	23.5	49.15	45.43	44.98	45.74	Papilloma	1.04E+00	1.61E-11
ENSMUSG00000103475_Gm37697	17.38	18.88	31.65	35.09	20.49	30.6	Papilloma	1.04E+00	1.14E-03
ENSMUSG00000048371_Pdp2	1.85	1.53	3.64	2.38	2.62	2.98	Papilloma	1.04E+00	6.30E-03
ENSMUSG00000037544_Dlgap5	14.09	15.89	19.94	23.28	18.05	27.51	Papilloma	1.04E+00	1.42E-03
ENSMUSG00000092595_Gm20427	1.44	1.35	2.13	2.84	0.61	1.23	Papilloma	1.04E+00	4.07E-02
ENSMUSG00000047409_Ctdspl	17.07	10.87	23.06	22.46	19.58	15.19	Papilloma	1.04E+00	2.35E-05
ENSMUSG00000048277_Syngr2	104.05	107.51	196.36	177.87	161.75	120.88	Papilloma	1.04E+00	2.35E-04
ENSMUSG00000041949_Tango6	3.85	3.1	6.13	6.1	6.13	4.95	Papilloma	1.04E+00	1.03E-04
ENSMUSG00000037995_Igsf9	42.54	23.1	44.38	61.7	46.71	34.75	Papilloma	1.04E+00	2.11E-03
ENSMUSG00000024785_Rcl1	18.75	18.92	37.31	31.72	32.8	27.42	Papilloma	1.04E+00	6.55E-05
ENSMUSG00000032783_Troap	4.46	4.62	9.02	7.44	6.08	4.78	Papilloma	1.04E+00	2.59E-03
ENSMUSG00000034255_Arhgap27	16.22	13.7	25.12	26.86	22.6	16.09	Papilloma	1.03E+00	2.30E-04
ENSMUSG00000049881_2810025M15Rik	29.36	28.79	60.42	52.71	42.47	60.95	Papilloma	1.03E+00	1.18E-03
ENSMUSG00000028811_Yars	29.73	36.51	49.58	56.13	44.48	43.57	Papilloma	1.03E+00	5.87E-04
ENSMUSG00000034259_Exosc4	14.86	16.59	31.3	26.78	24.85	24.66	Papilloma	1.03E+00	5.88E-05
ENSMUSG00000038762_Abcf1	58.61	46.38	92.64	83.12	81.06	78.08	Papilloma	1.03E+00	7.45E-09
ENSMUSG00000025231_Sufu	11.09	8.16	15.37	15.32	10.59	9.33	Papilloma	1.03E+00	3.83E-06
ENSMUSG00000021177_Tdp1	9.98	11.37	19.87	18.45	17.17	16.38	Papilloma	1.03E+00	9.67E-05
ENSMUSG00000041747_Utp15	10.91	8.71	19.26	14.94	16.76	14.24	Papilloma	1.03E+00	1.39E-04
ENSMUSG00000006411_Pvrl4	23.64	22.47	36.24	43.2	35.77	21.1	Papilloma	1.02E+00	7.54E-03
ENSMUSG00000027203_Dut	40.21	52.34	94.13	87.9	79.26	78.2	Papilloma	1.02E+00	1.20E-03
ENSMUSG00000073838_Tufm	52.23	62.6	101.3	108.72	96.01	99.75	Papilloma	1.02E+00	2.22E-04
ENSMUSG00000078652_Psme3	57.73	59.04	110.3	94.56	98.05	90.18	Papilloma	1.02E+00	6.62E-05
ENSMUSG00000027610_Gss	16.39	17.41	28.78	31.28	28.92	24.84	Papilloma	1.02E+00	1.11E-04
ENSMUSG00000054115_Skp2	4.36	2.96	6.76	5.21	5.83	4.01	Papilloma	1.02E+00	6.86E-03
ENSMUSG00000023110_Prmt5	22.46	25.08	41.72	42.32	42.6	37.09	Papilloma	1.02E+00	2.24E-04
ENSMUSG00000037966_Ninj1	33.04	40.84	68.91	70.04	62.61	65.24	Papilloma	1.02E+00	6.77E-04
ENSMUSG00000039509_Nup133	7.68	7.4	13.6	12.69	11.18	9.98	Papilloma	1.02E+00	1.70E-05
ENSMUSG00000024922_Ovol1	16.1	18.32	25.64	35.74	22.59	16.68	Papilloma	1.02E+00	5.94E-03
ENSMUSG00000022557_Bop1	38.33	45.48	75.8	74.66	65.65	67.34	Papilloma	1.02E+00	1.42E-04
ENSMUSG00000026211_Obsl1	4.35	4.28	7.64	8.81	6.99	6.9	Papilloma	1.02E+00	1.42E-02
ENSMUSG00000038252_Ncapd2	22.94	27.43	48.21	48.07	28.3	28.03	Papilloma	1.01E+00	7.53E-03
ENSMUSG00000014776_Nol3	3.95	3.87	6.22	7.57	5.96	6.72	Papilloma	1.01E+00	1.95E-04

ENSMUSG00000020166_Cnot2	47.04	34.53	70.76	71.81	66.86	70.08	Papilloma	1.01E+00	1.60E-10
ENSMUSG00000000134_Tfe3	19.77	17.84	37.37	37.94	32.76	22.73	Papilloma	1.01E+00	1.34E-04
ENSMUSG00000035960_Apex1	65.96	78.26	143.21	125.68	125.86	113.53	Papilloma	1.01E+00	3.50E-04
ENSMUSG00000031967_Afg3l1	25.25	20.44	28.21	40.05	27.69	32.12	Papilloma	1.01E+00	2.38E-05
ENSMUSG00000037085_Trmt12	1.66	1.28	2.38	2.68	2.19	2.68	Papilloma	1.01E+00	2.39E-04
ENSMUSG00000004393_Ddx56	33.83	32.5	62.5	51.56	52.48	49.41	Papilloma	1.01E+00	4.44E-06
ENSMUSG00000029388_Eif2b1	27.74	27.24	51.99	44.34	43.36	46.29	Papilloma	1.01E+00	2.62E-06
ENSMUSG00000020692_Nle1	30.27	23.7	49.81	41.01	37.28	25.49	Papilloma	1.01E+00	9.75E-05
ENSMUSG00000020899_Pfas	10.65	6.84	16.41	11.17	10.08	5.94	Papilloma	1.01E+00	1.10E-02
ENSMUSG00000024270_Slc39a6	25.6	26.44	42.62	46.45	44.32	42.54	Papilloma	1.01E+00	1.84E-06
ENSMUSG00000045752_Tssc4	23.31	21.92	40.07	37.48	31.72	35.42	Papilloma	1.01E+00	5.08E-07
ENSMUSG00000061360_Phf5a	65.41	64.21	140.1	106.94	120.77	117.78	Papilloma	1.01E+00	1.85E-06
ENSMUSG00000020917_Acly	71.06	56.09	101.86	98.72	90.89	91.64	Papilloma	1.01E+00	2.45E-11
ENSMUSG00000023004_Tuba1b	426.84	675.6	887.22	1137.13	838.41	987.76	Papilloma	1.01E+00	1.42E-02
ENSMUSG00000031907_Zfp90	3.2	1.89	4.01	4.69	4.02	3.94	Papilloma	1.01E+00	2.72E-03
ENSMUSG00000053553_3110082I17Rik	9.43	10.49	19.77	17.2	13.79	16.4	Papilloma	1.01E+00	3.76E-04
ENSMUSG00000045045_Lrfn4	13.04	16.15	26.08	25.28	24.05	14.08	Papilloma	1.01E+00	2.02E-02
ENSMUSG00000024982_Zdhhc6	20.32	16.7	33.36	31.36	29.09	35.53	Papilloma	1.00E+00	1.62E-08
ENSMUSG00000025314_Ptprj	2.24	1.5	3.24	3.15	2.78	1.7	Papilloma	1.00E+00	1.04E-02
ENSMUSG00000027067_Ssrp1	86.12	92.01	169.15	158.05	143.2	130.95	Papilloma	1.00E+00	3.17E-05
ENSMUSG00000068264_Ap5s1	6.23	7.44	13.35	12.83	11.79	9.47	Papilloma	1.00E+00	9.06E-03
ENSMUSG00000036114_Rpp25l	26.13	25.45	51.42	45.8	45.85	38.63	Papilloma	1.00E+00	7.02E-06
ENSMUSG00000039754_Alkbh4	6.01	5.04	9.92	9.01	10.23	8.61	Papilloma	1.00E+00	2.24E-05

