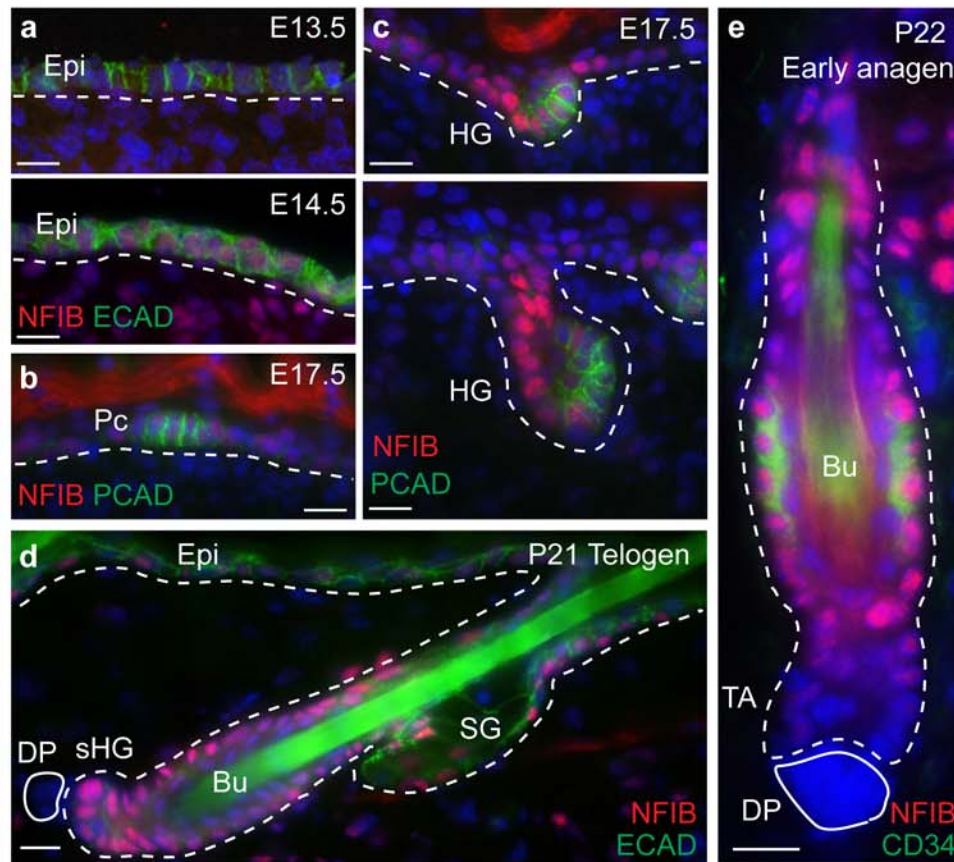


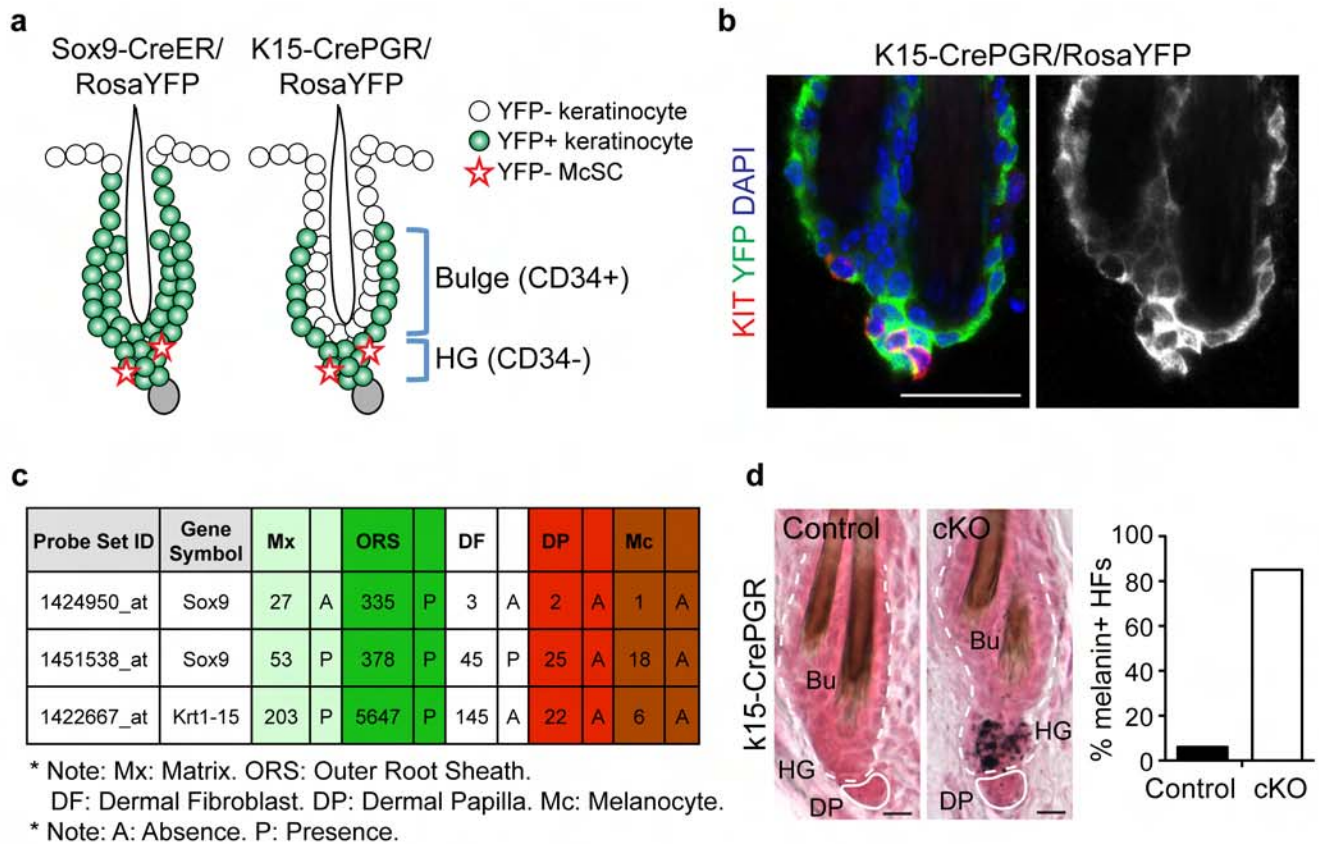
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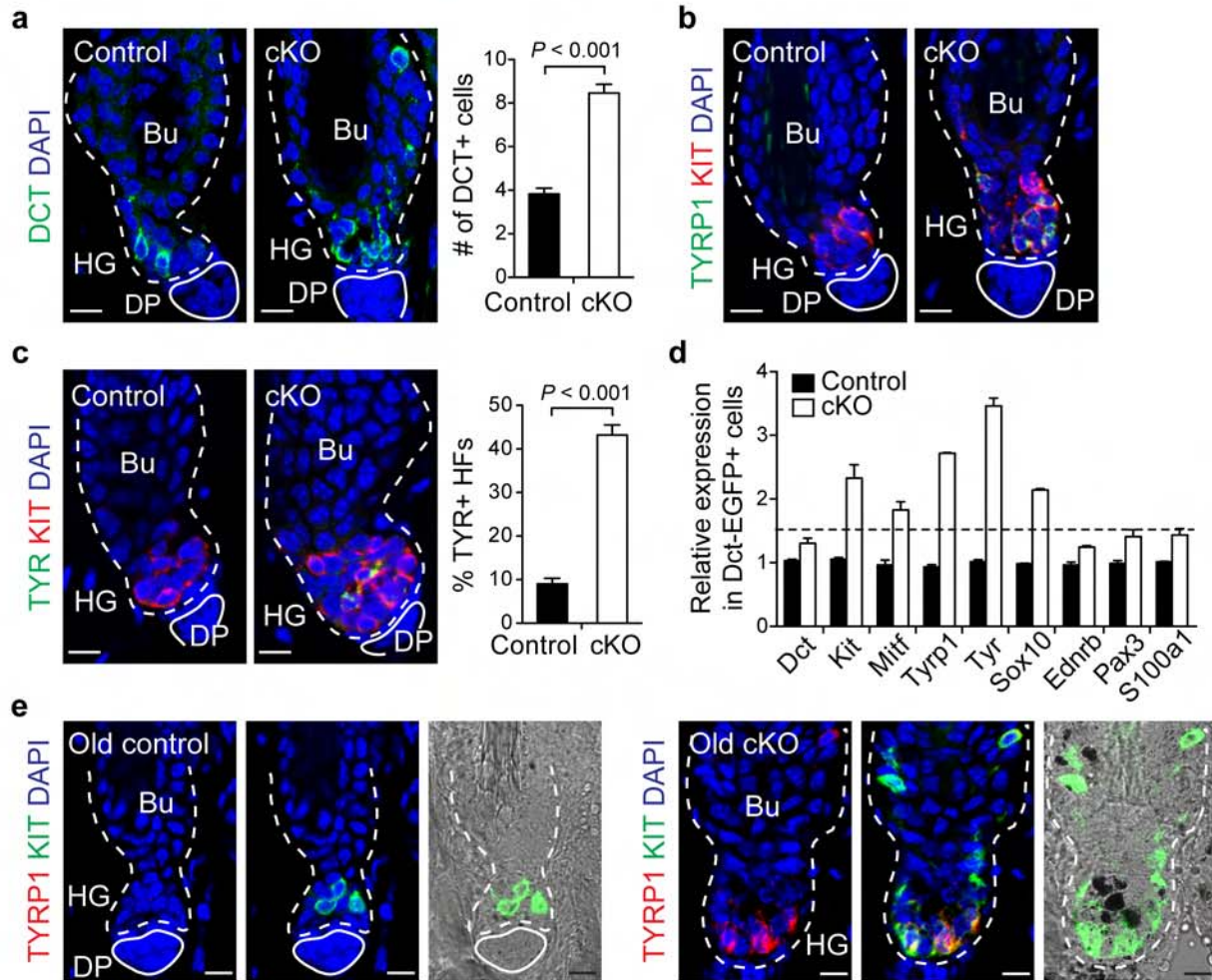
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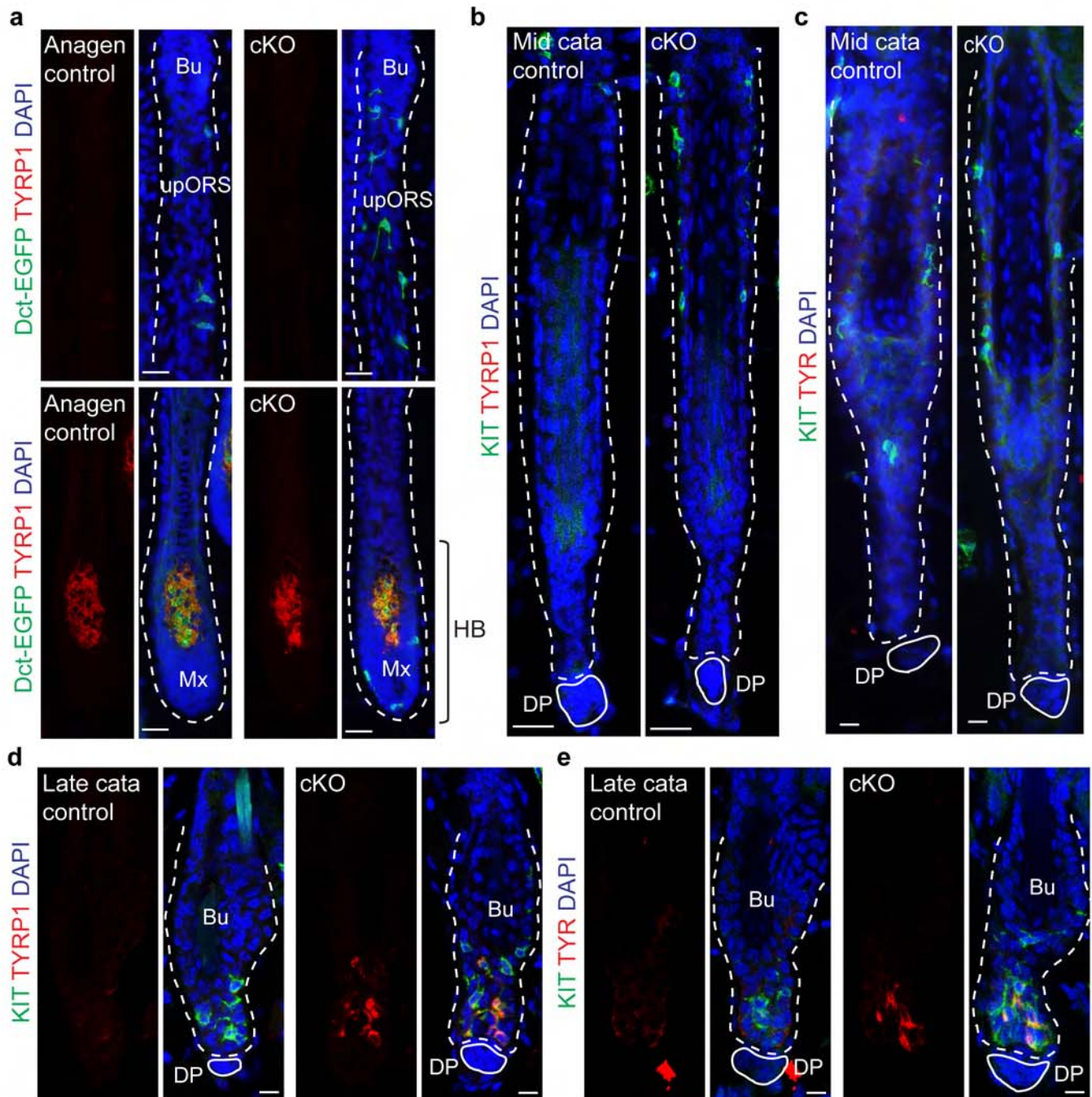
Supplementary Figure 1 | NFIB is enriched in early HFSC precursors in developing HFs. Immunofluorescence with indicated antibodies. **a**, NFIB appears in the basal layer of epidermis (Epi) as early as E14.5. **b**, Before or at the onset of epidermal invagination, NFIB is equally expressed in epidermal basal cells. PCAD marks placode (Pc) structure. **c**, As morphogenesis proceeds, NFIB is upregulated in the upper region of hair germ (HG), which is complementary with PCAD and the location of early HFSC precursors. **d**, During telogen, NFIB is enriched in the bulge (Bu) and secondary hair germ (sHG), and expressed at lower level in sebaceous glands (SG) and epidermis (Epi). **e**, At the onset of anagen, NFIB is downregulated in the emerging transit-amplifying population (TA) of committed progenitors close to dermal papilla (DP). Scale bars: 10 μm. ECAD: E-cadherin. PCAD: P-cadherin.