Table 3: Genes enriched for cluster C2 expression (relative to clusters C1 and C3)

Gene	ENSMUSG_ID	Prl8a9	ENSMUSG00000006490.3	B4galt5	ENSMUSG00000017929.13
Cav2	ENSMUSG00000000058.6	Cyba	ENSMUSG00000006519.11	Vezf1	ENSMUSG00000018377.10
Klf6	ENSMUSG00000000078.7	Slc4a3	ENSMUSG00000006576.16	Cuedc1	ENSMUSG00000018378.13
Wnt9a	ENSMUSG00000000126.11	Snai3	ENSMUSG00000006587.6	Shroom1	ENSMUSG00000018387.12
Gna12	ENSMUSG00000000149.10	Aprt	ENSMUSG00000006589.8	Myo1b	ENSMUSG00000018417.14
Ccnd2	ENSMUSG00000000184.12	Stx1a	ENSMUSG00000007207.10	Irf1	ENSMUSG00000018899.16
Arvcf	ENSMUSG00000000325.16	Ift43	ENSMUSG00000007867.9	Natd1	ENSMUSG00000018931.3
Galnt1	ENSMUSG00000000420.15	Hmgcll1	ENSMUSG00000007908.14	Ywhah	ENSMUSG00000018965.11
Mmp14	ENSMUSG00000000957.11	Fgfrl1	ENSMUSG00000008090.14	Rnf145	ENSMUSG00000019189.13
S100a6	ENSMUSG00000001025.8	Fhl2	ENSMUSG00000008136.14	Calm3	ENSMUSG00000019370.10
N4bp3	ENSMUSG00000001053.15	Relt	ENSMUSG00000008318.10	Trip10	ENSMUSG00000019487.11
Pcbp3	ENSMUSG00000001120.15	Elk3	ENSMUSG00000008398.15	Gyg	ENSMUSG00000019528.18
Gramd1a	ENSMUSG00000001248.15	Nav1	ENSMUSG00000009418.16	Akt3	ENSMUSG00000019699.16
Ckb	ENSMUSG00000001270.9	Apobec3	ENSMUSG00000009585.18	Frk	ENSMUSG00000019779.15
Tubb6	ENSMUSG00000001473.7	Vav2	ENSMUSG00000009621.18	Mical1	ENSMUSG00000019823.17
Fkbp10	ENSMUSG00000001555.10	Fxyd5	ENSMUSG00000009687.14	Tnfaip3	ENSMUSG00000019850.11
Akt1	ENSMUSG00000001729.14	Aldh3a2	ENSMUSG00000010025.19	Hsf2	ENSMUSG00000019878.8
Grik3	ENSMUSG00000001985.9	Hyal2	ENSMUSG00000010047.12	Lims1	ENSMUSG00000019920.18
Rhoc	ENSMUSG00000002233.13	Tnfrsf22	ENSMUSG00000010751.15	Dusp6	ENSMUSG00000019960.8
Gmpr2	ENSMUSG00000002326.6	Kdelr3	ENSMUSG00000010830.8	Apaf1	ENSMUSG00000019979.12
Snx9	ENSMUSG00000002365.10	Exoc3l2	ENSMUSG00000011263.16	Nedd1	ENSMUSG00000019988.7
Rgs19	ENSMUSG00000002458.13	Mlkl	ENSMUSG00000012519.14	Fgd6	ENSMUSG00000020021.4
Axl	ENSMUSG00000002602.16	Pea15a	ENSMUSG00000013698.12	Tmcc3	ENSMUSG00000020023.18
Tmem39a	ENSMUSG00000002845.14	St3gal1	ENSMUSG00000013846.10	Hsp90b1	ENSMUSG00000020048.13
Pla1a	ENSMUSG00000002847.7	Fhod1	ENSMUSG00000014778.10	Ddit4	ENSMUSG00000020108.4
Stard3nl	ENSMUSG00000003062.13	Hmgb3	ENSMUSG00000015217.11	Mum1	ENSMUSG00000020156.16
Cacnb3	ENSMUSG00000003352.14	Nipsnap3b	ENSMUSG00000015247.10	Nav3	ENSMUSG00000020181.17
Klc4	ENSMUSG00000003546.10	Zdhhc12	ENSMUSG00000015335.16	E2f7	ENSMUSG00000020185.16
Ercc1	ENSMUSG00000003549.9	Pcolce2	ENSMUSG00000015354.8	Csrp2	ENSMUSG00000020186.7
Rps6ka1	ENSMUSG00000003644.17	Cacfd1	ENSMUSG00000015488.14	Phlda1	ENSMUSG00000020205.8
Man1a	ENSMUSG00000003746.16	Hivep2	ENSMUSG00000015501.10	Mdm1	ENSMUSG00000020212.14
Mast2	ENSMUSG00000003810.12	Steap1	ENSMUSG00000015652.9	Prmt2	ENSMUSG00000020230.15
Cavin1	ENSMUSG00000004044.9	Adamtsl4	ENSMUSG00000015850.11	Dip2a	ENSMUSG00000020231.15
Large1	ENSMUSG00000004383.18	Adss	ENSMUSG00000015961.8	Ppm1m	ENSMUSG00000020253.15
Arhgef40	ENSMUSG00000004562.16	Ppfibp1	ENSMUSG00000016487.15	Pofut2	ENSMUSG00000020260.9
Cnn2	ENSMUSG00000004665.10	Atxn10	ENSMUSG00000016541.10	Adarb1	ENSMUSG00000020262.15
Ulk2	ENSMUSG00000004798.14	Pacsin2	ENSMUSG00000016664.16	Ahsa2	ENSMUSG00000020288.13
Hspb1	ENSMUSG00000004951.10	Sulf1	ENSMUSG00000016918.15	Fstl3	ENSMUSG00000020325.10
Slc2a9	ENSMUSG00000005107.13	Traf4	ENSMUSG00000017386.10	Igfbp3	ENSMUSG00000020427.11
Reep5	ENSMUSG00000005873.6	C1qtnf1	ENSMUSG00000017446.14	Smtn	ENSMUSG00000020439.17
Fblim1	ENSMUSG00000006219.12	Tns4	ENSMUSG00000017607.9	Patz1	ENSMUSG00000020453.17

Aebp1	ENSMUSG00000020473.13	Dok2	ENSMUSG00000022102.13	Pja2	ENSMUSG00000024083.16
Galnt10	ENSMUSG00000020520.14	Spry2	ENSMUSG00000022114.5	C3	ENSMUSG00000024164.15
Stxbp4	ENSMUSG00000020546.14	Gpr180	ENSMUSG00000022131.3	Tmem204	ENSMUSG00000024168.8
Pdia6	ENSMUSG00000020571.12	Sdc2	ENSMUSG00000022261.6	Phf1	ENSMUSG00000024193.8
Fkbp1b	ENSMUSG00000020635.8	Trio	ENSMUSG00000022263.10	Svil	ENSMUSG00000024236.18
Kif3c	ENSMUSG00000020668.10	Lrp12	ENSMUSG00000022305.13	Tpgs2	ENSMUSG00000024269.11
Hnf1b	ENSMUSG00000020679.11	Fam49b	ENSMUSG00000022378.14	Adamts10	ENSMUSG00000024299.17
Pecam1	ENSMUSG00000020717.19	Nptxr	ENSMUSG00000022421.19	Dynap	ENSMUSG00000024512.4
Helz	ENSMUSG00000020721.16	Csnk1e	ENSMUSG00000022433.19	Sec11c	ENSMUSG00000024516.13
Cacng4	ENSMUSG00000020723.3	Fam118a	ENSMUSG00000022434.8	Me2	ENSMUSG00000024556.4
Tmem94	ENSMUSG00000020747.17	Parvb	ENSMUSG00000022438.6	Prrc1	ENSMUSG00000024594.9
Sec14l1	ENSMUSG00000020823.16	Myh9	ENSMUSG00000022443.17	Gnaq	ENSMUSG00000024639.5
Nxn	ENSMUSG00000020844.6	Slc38a2	ENSMUSG00000022462.7	Fth1	ENSMUSG00000024661.7
Rph3al	ENSMUSG00000020847.15	Rapgef3	ENSMUSG00000022469.17	Fads2	ENSMUSG00000024665.8
Doc2b	ENSMUSG00000020848.7	Atp13a3	ENSMUSG00000022533.14	Fen1	ENSMUSG00000024742.15
Cacna1g	ENSMUSG00000020866.17	Gsdmd	ENSMUSG00000022575.5	Tmem2	ENSMUSG00000024754.13
Lrrc59	ENSMUSG00000020869.8	Ly6e	ENSMUSG00000022587.14	Ehd1	ENSMUSG00000024772.9
Myh10	ENSMUSG00000020900.15	Ptk2	ENSMUSG00000022607.18	Klc2	ENSMUSG00000024862.16
Plcd3	ENSMUSG00000020937.14	Rabl2	ENSMUSG00000022621.16	Papss2	ENSMUSG00000024899.7
Sec23a	ENSMUSG00000020986.13	Bbx	ENSMUSG00000022641.15	Ehbp1l1	ENSMUSG00000024937.15
Ptpn21	ENSMUSG00000021009.15	Cd200	ENSMUSG00000022661.14	Rcor2	ENSMUSG00000024968.14
Rab15	ENSMUSG00000021062.15	Gbe1	ENSMUSG00000022707.16	Vwa2	ENSMUSG00000025082.8
Dglucy	ENSMUSG00000021185.16	Sdf2l1	ENSMUSG00000022769.9	Bnc1	ENSMUSG00000025105.10
Npc2	ENSMUSG00000021242.9	Pak2	ENSMUSG00000022781.8	Pycr1	ENSMUSG00000025140.15
Evl	ENSMUSG00000021262.15	Arhgap31	ENSMUSG00000022799.4	Btrc	ENSMUSG00000025217.15
Slc25a29	ENSMUSG00000021265.3	Pdia5	ENSMUSG00000022844.8	Maged2	ENSMUSG00000025268.15
Tnfaip2	ENSMUSG00000021281.15	Ifnar1	ENSMUSG00000022967.13	Pfkfb1	ENSMUSG00000025271.13
Zfyve21	ENSMUSG00000021286.8	Adcy6	ENSMUSG00000022994.9	Flnb	ENSMUSG00000025278.9
Gpr137b	ENSMUSG00000021306.11	Tuba1b	ENSMUSG00000023004.8	Prdx4	ENSMUSG00000025289.15
Ctsl	ENSMUSG00000021477.9	Smarcd1	ENSMUSG00000023018.5	Cd63	ENSMUSG00000025351.14
Pdlim7	ENSMUSG00000021493.15	Krt18	ENSMUSG00000023043.7	Il23a	ENSMUSG00000025383.2
Dapk1	ENSMUSG00000021559.14	Sncg	ENSMUSG00000023064.4	Nnt	ENSMUSG00000025453.18
Tert	ENSMUSG00000021611.9	Ivns1abp	ENSMUSG00000023150.14	Cd151	ENSMUSG00000025510.14
Arhgef28	ENSMUSG00000021662.11	Twf2	ENSMUSG00000023277.13	Farp1	ENSMUSG00000025555.14
Hexb	ENSMUSG00000021665.9	Tmem176a	ENSMUSG00000023367.14	Dock9	ENSMUSG00000025558.19
Plau	ENSMUSG00000021822.3	Slc17a9	ENSMUSG00000023393.15	Tmem47	ENSMUSG00000025666.16
Samd4	ENSMUSG00000021838.17	Rab12	ENSMUSG00000023460.13	Jade1	ENSMUSG00000025764.14
Anxa11	ENSMUSG00000021866.15	Tiam2	ENSMUSG00000023800.15	Smad7	ENSMUSG00000025880.11
Wnt5a	ENSMUSG00000021994.15	Rps6ka2	ENSMUSG00000023809.10	Il18rap	ENSMUSG00000026068.11
Lcp1	ENSMUSG00000021998.16	Ptk7	ENSMUSG00000023972.10	Gls	ENSMUSG00000026103.14
Clu	ENSMUSG00000022037.15	Glp1r	ENSMUSG00000024027.8	Nabp1	ENSMUSG00000026107.11
Tnfrsf10b	ENSMUSG00000022074.6	Lbh	ENSMUSG00000024063.13	2-Sep	ENSMUSG00000026276.20
Sorbs3	ENSMUSG00000022091.6	Prkd3	ENSMUSG00000024070.15	Ing5	ENSMUSG00000026283.13

Steap3	ENSMUSG00000026389.16	Decr1	ENSMUSG00000028223.8	Herc3	ENSMUSG00000029804.17
Tnnt2	ENSMUSG00000026414.13	Nsmaf	ENSMUSG00000028245.15	Tmem176b	ENSMUSG00000029810.15
Il24	ENSMUSG00000026420.16	Ube2j1	ENSMUSG00000028277.13	Gfpt1	ENSMUSG00000029992.14
Arl8a	ENSMUSG00000026426.10	Slc35a1	ENSMUSG00000028293.14	Tgfa	ENSMUSG00000029999.14
Slc45a3	ENSMUSG00000026435.15	Nans	ENSMUSG00000028334.10	Rab43	ENSMUSG00000030055.16
Cdk18	ENSMUSG00000026437.11	Tmeff1	ENSMUSG00000028347.14	Copg1	ENSMUSG00000030058.17
Rgs16	ENSMUSG00000026475.7	B4galt1	ENSMUSG00000028413.13	Frmd4b	ENSMUSG00000030064.16
Cdc42bpa	ENSMUSG00000026490.18	Tesk1	ENSMUSG00000028458.12	Wnt7a	ENSMUSG00000030093.7
Acbd3	ENSMUSG00000026499.5	Tpm2	ENSMUSG00000028464.16	St8sia1	ENSMUSG00000030283.7
Abl2	ENSMUSG00000026596.13	Gne	ENSMUSG00000028479.18	Cand2	ENSMUSG00000030319.8
Soat1	ENSMUSG00000026600.12	Bnc2	ENSMUSG00000028487.18	Tead4	ENSMUSG00000030353.15
Mgst3	ENSMUSG00000026688.5	Plin2	ENSMUSG00000028494.12	Sipa1l3	ENSMUSG00000030583.16
Vim	ENSMUSG00000026728.9	B4galt2	ENSMUSG00000028541.14	2200002D01Rik	ENSMUSG00000030587.5
Pip4k2a	ENSMUSG00000026737.12	Fggy	ENSMUSG00000028573.18	Mfge8	ENSMUSG00000030605.15
Acvr1	ENSMUSG00000026836.15	Ephb2	ENSMUSG00000028664.14	Fah	ENSMUSG00000030630.16
Col5a1	ENSMUSG00000026837.16	Phc2	ENSMUSG00000028796.17	Pak1	ENSMUSG00000030774.13
Gpsm1	ENSMUSG00000026930.15	Acot7	ENSMUSG00000028937.14	Tgfb1i1	ENSMUSG00000030782.16
Nacc2	ENSMUSG00000026932.14	Fam126a	ENSMUSG00000028995.14	Cdr2	ENSMUSG00000030878.11
Ly75	ENSMUSG00000026980.15	Mfn2	ENSMUSG00000029020.13	Swap70	ENSMUSG00000031015.8
Galnt3	ENSMUSG00000026994.9	Sorcs2	ENSMUSG00000029093.14	Stk26	ENSMUSG00000031112.10
Dnajc10	ENSMUSG00000027006.13	Afap1	ENSMUSG00000029094.12	Praf2	ENSMUSG00000031149.7
Stk39	ENSMUSG00000027030.15	Fam114a1	ENSMUSG00000029185.14	Msn	ENSMUSG00000031207.16
Dhrs9	ENSMUSG00000027068.6	Pi4k2b	ENSMUSG00000029186.12	Efnb1	ENSMUSG00000031217.8
Ube2l6	ENSMUSG00000027078.14	Pdgfra	ENSMUSG00000029231.15	2610002M06Rik	ENSMUSG00000031242.7
Trim44	ENSMUSG00000027189.16	Gpat3	ENSMUSG00000029314.14	Acsl4	ENSMUSG00000031278.12
Myef2	ENSMUSG00000027201.16	Antxr2	ENSMUSG00000029338.13	Flna	ENSMUSG00000031328.15
Jag1	ENSMUSG00000027276.7	Tpst2	ENSMUSG00000029344.14	Zfp275	ENSMUSG00000031365.13
Bcl2l11	ENSMUSG00000027381.16	Cxcl3	ENSMUSG00000029379.10	Ap1s2	ENSMUSG00000031367.15
Il1a	ENSMUSG00000027399.1	Cxcl1	ENSMUSG00000029380.11	Abcd1	ENSMUSG00000031378.14
Arfgap1	ENSMUSG00000027575.19	Tctn2	ENSMUSG00000029386.15	Psmd10	ENSMUSG00000031429.14
Procr	ENSMUSG00000027611.12	G3bp2	ENSMUSG00000029405.16	Morc4	ENSMUSG00000031434.15
Src	ENSMUSG00000027646.15	Fam216a	ENSMUSG00000029463.5	Col4a1	ENSMUSG00000031502.11
Gnb4	ENSMUSG00000027669.14	Camkk2	ENSMUSG00000029471.13	Wwc2	ENSMUSG00000031563.8
Nceh1	ENSMUSG00000027698.14	Mad1l1	ENSMUSG00000029554.15	Plpp5	ENSMUSG00000031570.17
Anxa5	ENSMUSG00000027712.13	Actb	ENSMUSG00000029580.14	Gsr	ENSMUSG00000031584.16
Nbea	ENSMUSG00000027799.12	Fscn1	ENSMUSG00000029581.14	Rbpms	ENSMUSG00000031586.17
Tm4sf1	ENSMUSG00000027800.14	Arpc1b	ENSMUSG00000029622.16	Slc25a4	ENSMUSG00000031633.4
Mcub	ENSMUSG00000027994.14	Tspan12	ENSMUSG00000029669.14	Sh3rf1	ENSMUSG00000031642.9
Ctso	ENSMUSG00000028015.3	Fam3c	ENSMUSG00000029672.16	Adcy7	ENSMUSG00000031659.13
Arhgef2	ENSMUSG00000028059.16	Cux1	ENSMUSG00000029705.17	St3gal2	ENSMUSG00000031749.12
Pear1	ENSMUSG00000028073.15	Agfg2	ENSMUSG00000029722.15	Cotl1	ENSMUSG00000031827.13
Ecm1	ENSMUSG00000028108.15	Calu	ENSMUSG00000029767.16	Mphosph6	ENSMUSG00000031843.2
Wls	ENSMUSG00000028173.10	Fkbp9	ENSMUSG00000029781.7	Cmtm3	ENSMUSG00000031875.7