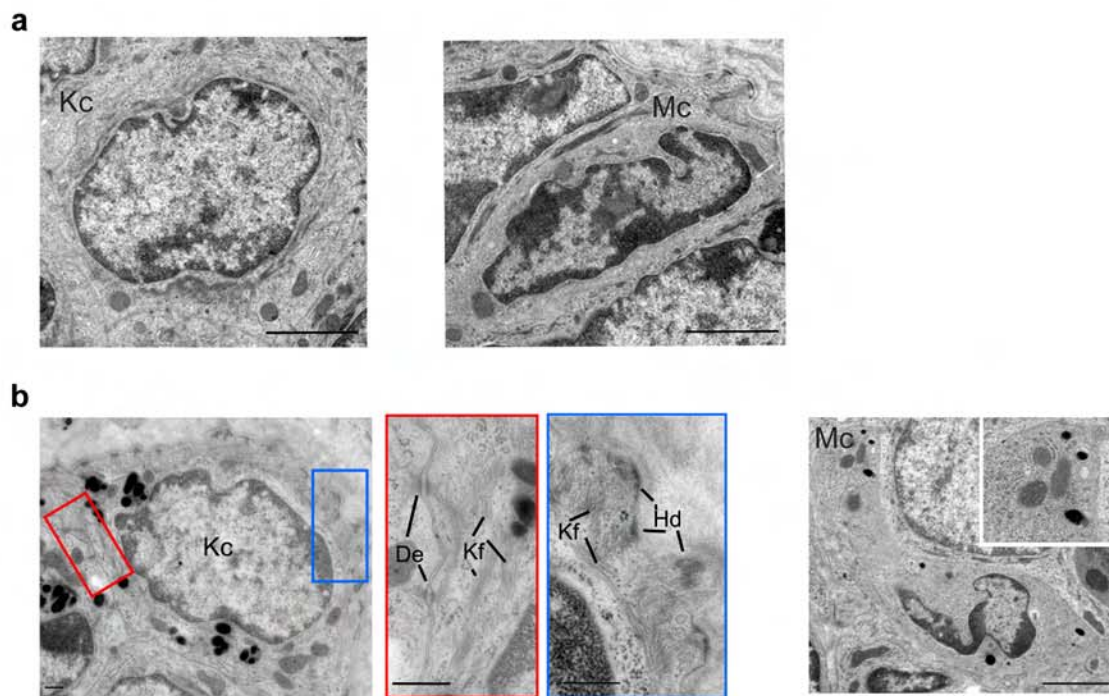
Supplementary Figure 2 | Two inducible-Cre lines *Sox9-CreER* and *K15-CrePGR*, are used in this study to ablate *Nfib* specifically in HFSCs. **a, Schematic. *RosaYFP/Cre* reporters show *Sox9-CreER* is active in most of regions in hair follicle and *K15-CrePGR* activity is more specific to the bulge and HG HFSCs after induction. Both are not active in McSCs. **b**, Immunofluorescence of *K15-CrePGR/RosaYFP* reporter with anti-YFP and KIT antibodies. KIT marks melanocytes. **c**, Transcriptional profilings of multiple populations in P4 skin through microarray show *Sox9* and *K15* (*Krt-15*) are expressed in ORS but absent in melanocytes, dermal papilla and dermal fibroblasts. **d**, Ectopic pigmentation phenotype in telogen *K15-CrePGR/Nfib(fl/fl)* cKO HF. Melanin is detected by Fontana-Masson staining. The percentage of HF with pigmented HG were quantified (n=2 mice/experiment, >100 HF were analyzed). Bu: bulge. Scale bars: 25 μm (b); 10 μm (d).**



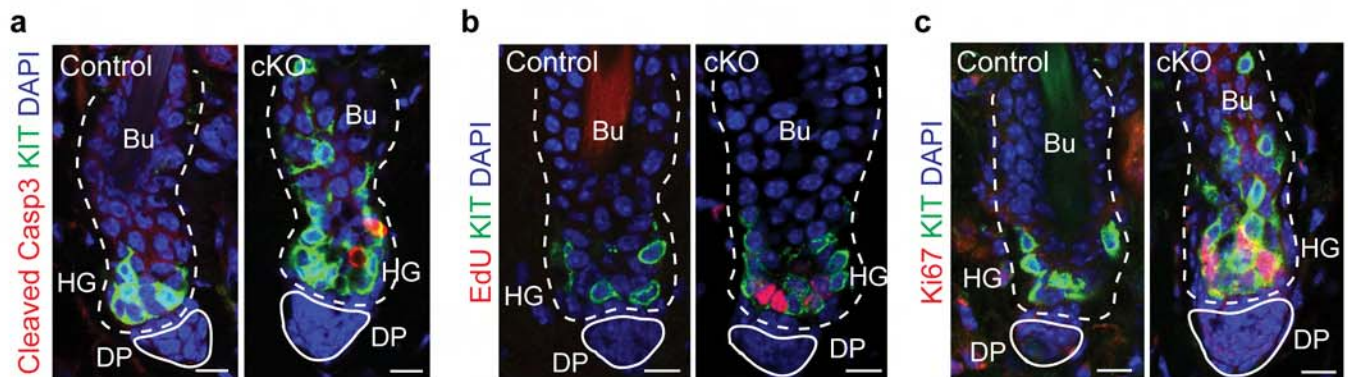
Supplementary Figure 3 | Increased melanocyte number and ectopic differentiation of McSCs in *Nfib*-cKO HF. **a-c**, Immunofluorescence with indicated antibodies and quantifications. **(a)** >24 HF from 2 mice/experiment. **(c)** $n=3$ mice/experiment, >20 HF/mouse. **d**, qPCR on FACS-isolated *Dct*-EGFP⁺ melanocytes from *Nfib*-cKO and control skins. **e**, Immunofluorescence from 21 month-old mice. Bu: bulge. Scale bars: 10 μ m. Error bars indicate s.e.m.



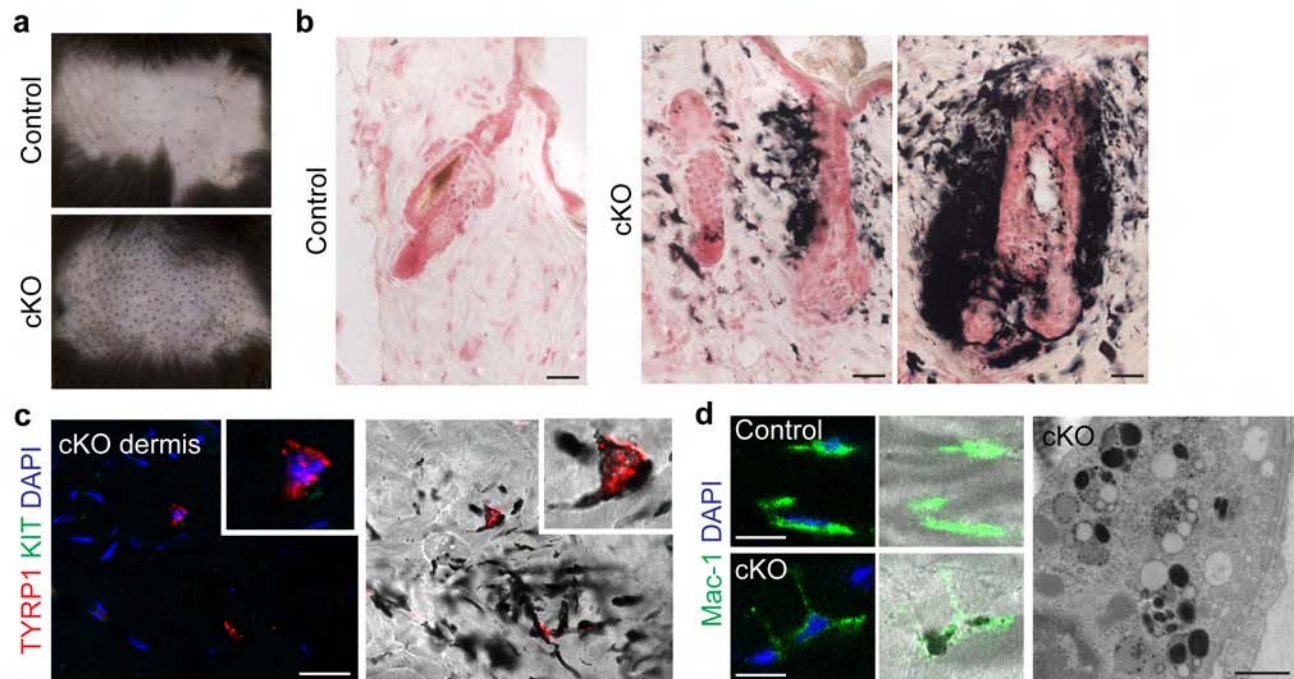
Supplementary Figure 4 | Ectopic differentiation of McSCs in *Nfib* cKO HF s ceases in anagen when DP moves away from the niche; it returns when DP approaches the niche in late catagen. Immunofluorescence with indicated antibodies. **a**, *Dct-EGFP* X *Nfib*-cKO and *Dct-EGFP* control mice were used to fluorescently tag melanocytes for purification (McSCs and differentiated melanocytes). In both cKO and control HF s, lineage committed melanocytes (TYRP1⁺ *Dct-EGFP*⁺) are only present in the upper matrix (Mx) of hair bulb (HB) but not in the SC niche including the bulge (Bu) and upper ORS (upORS). The number of McSCs is increased in cKO HF s and undifferentiated melanocytes also propagate to lower ORS in anagen. **b-c**, Differentiated melanocytes (TYRP1⁺ or TYR⁺) disappear from both cKO and control HF s during mid catagen when the hair bulb, which encases the DP, is degenerated. The DP is spared and draws upward to the SC niche at the end of catagen. **d-e**, During late catagen, melanocytes close to DP precociously express differentiating markers including TYRP1 and TYR. Scale bars: 25 μ m (a-b); 10 μ m (c-e).