Cbfb	ENSMUSG00000031885.14	Tmem5	ENSMUSG00000034620.17	Inf2	ENSMUSG00000037679.9
Psmb10	ENSMUSG00000031897.9	Dbn1	ENSMUSG00000034675.17	Fermt2	ENSMUSG00000037712.16
Pla2g15	ENSMUSG00000031903.7	Sema3f	ENSMUSG00000034684.12	Ppp1r16b	ENSMUSG00000037754.13
Bcar1	ENSMUSG00000031955.10	Dgkh	ENSMUSG00000034731.11	Tgm2	ENSMUSG00000037820.15
Aplp2	ENSMUSG00000031996.17	Dusp5	ENSMUSG00000034765.6	Zfp365	ENSMUSG00000037855.15
Ets1	ENSMUSG00000032035.16	Epgn	ENSMUSG00000035020.11	Fgd3	ENSMUSG00000037946.11
Bace1	ENSMUSG00000032086.12	Fam167a	ENSMUSG00000035095.11	Igsf9	ENSMUSG00000037995.15
Mcam	ENSMUSG00000032135.15	Elmod2	ENSMUSG00000035151.12	Ccdc50	ENSMUSG00000038127.14
Kank2	ENSMUSG00000032194.9	Ap2b1	ENSMUSG00000035152.14	Chpf2	ENSMUSG00000038181.16
Cgnl1	ENSMUSG00000032232.14	Heatr5a	ENSMUSG00000035181.6	Hoxa7	ENSMUSG00000038236.8
Ptpn9	ENSMUSG00000032290.7	Tpbg	ENSMUSG00000035274.13	Cep250	ENSMUSG00000038241.16
Rcn2	ENSMUSG00000032320.7	Ccl2	ENSMUSG00000035385.5	Fbxo25	ENSMUSG00000038365.8
Pstpip1	ENSMUSG00000032322.14	Tmem98	ENSMUSG00000035413.8	Lasp1	ENSMUSG00000038366.15
Stoml1	ENSMUSG00000032333.6	Myo1d	ENSMUSG00000035441.14	Gmds	ENSMUSG00000038372.14
Adamts7	ENSMUSG00000032363.15	Rcbtb1	ENSMUSG00000035469.17	Gcnt1	ENSMUSG00000038843.18
Plod2	ENSMUSG00000032374.14	Slc25a21	ENSMUSG00000035472.14	Sccpdh	ENSMUSG00000038936.13
Rbpms2	ENSMUSG00000032387.15	Cdcp1	ENSMUSG00000035498.10	Cables2	ENSMUSG00000038990.14
Smad3	ENSMUSG00000032402.12	Acta2	ENSMUSG00000035783.9	Cpa4	ENSMUSG00000039070.5
Nt5e	ENSMUSG00000032420.8	Dennd5a	ENSMUSG00000035901.14	Zfp503	ENSMUSG00000039081.10
Tgfbr2	ENSMUSG00000032440.13	Ripor2	ENSMUSG00000036006.20	L3mbtl3	ENSMUSG00000039089.15
Map4	ENSMUSG00000032479.15	Mgat5	ENSMUSG00000036155.13	Dap	ENSMUSG00000039168.15
Ephb1	ENSMUSG00000032537.15	Prickle1	ENSMUSG00000036158.12	Tbc1d19	ENSMUSG00000039178.9
Srprb	ENSMUSG00000032553.14	Tmem258	ENSMUSG00000036372.14	Rbpj	ENSMUSG00000039191.12
Gnai2	ENSMUSG00000032562.13	Gadd45a	ENSMUSG00000036390.8	Isg20	ENSMUSG00000039236.18
Manf	ENSMUSG00000032575.16	Arhgap26	ENSMUSG00000036452.18	B3galnt2	ENSMUSG00000039242.10
Fhl3	ENSMUSG00000032643.12	Wtip	ENSMUSG00000036459.15	BC017643	ENSMUSG00000039294.14
Inppl1	ENSMUSG00000032737.13	Greb1	ENSMUSG00000036523.16	Slc9a8	ENSMUSG00000039463.14
Fkbp1a	ENSMUSG00000032966.14	Ttyh3	ENSMUSG00000036565.7	Wfs1	ENSMUSG00000039474.13
Chpf	ENSMUSG00000032997.16	Cenpt	ENSMUSG00000036672.5	Tnrc18	ENSMUSG00000039477.16
Pygb	ENSMUSG00000033059.7	Cyld	ENSMUSG00000036712.15	Alg2	ENSMUSG00000039740.6
Igf2bp2	ENSMUSG00000033581.17	Micall2	ENSMUSG00000036718.17	Orai2	ENSMUSG00000039747.11
Pxk	ENSMUSG00000033885.15	Cuedc2	ENSMUSG00000036748.16	Cercam	ENSMUSG00000039787.13
Kcnk1	ENSMUSG00000033998.9	Amdhd2	ENSMUSG00000036820.12	2410089E03Rik	ENSMUSG00000039801.7
Phka1	ENSMUSG00000034055.16	Neto2	ENSMUSG00000036902.11	Cited2	ENSMUSG00000039910.10
Poglut1	ENSMUSG00000034064.14	Lrrc20	ENSMUSG00000037151.8	Spsb1	ENSMUSG00000039911.13
Tmed8	ENSMUSG00000034111.6	Clic4	ENSMUSG00000037242.8	Plcb4	ENSMUSG00000039943.16
Irf2bpl	ENSMUSG00000034168.7	Paqr7	ENSMUSG00000037348.15	Clstn1	ENSMUSG00000039953.13
Hsdl1	ENSMUSG00000034189.5	Enpp1	ENSMUSG00000037370.13	Dtx4	ENSMUSG00000039982.8
Ramp1	ENSMUSG00000034353.14	Cnnm4	ENSMUSG00000037408.10	Disp2	ENSMUSG00000040035.14
Lif	ENSMUSG00000034394.14	Zdhhc18	ENSMUSG00000037553.14	Tax1bp3	ENSMUSG00000040158.12
Pja1	ENSMUSG00000034403.16	Tnfrsf23	ENSMUSG00000037613.16	Tm7sf3	ENSMUSG00000040234.16
Caskin2	ENSMUSG00000034471.12	Kcnk2	ENSMUSG00000037624.15	Ddx58	ENSMUSG00000040296.15
Kdelc2	ENSMUSG00000034487.4	Slc20a2	ENSMUSG00000037656.9	Cchcr1	ENSMUSG00000040312.14