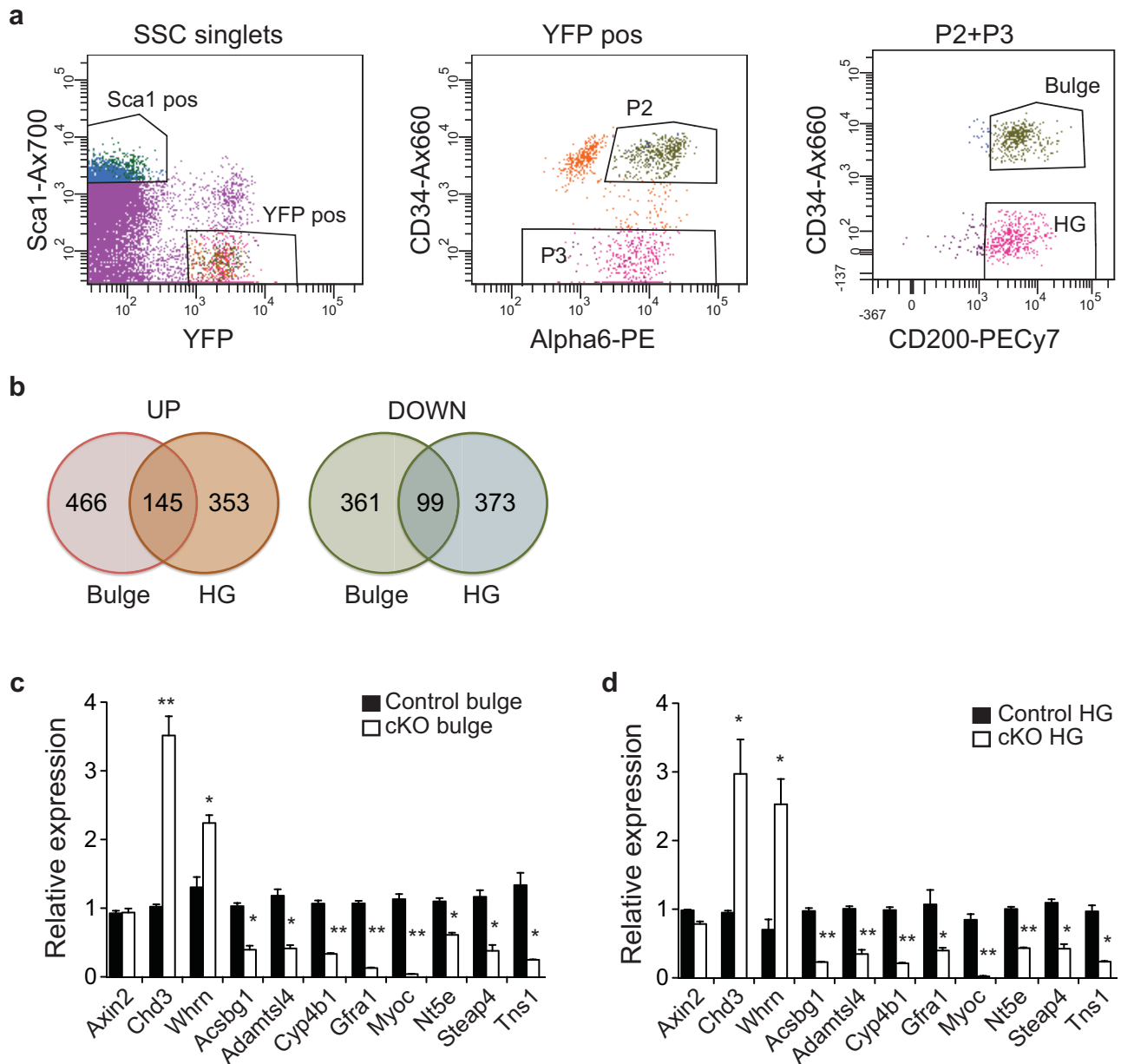
Supplementary Figure 5 | Ectopic pigmentation in telogen *Nfib*-cKO HFSCs. High magnifications from Figure 3a. Ultrathin sections of telogen *K15-CrePGR* cKO HF. **a**, Pigment-free HG-HFSC and McSC in the control HF. Kc: keratinocyte. Mc: melanocyte. **b**, Pigment-positive HG-HFSC and melanocyte in *Nfib*-cKO HF. Boxed areas are magnified showing characteristic features of keratinocytes that are absent in melanocytes, including keratin filament bundles (Kf), desmosomes (De) and hemidesmosomes (Hd). Scale bar: 2 μ m (a) and (Mc in b); 0.5 μ m (Kc in b).



Supplementary Figure 6 | Apoptotic and proliferative cells in *Nfib* cKO HF are not KIT^+ melanocytes. Immunofluorescence with indicated antibodies. **a**, Apoptotic cells marked by cleaved caspase 3 in cKO HF are not KIT^+ . **b-c**, EdU^+ or $Ki67^+$ cells in cKO HF are not KIT^+ melanocytes. Bu: bulge. Scale bars: 10 μ m.



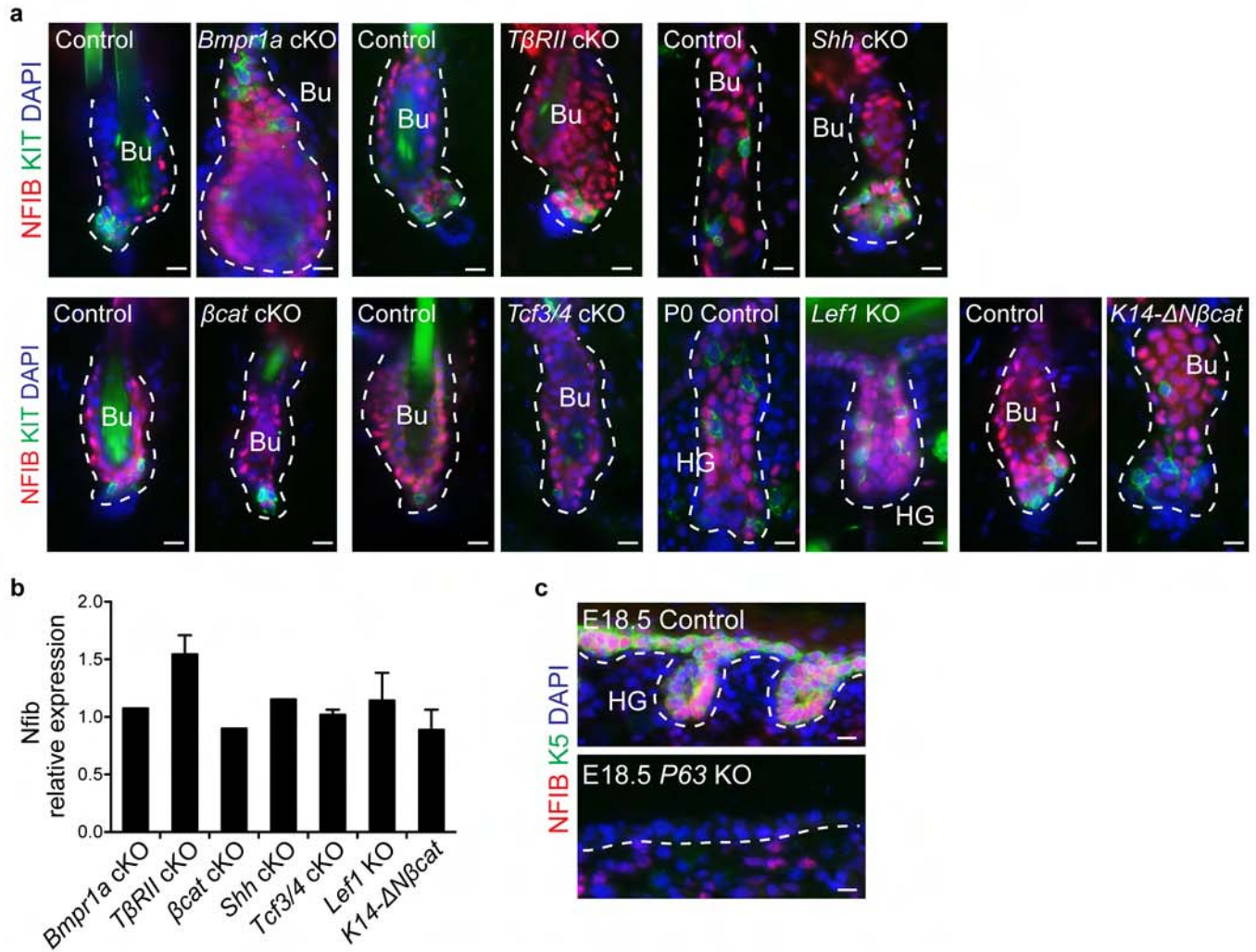
Supplementary Figure 7 | Hyperpigmentation in the skin of 21 month-old *Nfib* cKO mice. **a**, Black pigmented spots on the skin surface of *Nfib* cKO mice. **b**, Melanin is detected by *Fontana-Masson* staining. Note hyperpigmentation in the dermis not seen in younger *Nfib*-cKO animals. **c**, TYRP1⁺KIT⁻ dermal melanocytes in *Nfib* cKO skin and could not account for the majority of pigmented cells in the dermis. **d**, Pigmented macrophages marked by Mac-1 and identified by ultrastructural analysis were prevalent in the dermis of old *Nfib*-cKO skin. Scale bars: 25 μ m (b); 10 μ m (c,d).



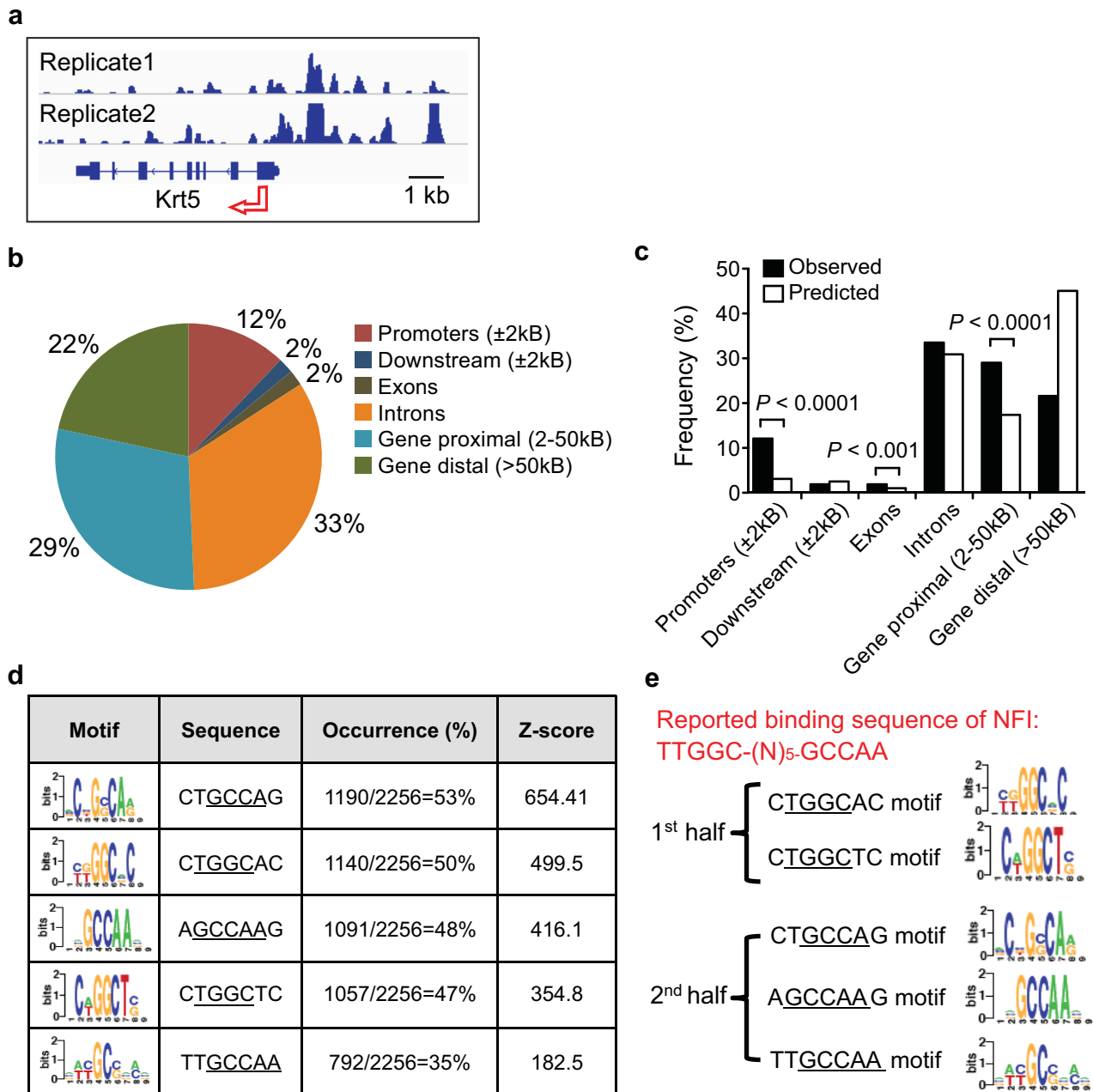
Supplementary Figure 8 | Isolation of bulge and HG HFSCs from *Nfib* het and cKO skins for RNA-seq and qPCR analysis. **a**, FACS isolation. Bulge HFSCs were isolated with markers YFP⁺ Sca1⁻ $\alpha 6^{\text{high}}$ CD34⁺ CD200⁺; HG HFSCs with the same markers but CD34⁻. **b**, Venn diagrams representing gene expression changes in cKO bulge/HG cells compared to control by RNA-seq analysis (≥ 2 -fold). **c**, qPCR confirms the results from RNA-seq analysis. * $P < 0.05$. ** $P < 0.001$. Error bars indicate s.e.m.



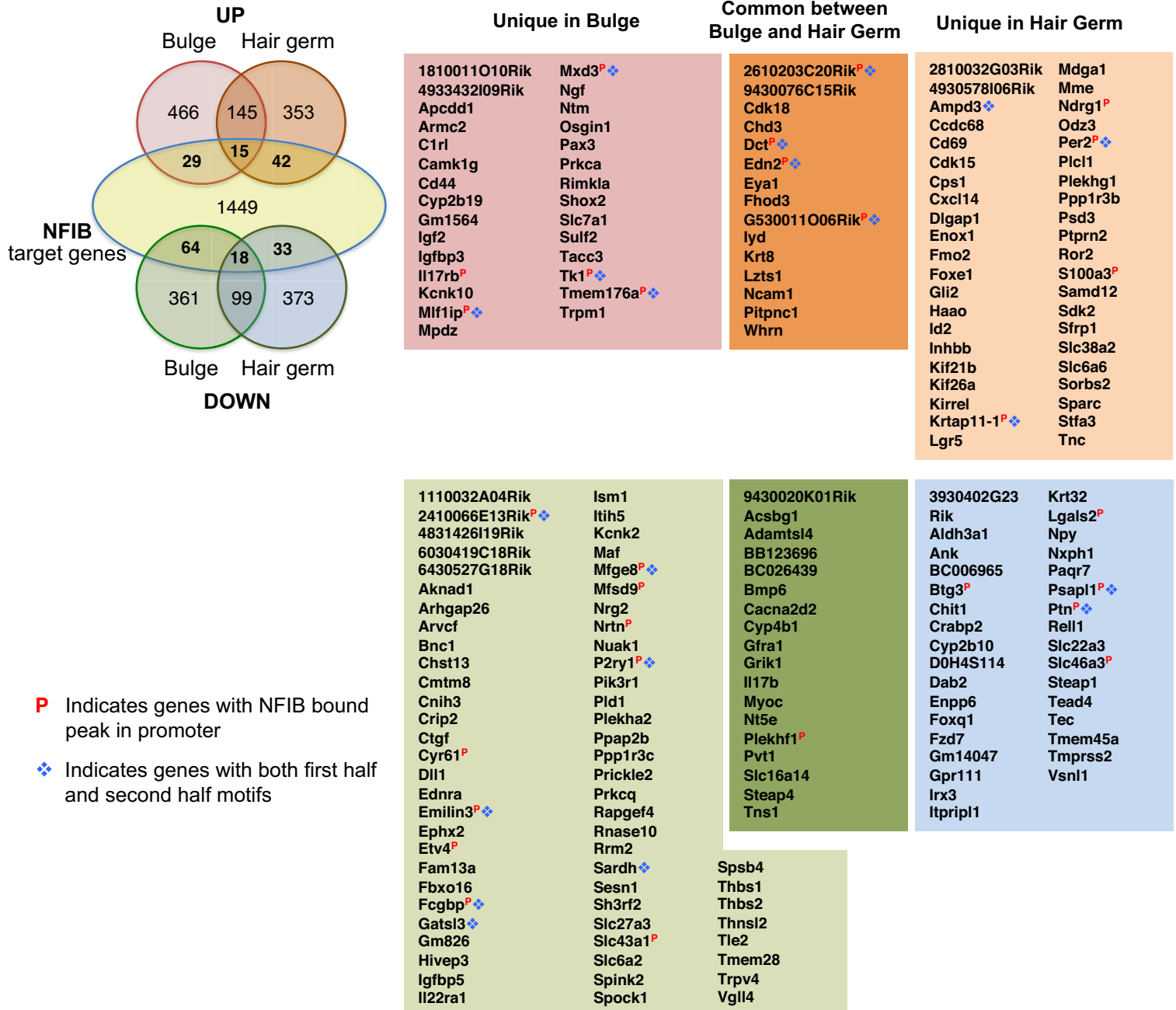
Supplementary Figure 9 | Pathway analysis. The heatmap shows the enriched biological processes (Gene Ontology) for the up- or down-regulated genes in *Nfib* cKO bulge and HG HFSCs relative to control in RNA-seq results, compared to the rest of the known genes in RefSeq annotation database. The categories indicate genes over/under expressed in cKO bulge (Bulge Up/Bulge Down), and over/under expressed in HG HFSCs (HG Up/HG Down). Note: for this analysis, we excluded the small subset of pigment mRNAs, which might appear to arise from ectopic melanosome uptake by HFSCs nearest the DP.