Slc25a24	ENSMUSG00000040322.10	Cdkn2a	ENSMUSG00000044303.6	Hic2	ENSMUSG00000050240.16
Fam102b	ENSMUSG00000040339.10	Trp53i13	ENSMUSG00000044328.13	6-Sep	ENSMUSG00000050379.15
Dtx3	ENSMUSG00000040415.15	Ackr3	ENSMUSG00000044337.5	Gdpgp1	ENSMUSG00000050973.11
Cfap69	ENSMUSG00000040473.15	Rin3	ENSMUSG00000044456.16	Zfp52	ENSMUSG00000051341.6
Pck2	ENSMUSG00000040618.7	Tnfaip8l1	ENSMUSG00000044469.8	Plekhm3	ENSMUSG00000051344.13
Oaz2	ENSMUSG00000040652.16	Lncpint	ENSMUSG00000044471.12	Ywhag	ENSMUSG00000051391.9
Limd2	ENSMUSG00000040699.13	Dmd	ENSMUSG00000045103.18	Dcun1d4	ENSMUSG00000051674.15
Lat2	ENSMUSG00000040751.12	Dpy19l4	ENSMUSG00000045205.16	8-Mar	ENSMUSG00000051855.15
Inhba	ENSMUSG00000041324.14	Proser2	ENSMUSG00000045319.13	Mest	ENSMUSG00000052331.14
Serpina3h	ENSMUSG00000041449.16	Sh2d5	ENSMUSG00000045349.15	Ankrd44	ENSMUSG00000052512.17
Serpina3g	ENSMUSG00000041481.17	Epcam	ENSMUSG00000045394.9	Nav2	ENSMUSG00000052563.13
Tmtc4	ENSMUSG00000041594.18	Ifitm10	ENSMUSG00000045777.14	D930048N14Rik	ENSMUSG00000052609.9
Ggact	ENSMUSG00000041625.15	Serpinb9	ENSMUSG00000045827.10	Plekhg3	ENSMUSG00000053062.16
Enc1	ENSMUSG00000041773.8	Slitrk6	ENSMUSG00000045871.5	Jam2	ENSMUSG00000053137.7
Ptpre	ENSMUSG00000041836.10	Tmem229b	ENSMUSG00000046157.13	Mapk11	ENSMUSG00000053317.11
Wipi1	ENSMUSG00000041895.15	Plaur	ENSMUSG00000046223.10	Sec61b	ENSMUSG00000053604.5
S100a10	ENSMUSG00000041959.14	Cox17	ENSMUSG00000046516.10	Rpia	ENSMUSG00000053931.11
Wdr60	ENSMUSG00000042050.8	Zfp518b	ENSMUSG00000046572.10	Cnn3	ENSMUSG00000054027.8
Arsb	ENSMUSG00000042082.7	Gm5424	ENSMUSG00000046687.6	Nt5dc3	ENSMUSG00000054150.12
Klhdc8a	ENSMUSG00000042115.4	Hmga1	ENSMUSG00000046711.16	Syne3	ENSMUSG00000054321.7
Vwa1	ENSMUSG00000042116.3	3110062M04Rik	ENSMUSG00000046806.13	Taf4b	ENSMUSG00000054364.5
Zfand4	ENSMUSG00000042213.17	Atxn1	ENSMUSG00000046876.16	Rhob	ENSMUSG00000054519.8
Lyn	ENSMUSG00000042228.14	Nqo2	ENSMUSG00000046949.16	Zfp867	ENSMUSG00000054580.14
Tmc7	ENSMUSG00000042246.5	Tmem164	ENSMUSG00000047045.17	Pla2r1	ENSMUSG00000055485.6
Mkl1	ENSMUSG00000042292.17	Dusp18	ENSMUSG00000047205.12	Soga1	ENSMUSG00000055723.6
Ikbke	ENSMUSG00000042349.13	Gap43	ENSMUSG00000047261.9	Rras2	ENSMUSG00000055926.3
Gjb3	ENSMUSG00000042367.12	AI837181	ENSMUSG00000047423.10	Gm14137	ENSMUSG00000056121.16
Pbxip1	ENSMUSG00000042613.9	Lxn	ENSMUSG00000047557.2	Fez2	ENSMUSG00000056131.13
Itpr3	ENSMUSG00000042644.9	Flrt1	ENSMUSG00000047787.8	Pgm3	ENSMUSG00000056457.6
Commd10	ENSMUSG00000042705.9	Marcksl1	ENSMUSG00000047945.6	Prl2c3	ENSMUSG00000056758.14
Ttc9	ENSMUSG00000042734.6	Mlec	ENSMUSG00000048578.11	Hmga2	ENSMUSG00000056832.14
Krtcap2	ENSMUSG00000042747.12	Myof	ENSMUSG00000048612.16	Ttc26	ENSMUSG00000056888.11
Lgr6	ENSMUSG00000042793.13	Ctxn1	ENSMUSG00000048644.8	Glipr1	ENSMUSG00000057074.6
Serpinb6b	ENSMUSG00000042842.11	Pthlh	ENSMUSG00000048776.8	Ces1g	ENSMUSG00000057329.7
Aida	ENSMUSG00000042901.10	Fkrp	ENSMUSG00000048920.8	Bcl2	ENSMUSG00000057346.12
Synpo	ENSMUSG00000043079.17	Sorl1	ENSMUSG00000049313.8	Apol9a	ENSMUSG00000057363.12
Mmp1a	ENSMUSG00000043089.6	Krt8	ENSMUSG00000049382.10	Uxs1	ENSMUSG00000057722.17
Fbrsl1	ENSMUSG00000043323.17	Gemin4	ENSMUSG00000049396.6	Lepr	ENSMUSG00000057778.14
Orai3	ENSMUSG00000043964.14	Htr1b	ENSMUSG00000049511.5	Cyb5d2	ENSMUSG00000058056.16
Cep164	ENSMUSG00000043987.18	Sall2	ENSMUSG00000049532.11	Palld	ENSMUSG00000058427.10
Fmn1	ENSMUSG00000044042.19	Fam109b	ENSMUSG00000049687.5	Cxcl2	ENSMUSG00000058793.14
Ctla2a	ENSMUSG00000044258.10	Ubqln2	ENSMUSG00000050148.9	Cds2	ENSMUSG00000059263.9
Cnr1	ENSMUSG00000044288.6	Eva1b	ENSMUSG00000050212.4	Usp47	ENSMUSG00000059555.6