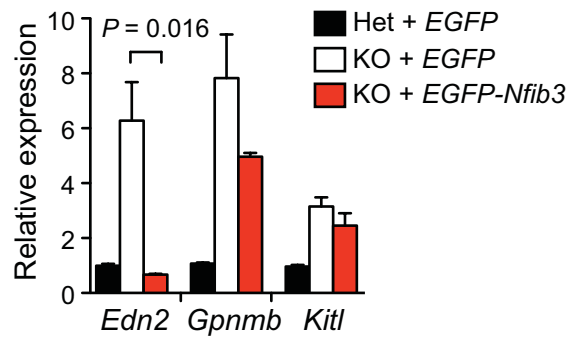
Supplementary Figure 10 | NFIB expression in different mutants. a,c, Immunofluorescence with indicated antibodies. Frozen skin sections were from the following genetic backgrounds and where relevant, induced for Cre expression: *K15-CrePGR X Bmpr1a fl/fl*, *K14-Cre X TGFβRII (TβRII) fl/fl*, *K15-CrePGR X Sonic Hedgehog (Shh) fl/fl*, *K15-CrePGR X β-catenin (βcat) fl/fl*, *K15-CrePGR X Tcf3(fl/fl) X Tcf4-null*, *Lef1-null*, *K14-ΔNβcat*. **b**, Relative *Nfib* RNA levels in HFSCs FACS-purified from these different backgrounds ($CD34^+α6^+$) followed by transcriptional profiling analyses (full array databases to be reported elsewhere). The HFs ($Pcad^+α6^+$) were isolated from E17.5 *Lef1* KO and control embryos. Bu: bulge. Scale bars: 10 μm. Error bars indicate s.e.m.



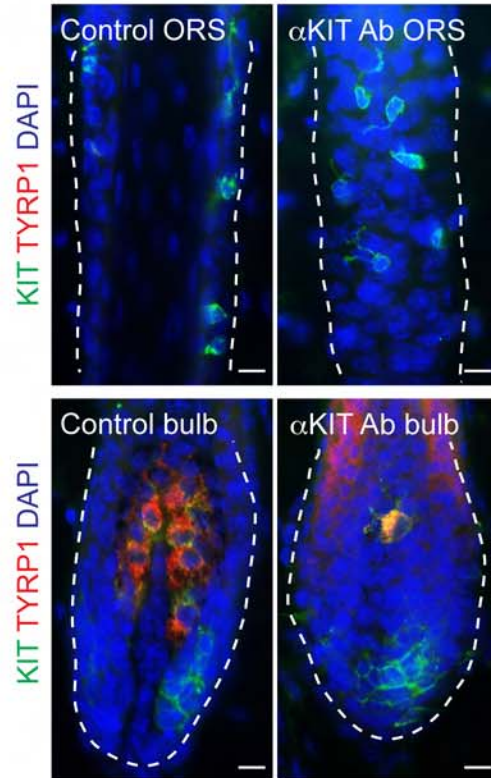
Supplementary Figure 11 | Genomic distribution of NFIB ChIP-seq peaks and motif analysis. a, Visualization of NFIB ChIP-seq profiles of *Krt5* promoter. **b,** Genomic distribution of NFIB ChIP-seq peaks relative to RefSeq transcripts. Promoter: within $\pm 2\text{kB}$ of transcription start site. Downstream: within $\pm 2\text{kB}$ of transcription end site. Gene proximal: within upstream 2-50kB of transcription start site. Gene distal: beyond upstream 50kB of transcription start site. **c,** Comparison of the observed NFIB bound peak distribution to the predicted distribution based on the genomic representation of each compartment, using the Binomial test. **d,** The motifs discovered from *de novo* motifs analysis using FIRE program are shown. The percentage of NFIB bound peaks occurrences and the corresponding z-scores are indicated for each motif. **e,** The discovered motifs are grouped based on their similarity to reported first and second halves of the NFIB palindromic motif.



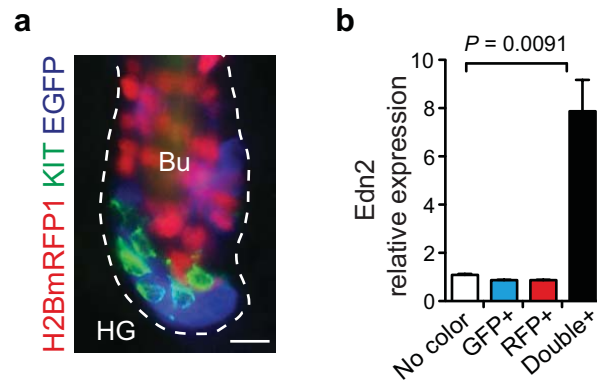
Supplementary Figure 12 | Identification of direct NFIB target genes in HFSCs whose expression is regulated by NFIB. The Venn diagram on the left shows the comparison between 1449 NFIB direct target genes from ChIP-seq analysis and genes up or down-regulated in *Nfib* cKO bulge/HG HFSCs from RNA-seq. Genes that are bound by *and* regulated by NFIB are listed. Unique in Bulge or HG means their expression levels are only changed in each population. Common between Bulge and HG indicates genes that are changed in both populations. Genes with NFIB bound peak in their promoter (\pm 2kb from TSS), and with both halves of NFIB palindromic motif are explicitly marked.



Supplementary Figure 13 | Regulation of *Edn2* expression by NFIB *in vitro*. qPCR from *Nfib* het or KO keratinocyte cultures transfected with *EGFP* or *EGFP-Nfib3* transgenes. Values are normalized to het+*EGFP*. Error bars indicate s.e.m.



Supplementary Figure 14 | Inhibition of KIT receptor during anagen in *Nfib*-cKO skins. Immunofluorescence with indicated antibodies. Note the disappearance of TYRP1⁺ mature melanocytes in the hair bulb after α KIT antibodies treatment during anagen. McSCs in the bulge/ORS were not affected. Scale bars: 10 μ m.



Supplementary Figure 15 | *Edn2* induction in skin epithelial cells but not melanocytes by *in utero* lentiviral injection. **a**, Immunofluorescence with KIT and GFP antibodies. As judged by H2BmRFP1/GFP expression, transduction is confined to skin epithelial cells and not seen in KIT⁺ McSCs. **b**, Upregulation of *Edn2* in doubly transduced cells examined by qPCR on FACS-isolated populations after 10 or 30 days of feeding on Doxycycline-containing chow (n=3). Values are normalized to no-color control. Bu: bulge. HG: hair germ. Scale bars: 10 μ m. Error bars indicate s.e.m.

Supplementary Table 1 | Gene list from RNA-seq analysis for bulge/HG HFSCs from *Nfib* cKO and het skins. Fold change is estimated as log₂ ratio between cKO and WT in Bulge- and HG-HFSCs.

Bulge Up		WT Bulge	KO Bulge	WT HG	KO HG	Log2 KO Bulge/WT Bulge	Log2 KO HG/WT HG
GENE	Description						
Mir23b		0	101.69	0	0	6.682151888	0
Snord47		0	98.06	0	184.98	6.630230716	7.539003674
Snord100		0	92.27	86.05	80.26	6.543341212	-0.099298933
Mir24-1		0	90.59	0	0	6.517118185	0
Mir5117		0	73.77	42.16	67.79	6.224387628	0.672503991
Snord2		0	63.97	0	0	6.0217018	0
Slc15a2	solute carrier family 15 member 2 isoform 2	0	53.71	0	65.66	5.773732651	6.058749412
Mir3058		0	53.23	0	0	5.761019265	0
Mir5133		0	44.93	0	0	5.521364878	0
Snora75		0	39.71	15.14	0	5.347311316	-4.012568674
Snora3		0	35.51	28.45	53.48	5.190219764	0.887459069
Snord22		0	35.37	26.81	59.57	5.184677021	1.122999667
Snora68		0	33.21	37.66	51.34	5.096346199	0.437072287
Mir675		0	32.93	0	32.47	5.084489525	5.064796646
Snora30		0	29.96	0	0	4.952333566	0
Snora7a		0	29.45	0	0	4.928370323	0
Snora44		0	25.97	16.53	28.7	4.753283616	0.760636935
H19		1.26	41.51	1.04	68.06	4.233407581	5.081209277
Ccl20	C-C motif chemokine 20 isoform 2	0	12.8	18.46	39.31	3.786596362	1.050626073
Snora24		0	12.48	16.41	0	3.752748591	-4.121844298
Ugt1a10	UDP glycosyltransferase 1 family, polypeptide	0.12	13.69	0	0	3.713263758	0
Rmp		0	11.42	0	0	3.634593268	0
Insl3	insulin-like 3 precursor	0.23	13.65	0.16	5.31	3.574170444	2.4435152
Mir678		2.56	41.05	0	0	3.562156654	0
Prr9	proline-rich protein 9	0	10.27	1.42	12.3	3.49441561	2.458347293
Itga8	integrin alpha-8 precursor	2.28	34.84	1.03	9.41	3.449802917	2.358418436
Hist2h2bb	histone H2B type 2-B	0	9.84	2.49	8.22	3.438292852	1.401539714
Atp12a	potassium-transporting ATPase alpha chain 2	3.34	45.42	32.8	60.65	3.418979575	0.867077648
Gap43	neuromodulin	0	9.49	0	0	3.390942773	0
Kcnn3	small conductance calcium-activated potassium	3.86	45.31	0.36	2.22	3.252295538	1.243454037
Kcnp2	Kv channel-interacting protein 2 isoform b	0	8.51	9.79	38.71	3.249445341	1.879807496
Slc18a3	vesicular acetylcholine transporter	2.67	33.85	0	3.76	3.247306688	2.250961574
C2cd4b	family with sequence similarity 148, member B	4.21	46.26	7.52	22.76	3.181264352	1.479609501
Hba-a2	hemoglobin alpha, adult chain 2	1.98	25.27	2.98	4.62	3.140031965	0.4978017
Car2	carbonic anhydrase 2	0	7.52	1.38	8.39	3.09085343	1.980163584
Sphkap	A-kinase anchor protein SPHKAP	19.75	174.31	0.36	6.42	3.078725051	2.447812535
Fam71a	hypothetical protein LOC619288	4.05	40.2	2.22	14.87	3.028289044	2.301169535
Crygn	gamma-crystallin N	0	7.05	4.47	2.79	3.008988783	-0.529342985
Rpph1		0	7	0	0	3	0
Hmga2	high mobility group protein HMGI-C	2.88	28.84	0.39	3.66	2.943118978	1.745245072
Mpp4	MAGUK p55 subfamily member 4 isoform 1	0.28	8.41	0.22	0.26	2.878050913	0.046542586
Ptgds	prostaglandin-H2 D-isomerase	1.5	16.67	9.06	11.58	2.82130204	0.322501617
Chst9	carbohydrate sulfotransferase 9	0	5.56	0	0	2.713695815	0
C2	complement C2 precursor	15.85	104.06	5.32	16.24	2.640392993	1.447763311
Nts	neurotensin/neurodynin N	0	5.22	0	1.49	2.63691458	1.316145742
Nppc	C-type natriuretic peptide preproprotein	180.97	1130.03	71.35	315.96	2.635864668	2.131235863
Pcp4	Purkinje cell protein 4	2.06	17.68	2.62	11.06	2.609890897	1.736168305
Glr3	glycine receptor subunit beta precursor	25.67	155.33	9.57	34.39	2.551304931	1.743366385
Hbb-b2	hemoglobin subunit beta-2	1.68	14.68	8.31	11.46	2.548620654	0.420450995
Plekha6	pleckstrin homology domain-containing family A	3.08	22.26	13.46	20.29	2.51121004	0.558108398
Sync	syncoilin	0.9	9.68	0.71	1.32	2.490840323	0.44012848
Sprr1b	cornifin-B	0	4.45	2.62	5.74	2.44625623	0.896758894
Nuf2	kinetochore protein Nuf2	2.65	18.77	35.81	22.58	2.437344502	-0.642534031
Wnt16	protein Wnt-16 precursor	2.86	19.78	18.63	30.86	2.428522902	0.698686094
Gp1hbp1	glycosylphosphatidylinositol-anchored high	0	4.34	0	0	2.416839742	0
Klk14	kallikrein-14 preproprotein	0	4.3	0	0	2.40599236	0
Cpa6	carboxypeptidase A6 precursor	0	4.26	0	3.36	2.3950628	2.124328135
As3mt	arsenite methyltransferase	0.82	8.53	2.55	3.79	2.388537764	0.432206631
Asphd2	aspartate beta-hydroxylase domain-containing	0	4.22	0	2.13	2.384049807	1.646162657
Pcdh20	protocadherin-20 precursor	20.9	113.02	7.95	29.84	2.380284132	1.784843178
Lst1	leukocyte-specific transcript 1 protein	0	4.19	0	0	2.375734539	0
Nxf7	nuclear RNA export factor 7 isoform 2	0	4.17	0.91	13.78	2.370164281	2.952001726
1700125H03Rik		0	4.16	5.12	12.61	2.367371066	1.153063509
Tas1r2	taste receptor type 1 member 2 precursor	0	4.13	0	0	2.358958826	0
Serp1nb6e	serine (or cysteine) peptidase inhibitor, clade	4.01	24.57	3.66	19.05	2.351569652	2.105200377
Birc5	baculoviral IAP repeat-containing protein 5	5.78	33.07	69.33	46.56	2.329144769	-0.564391502
Ifftm5	interferon-induced transmembrane protein 5	0	4.02	3.71	0	2.327687364	-2.23572706
Fhod3	FH1/FH2 domain-containing protein 3	1.23	10.09	7.66	30.59	2.31414375	1.867029007
Hmnr	hyaluronan mediated motility receptor	2.32	15.29	33.6	20.41	2.294731457	-0.692487242
Kcnq3	potassium voltage-gated channel subfamily KQT	0.77	7.67	0	0	2.292282633	0
Ccnb2	G2/mitotic-specific cyclin-B2	4.59	26.36	57.53	41.29	2.291148042	-0.468859718
Kirrel3	kin of IRRE-like protein 3 isoform D precursor	0	3.88	3.15	2.98	2.286881148	-0.060342906
Cdk1	cyclin-dependent kinase 1	6.08	33.47	69.51	42.86	2.283520033	-0.684922069
Shcbp1	SHC SH2 domain-binding protein 1	1.65	11.9	36.07	19.55	2.283306801	-0.851113721
Ntm	neurotrophin precursor	2.7	16.57	0	0	2.247517015	0
Ephb1	ephrin type-B receptor 1 isoform 1	4.53	25.25	3.38	4.72	2.246966037	0.385084277
Icam2	intercellular adhesion molecule 2 precursor	0	3.73	0	1.9	2.241840184	1.5360529
Pthlh	parathyroid hormone-related protein	74.71	355.93	679.17	418.8	2.237085392	-0.696193208
Kird1	natural killer cells antigen CD94	0	3.71	0	0	2.23572706	0
Nlgn1	neuroligin-1 isoform 2	2.25	14.28	0.82	2.33	2.23313292	0.871583727
Anxa9	annexin A9	5.33	28.6	23.26	12.86	2.225319771	-0.807652293
Iqgap3	IQ motif containing GTPase activating protein 3	2.97	17.56	36.56	20.87	2.224985798	-0.780243843
Mki67	antigen KI-67	8.13	41.51	114.46	72.14	2.219115494	-0.658660599
Tpx2	TPX2, microtubule-associated protein homolog	3.69	20.6	42.7	29.93	2.203371485	-0.498626446
Pdgfr	platelet-derived growth factor C	18.44	88.47	29.41	49.65	2.202375797	0.736016453
Fmod	fibromodulin precursor	43.76	204.85	5	26.21	2.201311507	2.181102551
C1qtnf5	complement C1q tumor necrosis factor-related	0.17	4.37	0.02	0.03	2.198413558	0.014075185