Tor4a	ENSMUSG00000059713.12		Hpcal1	ENSMUSG00000071547.4		Gm4875	ENSMUSG00000083396.1
Rcan3	ENSMUSG00000059970.7		Nt5dc2	ENSMUSG00000072235.6		Gm15542	ENSMUSG00000085936.7
Hspa2	ENSMUSG00000060090.16		Tuba1a	ENSMUSG00000072623.6		2610307P16Rik	ENSMUSG00000089715.12
Rp2	ENSMUSG00000060147.15		Zfp9	ENSMUSG00000073002.9		Cbx6	ENSMUSG00000089739.2
Serpinb6a	ENSMUSG00000060206.11		Vamp5	ENSMUSG00000073274.4		Gm20431	ENSMUSG00000090191.1
Zfp462	ENSMUSG00000060260.13		Gm14636	ENSMUSG00000073664.11		9230105E05Rik	ENSMUSG00000090213.1
Pwwp2b	ENSMUSG00000060568.14		Nbeal1	ENSMUSG00000073755.4		Tmem189	ENSMUSG00000091191.2
Fam78b	ENSMUSG00000060594.6		5730409E04Rik	ENSMUSG00000074170.5		Gm17334	ENSMUSG00000093846.1
Layn	ENSMUSG00000060935.6		Plekhf1	ENSMUSG00000074305.9		Gm4425	ENSMUSG00000093908.2
Tmem263	ENSMUSG00000061731.9		Peak1	ENSMUSG00000074361.11		Gm5784	ENSMUSG00000095098.2
Ext1	ENSMUSG00000062590.13		C5ar2	ENSMUSG00000074364.6		Ccdc85b	ENSMUSG00000095115.2
Armc9	ENSMUSG00000062937.7		Ehd2	ENSMUSG00000074480.4		Itpripl2	ENSMUSG00000096956.2
Mtap	ENSMUSG00000063253.11		Mex3a	ENSMUSG00000074577.9		Snhg18	ENSMUSG00000097002.1
Scoc	ENSMUSG00000063354.7		Ripor3	ENSMUSG00000074916.5		Gm2670	ENSMUSG00000097636.8
Slc39a4	ENSMUSG00000063506.14		Chst14	ENSMUSG00000075122.5		Mirt1	ENSMUSG00000097715.2
Arhgap22	ENSMUSG00000064080.12		Cd80	ENSMUSG00000075702.9		Gpr137b-ps	ENSMUSG00000097993.7
Fbln2	ENSMUSG00000064210.7		Selenom	ENSMUSG00000076441.9		Ptprv	ENSMUSG00000098369.6
Ano6	ENSMUSG00000064262.7		Ass1	ENSMUSG00000078247.4		Gm2274	ENSMUSG00000098428.6
Gimap8	ENSMUSG00000066357.6		Airn	ENSMUSG00000078249.5		Gm2260	ENSMUSG00000100113.1
Wdr6	ENSMUSG00000066877.11		Hmga1b	ENSMUSG00000078706.4		Gm28592	ENSMUSG00000102336.1
Nck2	ENSMUSG00000067786.16		Gm53	ENSMUSG00000078771.10		Gm37233	ENSMUSG00000105356.1
Nnat	ENSMUSG00000068196.5		Evi2a	ENSMUSG00000078915.2		Gm42603	ENSMUSG00000106847.1
Col8a1	ENSMUSG00000068335.6		Hsp25-ps1	ENSMUSG00000078952.9		Peg13	ENSMUSG00000107379.1
Dok1	ENSMUSG00000068566.12		Lncenc1	ENSMUSG00000079014.4		Gm43126	ENSMUSG00000107842.1
Myadm	ENSMUSG00000070044.15		Serpina3i	ENSMUSG00000079092.4		Gm44089	ENSMUSG00000111212.1
Fam149a	ENSMUSG00000070047.14		Prl2c2	ENSMUSG00000079104.4		Gm47087	ENSMUSG00000111394.1
Fat1	ENSMUSG00000070348.5		Prps1l3	ENSMUSG00000079111.3		AC160637	ENSMUSG00000112336.1
Ccnd1	ENSMUSG00000070858.12		Kdelr2	ENSMUSG00000079184.10		Gm47766	ENSMUSG00000118210.1
Gm1673	ENSMUSG00000070871.10		Mphosph8	ENSMUSG00000079563.10		AC161165	ENSMUSG00000118559.1
Ccnyl1	ENSMUSG00000071180.5		Pglyrp2	ENSMUSG00000079852.4			
Smim15	ENSMUSG00000071379.2		Klra4	ENSMUSG00000082791.3			

Table 4: Significantly Up-regulated CSC genes by TGFβ responding tumor basal cells versus TGFβ non-responding tumor basal cell (TPMs per Sample)

		TGFβ non-responding	TGFβ responding	TGFβ non-responding	TGFβ responding			
ID	Gene	SCC 1	SCC 1	SCC 2	SCC 2	Enriched in	Log2(Fold-Change)	padj
ENSMUSG00000026596	Abl2	4.61	9.57	9.67	13.18	CSC (C2)	0.5846244	2.74E-02
ENSMUSG00000031278	Acsl4	18.18	33.66	26.77	42.8	CSC (C2)	0.6505965	1.66E-03
ENSMUSG00000031659	Adcy7	4.66	10.78	12.34	24.99	CSC (C2)	0.987014	9.51E-07
ENSMUSG00000029094	Afap1	6.41	10.57	12.11	18.25	CSC (C2)	0.5354953	0.0356216
ENSMUSG00000029338	Antxr2	32.26	62.92	73.72	101.4	CSC (C2)	0.5492393	0.0116402
ENSMUSG00000019979	Apaf1	6.06	8.63	12.47	19.57	CSC (C2)	0.6517968	0.0150526
ENSMUSG00000021662	Arhgef28	4.29	7.95	7.16	11.3	CSC (C2)	0.6547511	0.0135719
ENSMUSG00000022533	Atp13a3	11.03	22.97	31.86	46.35	CSC (C2)	0.6748898	0.0016562
ENSMUSG00000070348	Ccnd1	155.58	268.35	353.66	545.94	CSC (C2)	0.6321957	6.11E-04
ENSMUSG00000000184	Ccnd2	20.48	45.65	27.73	61.47	CSC (C2)	1.0302047	7.42E-09
ENSMUSG00000022661	Cd200	73.45	137.3	72.32	119.92	CSC (C2)	0.6333494	1.97E-03
ENSMUSG00000075122	Cd80	2.66	7.26	17.75	37.7	CSC (C2)	1.1301577	0.0000425
ENSMUSG00000044303	Cdkn2a	27.17	62.28	35.39	95.06	CSC (C2)	1.1796099	8.71E-07
ENSMUSG00000038241	Cep250	6.05	11.26	13.49	24.53	CSC (C2)	0.7319129	0.0016961
ENSMUSG00000032232	Cgnl1	1.25	2.56	2.95	5.44	CSC (C2)	0.8539175	1.46E-02
ENSMUSG00000053931	Cnn3	61.14	91.49	166.49	265.51	CSC (C2)	0.5110892	0.0323759
ENSMUSG00000044288	Cnr1	0.81	2.96	1.46	3.82	CSC (C2)	1.4900639	0.0000192
ENSMUSG00000039070	Cpa4	8.65	21.59	16.16	42.45	CSC (C2)	1.2319003	7.42E-09
ENSMUSG00000029379	Cxcl3	90.52	155.6	96.78	224.35	CSC (C2)	0.8595896	3.93E-04
ENSMUSG00000021559	Dapk1	11.21	21.26	11.28	16.83	CSC (C2)	0.6120153	9.71E-03
ENSMUSG00000027068	Dhrs9	1.89	5.98	9.7	22.75	CSC (C2)	1.2735794	1.81E-08
ENSMUSG00000020231	Dip2a	12.19	20.95	24.5	31.07	CSC (C2)	0.5319277	3.50E-02
ENSMUSG00000020848	Doc2b	3.09	9.79	3.81	11.38	CSC (C2)	1.4913956	6.75E-10
ENSMUSG00000025558	Dock9	13.09	26.22	31.81	45.83	CSC (C2)	0.6402518	0.0022594
ENSMUSG00000068335	Dok1	11.37	20.21	8.29	20.65	CSC (C2)	0.8455928	8.74E-03
ENSMUSG00000034765	Dusp5	14.52	23.86	44.26	75.32	CSC (C2)	0.618618	0.0104776
ENSMUSG00000024512	Dynap	2.07	6.91	14.78	45.31	CSC (C2)	1.560721	7.97E-08
ENSMUSG00000028108	Ecm1	51.68	78.77	90.55	159.21	CSC (C2)	0.5441295	3.78E-02
ENSMUSG00000078771	Evi2a	2.85	9.77	11.4	23.55	CSC (C2)	1.0086423	0.0221274
ENSMUSG00000040339	Fam102b	3.68	7.58	12.18	17.82	CSC (C2)	0.6717235	0.0124061
ENSMUSG00000060568	Fam78b	8.48	15.51	23.28	37.27	CSC (C2)	0.7105932	3.36E-03
ENSMUSG00000070047	Fat1	26.99	48.5	55.38	70.88	CSC (C2)	0.6423028	0.0060463
ENSMUSG00000006219	Fblim1	19.13	38.03	57.67	77.11	CSC (C2)	0.5527499	0.0264307

ENSMUSG00000064080	Fbln2	136.84	217.88	290.92	479.38	CSC (C2)	0.695996	0.0001134
ENSMUSG00000025278	Flnb	26.72	53.42	88.3	106.62	CSC (C2)	0.5093242	0.0432365
ENSMUSG00000044042	Fmn1	0.95	3.44	5.92	5.7	CSC (C2)	0.8470469	0.0174662
ENSMUSG00000000420	Galnt1	51.22	98.54	112.28	147.97	CSC (C2)	0.5062022	0.0324393
ENSMUSG00000029992	Gfpt1	4.61	11.33	17.14	23.03	CSC (C2)	0.6620848	1.18E-02
ENSMUSG00000055926	Gm14137	0.59	1.81	2.14	4.07	CSC (C2)	1.1013794	0.0462063
ENSMUSG00000015501	Hivep2	4.1	8.74	9.03	11.78	CSC (C2)	0.580135	3.67E-02
ENSMUSG00000056758	Hmga2	44.88	103.24	211.41	367.42	CSC (C2)	0.8841246	1.01E-06
ENSMUSG00000007908	Hmgcll1	0.88	1.49	4.78	8.92	CSC (C2)	0.9381698	4.91E-02
ENSMUSG00000020679	Hnf1b	0.91	2.08	4.15	9.64	CSC (C2)	0.9721835	0.042246
ENSMUSG00000033581	Igf2bp2	20.4	58.53	70.34	111.94	CSC (C2)	0.9087821	1.88E-04
ENSMUSG00000027399	Il1a	10.45	27.42	29.72	51.05	CSC (C2)	0.930245	0.0002108
ENSMUSG00000095115	Itpripl2	10.15	18.23	16.73	24.05	CSC (C2)	0.5539864	1.65E-02
ENSMUSG00000053062	Jam2	3.28	6.74	10.34	19.98	CSC (C2)	0.8097931	1.78E-02
ENSMUSG00000023043	Krt18	52.2	91.41	221.05	430.93	CSC (C2)	0.7608384	0.0002093
ENSMUSG00000049382	Krt8	30.08	61.11	220.78	522.86	CSC (C2)	0.9869841	1.68E-06
ENSMUSG00000038366	Lasp1	58.61	98.31	161.26	242.48	CSC (C2)	0.5357415	0.0083675
ENSMUSG00000057722	Lepr	1.99	8.37	1.66	2.49	CSC (C2)	1.2125114	0.0041191
ENSMUSG00000025268	Maged2	24.39	38.37	39.96	74.94	CSC (C2)	0.6327043	1.81E-02
ENSMUSG00000036155	Mgat5	6.19	12.83	17.18	25.04	CSC (C2)	0.6751903	2.90E-03
ENSMUSG00000068566	Myadm	47.48	85.96	142.3	209.09	CSC (C2)	0.5799734	3.93E-03
ENSMUSG00000022443	Myh9	116.14	201.6	311.14	396.86	CSC (C2)	0.4468503	4.32E-02
ENSMUSG00000018417	Myo1b	25.32	49.74	69.5	105.91	CSC (C2)	0.5002294	0.0296296
ENSMUSG00000048612	Myof	43.48	95.71	103.7	146.29	CSC (C2)	0.6922394	0.0010214
ENSMUSG00000026107	Nabp1	6.71	16.82	36.85	58.69	CSC (C2)	0.7843386	1.66E-03
ENSMUSG00000052512	Nav2	5.24	11.74	17.77	22.01	CSC (C2)	0.5661646	4.10E-02
ENSMUSG00000020181	Nav3	0.47	1.58	1.37	3.1	CSC (C2)	1.0028268	7.26E-03
ENSMUSG00000027799	Nbea	0.78	1.24	1.65	2.81	CSC (C2)	0.9965405	0.0174662
ENSMUSG00000032420	Nt5e	22.08	49.17	51.23	61.93	CSC (C2)	0.5756122	0.0385942
ENSMUSG00000039747	Orai2	27.29	53.47	44.9	63.54	CSC (C2)	0.5172725	0.0386429
ENSMUSG00000022438	Parvb	3.37	5.08	12.25	24.2	CSC (C2)	0.7126347	1.61E-02
ENSMUSG00000015354	Pcolce2	5.43	12.32	19.48	36.94	CSC (C2)	0.7898175	0.0040481
ENSMUSG00000074305	Peak1	3.68	9.76	13.55	22.02	CSC (C2)	0.9031946	8.71E-05
ENSMUSG00000020205	Phlda1	49.96	89.09	164.14	266.2	CSC (C2)	0.5825814	0.0086662
ENSMUSG00000021822	Plau	86.61	172.49	332.42	611.38	CSC (C2)	0.8122014	1.89E-06
ENSMUSG00000052609	Plekhg3	9.75	17.48	28.17	42.99	CSC (C2)	0.5946295	7.24E-03
ENSMUSG00000032374	Plod2	3.51	9.45	20.03	34.47	CSC (C2)	0.9547201	0.0001093
ENSMUSG00000016487	Ppfibp1	24.68	50.62	59.31	80.66	CSC (C2)	0.5299504	0.0182327
ENSMUSG00000006490	Prl8a9	8.11	20.3	16.77	25.32	CSC (C2)	0.8480932	0.0391225
ENSMUSG00000020230	Prmt2	6.85	12.56	17.72	29.59	CSC (C2)	0.6600765	3.52E-02
ENSMUSG00000048776	Pthlh	38.12	77.87	269.78	381.53	CSC (C2)	0.6532153	0.002509

ENSMUSG00000022469	Rapgef3	16.27	23.59	52.6	82.5	CSC (C2)	0.5209089	0.03594
ENSMUSG00000026475	Rgs16	5.38	11.58	21.56	68.07	CSC (C2)	1.256512	1.22E-06
ENSMUSG00000021838	Samd4	1.39	2.69	2.32	4.62	CSC (C2)	0.8461484	0.0221162
ENSMUSG00000042842	Serpinb6b	3.57	9.38	2.79	7.79	CSC (C2)	1.329899	0.0010159
ENSMUSG00000045827	Serpinb9	3.46	8.16	8.76	18.78	CSC (C2)	1.0486464	0.000041
ENSMUSG00000018387	Shroom1	1.18	2.58	2.85	6.36	CSC (C2)	0.9997134	3.45E-02
ENSMUSG00000040322	Slc25a24	19.16	37.29	48.77	67.34	CSC (C2)	0.5778828	0.0134754
ENSMUSG00000005107	Slc2a9	13.69	29.5	7.58	9.93	CSC (C2)	0.6647812	3.72E-02
ENSMUSG00000045871	Slitrk6	5.61	12.31	16.25	22.36	CSC (C2)	0.6664749	0.0194054
ENSMUSG00000026600	Soat1	9.4	18.21	24.78	41.8	CSC (C2)	0.6410042	1.10E-02
ENSMUSG00000030283	St8sia1	2.77	6.9	6.99	12.68	CSC (C2)	0.9237605	4.00E-03
ENSMUSG00000027030	Stk39	8.25	15.84	24.03	27.14	CSC (C2)	0.5717573	4.10E-02
ENSMUSG00000016918	Sulf1	3.47	6.67	10.98	17.31	CSC (C2)	0.6888042	0.0145658
ENSMUSG00000024236	Svil	13.88	23.05	38.22	51.96	CSC (C2)	0.6185936	4.16E-03
ENSMUSG00000054321	Taf4b	10.47	21.3	13.37	19.32	CSC (C2)	0.6558831	6.86E-03
ENSMUSG00000029999	Tgfa	24.13	44.82	83.7	106.76	CSC (C2)	0.4832164	4.41E-02
ENSMUSG00000042246	Tmc7	2.74	5.65	5.45	9.16	CSC (C2)	0.7755468	1.34E-02
ENSMUSG00000020023	Tmcc3	8.36	16.93	20.85	28.72	CSC (C2)	0.5640035	1.81E-02
ENSMUSG00000028347	Tmeff1	7.33	15.1	11.98	19.61	CSC (C2)	0.7184784	2.87E-02
ENSMUSG00000021281	Tnfaip2	25.1	45.05	50.8	81.97	CSC (C2)	0.5306338	0.0208823
ENSMUSG00000022074	Tnfrsf10b	4.23	9.29	16.92	24.95	CSC (C2)	0.6994686	0.0311051
ENSMUSG00000010751	Tnfrsf22	5.32	9.88	11.58	15.49	CSC (C2)	0.707706	0.0255057
ENSMUSG00000037613	Tnfrsf23	23.14	52.75	80.79	121.42	CSC (C2)	0.6572037	0.0026262
ENSMUSG00000022263	Trio	4.16	8.27	9.47	12.87	CSC (C2)	0.5829951	0.0218048
ENSMUSG00000042734	Ttc9	7.06	12.24	20.05	34.08	CSC (C2)	0.6544816	0.0150526
ENSMUSG00000030093	Wnt7a	2.66	4.72	3.56	7.86	CSC (C2)	0.8490469	0.0417843
ENSMUSG00000051391	Ywhag	80.53	137.64	191.97	250.9	CSC (C2)	0.460231	0.0382336

Table 5: Significantly Up-regulated genes that are unique in SCC CSC (TPMs per Sample)

ID	Gene	TGFβ non-responding SCC 1	TGFβ responding SCC 1	TGFβ non-responding SCC 2	TGFβ responding SCC 2	Enriched in	Log2(Fold-Change)	padj
ENSMUSG00000031278	Doc2b	3.09	9.79	3.81	11.38	SCC CSC	1.49E+00	6.75E-10
ENSMUSG00000029338	Serpinb6b	3.57	9.38	2.79	7.79	SCC CSC	1.33E+00	1.02E-03
ENSMUSG00000000184	Dhrs9	1.89	5.98	9.7	22.75	SCC CSC	1.27E+00	1.81E-08
ENSMUSG00000075122	Rgs16	5.38	11.58	21.56	68.07	SCC CSC	1.26E+00	1.22E-06
ENSMUSG00000044303	Cpa4	8.65	21.59	16.16	42.45	SCC CSC	1.23E+00	7.42E-09
ENSMUSG00000039070	Lepr	1.99	8.37	1.66	2.49	SCC CSC	1.21E+00	4.12E-03
ENSMUSG00000027068	Cdkn2a	27.17	62.28	35.39	95.06	SCC CSC	1.18E+00	8.71E-07
ENSMUSG00000020848	Cd80	2.66	7.26	17.75	37.7	SCC CSC	1.13E+00	4.25E-05
ENSMUSG00000025558	Serpinb9	3.46	8.16	8.76	18.78	SCC CSC	1.05E+00	4.10E-05
ENSMUSG00000028108	Ccnd2	20.48	45.65	27.73	61.47	SCC CSC	1.03E+00	7.42E-09
ENSMUSG00000078771	Evi2a	2.85	9.77	11.4	23.55	SCC CSC	1.01E+00	2.21E-02
ENSMUSG00000040339	Krt8	30.08	61.11	220.78	522.86	SCC CSC	9.87E-01	1.68E-06
ENSMUSG00000064080	Plod2	3.51	9.45	20.03	34.47	SCC CSC	9.55E-01	1.09E-04
ENSMUSG00000044042	Hmgcll1	0.88	1.49	4.78	8.92	SCC CSC	9.38E-01	4.91E-02
ENSMUSG00000000420	Il1a	10.45	27.42	29.72	51.05	SCC CSC	9.30E-01	2.11E-04
ENSMUSG00000056758	St8sia1	2.77	6.9	6.99	12.68	SCC CSC	9.24E-01	4.00E-03
ENSMUSG00000007908	Hmga2	44.88	103.24	211.41	367.42	SCC CSC	8.84E-01	1.01E-06
ENSMUSG00000027399	Fmn1	0.95	3.44	5.92	5.7	SCC CSC	8.47E-01	1.75E-02
ENSMUSG00000053062	Plau	86.61	172.49	332.42	611.38	SCC CSC	8.12E-01	1.89E-06
ENSMUSG00000023043	Jam2	3.28	6.74	10.34	19.98	SCC CSC	8.10E-01	1.78E-02
ENSMUSG00000049382	Pcolce2	5.43	12.32	19.48	36.94	SCC CSC	7.90E-01	4.05E-03
ENSMUSG00000057722	Nabp1	6.71	16.82	36.85	58.69	SCC CSC	7.84E-01	1.66E-03
ENSMUSG00000025268	Krt18	52.2	91.41	221.05	430.93	SCC CSC	7.61E-01	2.09E-04
ENSMUSG00000022443	Parvb	3.37	5.08	12.25	24.2	SCC CSC	7.13E-01	1.61E-02
ENSMUSG00000026107	Tnfrsf10b	4.23	9.29	16.92	24.95	SCC CSC	6.99E-01	3.11E-02
ENSMUSG00000022438	Fbln2	136.84	217.88	290.92	479.38	SCC CSC	6.96E-01	1.13E-04
ENSMUSG00000015354	Sulf1	3.47	6.67	10.98	17.31	SCC CSC	6.89E-01	1.46E-02
ENSMUSG00000021822	Fam102b	3.68	7.58	12.18	17.82	SCC CSC	6.72E-01	1.24E-02
ENSMUSG00000032374	Slc2a9	13.69	29.5	7.58	9.93	SCC CSC	6.65E-01	3.72E-02
ENSMUSG00000016487	Taf4b	10.47	21.3	13.37	19.32	SCC CSC	6.56E-01	6.86E-03
ENSMUSG00000048776	Ttc9	7.06	12.24	20.05	34.08	SCC CSC	6.54E-01	1.51E-02
ENSMUSG00000022469	Pthlh	38.12	77.87	269.78	381.53	SCC CSC	6.53E-01	2.51E-03
ENSMUSG00000026475	Acsl4	18.18	33.66	26.77	42.8	SCC CSC	6.51E-01	1.66E-03
ENSMUSG00000042842	Soat1	9.4	18.21	24.78	41.8	SCC CSC	6.41E-01	1.10E-02

ENSMUSG00000045827	Dock9	13.09	26.22	31.81	45.83	SCC CSC	6.40E-01	2.26E-03
ENSMUSG00000005107	Maged2	24.39	38.37	39.96	74.94	SCC CSC	6.33E-01	1.81E-02
ENSMUSG00000026600	Tmcc3	8.36	16.93	20.85	28.72	SCC CSC	5.64E-01	1.81E-02
ENSMUSG00000030283	Antxr2	32.26	62.92	73.72	101.4	SCC CSC	5.49E-01	1.16E-02
ENSMUSG00000016918	Ecm1	51.68	78.77	90.55	159.21	SCC CSC	5.44E-01	3.78E-02
ENSMUSG00000054321	Ppfibp1	24.68	50.62	59.31	80.66	SCC CSC	5.30E-01	1.82E-02
ENSMUSG00000020023	Rapgef3	16.27	23.59	52.6	82.5	SCC CSC	5.21E-01	3.59E-02
ENSMUSG00000022074	Galnt1	51.22	98.54	112.28	147.97	SCC CSC	5.06E-01	3.24E-02
ENSMUSG00000042734	Myh9	116.14	201.6	311.14	396.86	SCC CSC	4.47E-01	4.32E-02

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