Irf2	interferon-induced protein with	2.01	5.23	1.73	2.37	1.049468676	0.30384764
A3galt2	alpha-1,3-galactosyltransferase 2 precursor	2.16	5.54	1.75	2.72	1.049366077	0.435871003
Pif1	ATP-dependent DNA helicase PIF1	0.59	2.29	5.99	4.27	1.049060818	-0.407489494
Chk1	serine/threonine-protein kinase Chk1	3.56	8.43	20.24	14.81	1.048223947	-0.425946398
9530077C05Rik	hypothetical protein LOC68283	4.51	10.39	1.64	3.43	1.047643523	0.746768769
Trps1	zinc finger transcription factor Trps1	34.69	72.75	26.57	58.28	1.047123148	1.10444618
Slc16a4	monocarboxylate transporter 5	1.01	3.15	2.11	2.95	1.045915835	0.344938073
Gm129	hypothetical protein LOC229599	1.03	3.19	2.48	3.05	1.045470517	0.218834602
Adams1	A disintegrin and metalloproteinase with	211.81	437.88	702.48	734.9	1.044260582	0.065000327
Pdgfd	platelet-derived growth factor D	3.82	8.94	0	1.01	1.044212705	1.007195501
Gas5		115.77	239.71	178.96	284.23	1.043626407	0.664449458
Apln	apelin precursor	3.11	7.47	17.79	17.38	1.043223576	-0.0318283
2510049J12Rik	hypothetical protein LOC70291	0	1.06	0.82	0.58	1.042644337	-0.204013892
Galnt12	polypeptide N-acetylgalactosaminyltransferase	0	1.06	0	0	1.042644337	0
Hsd17b13	17-beta-hydroxysteroid dehydrogenase 13 isoform	0	1.06	61.86	21.22	1.042644337	-1.500283455
Tagln	transgelin	24.79	52.12	18.77	63.36	1.042443374	1.702851455
Tmem117	transmembrane protein 117	1.19	3.51	0	0.85	1.042196564	0.887525271
Gm13177	arylacetamide deacetylase-like 4	8.37	18.29	6.92	8.68	1.04173219	0.289506617
Incenp	inner centromere protein	15.2	32.35	54.19	40.62	1.041692948	-0.40712992
Rasa4	ras GTPase-activating protein 4 isoform 1	2.61	6.43	1.73	2.93	1.041363374	0.525628361
Grp1	glycine/arginine-rich protein 1	2.99	7.2	2.92	2.26	1.039235163	-0.26598169
Bcl3	B-cell lymphoma 3 protein homolog	7.72	16.92	25.08	38.41	1.039170597	0.59561788
Hbb-b1	hemoglobin subunit beta-1	11.9	25.49	4.33	6.51	1.038076778	0.494677375
Cd44	CD44 antigen isoform f precursor	410.92	844.48	666.41	873.38	1.037406453	0.389687099
Snora28		81.89	169.13	83.39	112.85	1.037367594	0.431990333
Degs2	sphingolipid delta(4)-desaturase/C4-hydroxylase	1.88	4.91	7.4	6.09	1.037089319	-0.2446037
Procr	endothelial protein C receptor	9.55	20.64	6.2	17.05	1.0364575	1.325930025
Sema3b	semaphorin-3B	9.5	20.53	2.08	7.26	1.035958992	1.423211431
Gimap1	GTPase IMAP family member 1	0	1.05	0	0	1.03562391	0
ORF63	TAK1-like protein	0	1.05	0	0	1.03562391	0
Slc5a3	sodium/myo-inositol cotransporter	9.48	20.47	12.79	19.49	1.034683474	0.571297527
Igfbp7	insulin-like growth factor-binding protein 7	913.81	1871.86	139.17	255.99	1.033699018	0.874534614
Ogn	mimectan precursor	9.49	20.43	3.15	5.63	1.030617172	0.675897534
Cd72	B-cell differentiation antigen CD72 isoform 4	16.28	34.26	22.16	3.44	1.028929257	-2.383003672
Fgf17	fibroblast growth factor 17 precursor	0	1.04	0	0	1.028569152	0
Hes1	transcription factor HES-1	125.53	257.06	209.55	215.84	1.028227052	0.042468037
Ager	advanced glycosylation end product-specific	1.28	3.65	0.83	2.94	1.028196892	1.106351981
Kcnk10	potassium channel subfamily K member 10	18.68	39.12	1.4	2.06	1.027591385	0.350497247
Car3	carbonic anhydrase 3	0	1.03	0	0	1.021479727	0
Foxj1	forkhead box protein J1	0	1.03	0	1.1	1.021479727	1.070389328
Gm5151	hypothetical protein LOC381582	0	1.03	0	0	1.021479727	0
Cd3g	T-cell surface glycoprotein CD3 gamma chain	9.45	20.2	7.85	5.37	1.020561322	-0.474384083
Dusp10	dual specificity protein phosphatase 10	19.85	41.29	50.91	59.11	1.020269177	0.211592532
Mybl2	myb-related protein B	1.54	4.15	8.29	6.49	1.019743935	-0.310712878
Dbf4	protein DBF4 homolog A isoform 1	6.51	14.2	29.3	23.71	1.017186511	-0.294222783
Gm4925	ribosomal protein S12-like	0	1.02	0	0	1.014355293	0
Pvr	poliovirus receptor	37.91	77.56	16.28	29.17	1.013653949	0.804011479
Cit	citron Rho-interacting kinase	0.61	2.25	5.68	3.97	1.01337903	-0.426602251
Kif26b	kinesin-like protein KIF26B	1.7	4.45	7.48	22.95	1.013296823	1.497889486
Armc2	armadillo repeat-containing protein 2	1.52	4.08	0.89	1.16	1.011404763	0.192645078
Slf8	schlafen 8 isoform 2	1.92	4.88	2.27	3.02	1.009847786	0.297904866
Mir24-2		161.61	326.39	108.93	154.05	1.009594275	0.496148373
EdnrB	endothelin B receptor isoform 1	1.61	4.25	1.85	2.56	1.008267616	0.320915322
4933432I09Rik		0	1.01	0	0	1.007195501	0
Ppm1n	probable protein phosphatase 1N	0	1.01	0	0	1.007195501	0
Soat2	sterol O-acyltransferase 2	0	1.01	0	0	1.007195501	0
Arl5c	ADP-ribosylation factor-like protein 5C	2.93	6.89	1.57	1.26	1.005495988	-0.185445587
Cd97	CD97 antigen isoform 4	15.09	31.29	46.99	35.57	1.004923115	-0.392073186
Lrrk2	leucine-rich repeat serine/threonine-protein	2.75	6.52	2.92	6.61	1.003842066	0.957042799
Gm11428	activated macrophage/microglia WAP domain	3.22	7.46	0	0	1.003414664	0
Kcnj13	inward rectifier potassium channel 13	2.08	5.17	3.21	3.07	1.002340138	-0.048791439
Robo4	roundabout homolog 4	0.81	2.62	0.61	0.62	1	0.008933125
Tgtp1	T-cell specific GTPase	0.6	2.2	1.2	0.75	1	-0.330148602
BB283400		0	1	0	0	1	0

HG Up							
GENE	Description	WT Bulge	KO Bulge	WT HG	KO HG	Log2 KO Bulge/WT Bulge	Log2 KO HG/WT HG
Snord69		0	0	0	232.99	0	7.870303065
Snord47		0	98.06	0	184.98	6.630230716	7.539003674
Mir3109		0	0	0	83.95	0	6.408542042
Mir705		69	71.9	0	81.65	0.058563892	6.368942914
Mir5114		70.08	0	0	79.43	-6.151371776	6.329661815
Mir5121		0	0	0	78.95	0	6.321026129
Slc15a2	solute carrier family 15 member 2 isoform 2	0	53.71	0	65.66	5.773732651	6.058749412
Snord16a		0	0	0	63.42	0	6.009436756
Mirlet7d		31.52	34.93	0	39.43	0.143861678	5.337354298
H19		1.26	41.51	1.04	68.06	4.233407581	5.081209277
Mir675		0	32.93	0	32.47	5.084489525	5.064796646
Snord89		0	0	0	30.79	0	4.990501111
Mir5122		34.36	0	0	28.32	-5.14404637	4.873813198
Amtn	amelotin precursor	0	2.79	0	24.97	1.922197848	4.698774109
Scrg1	scrapie-responsive protein 1 precursor	103.44	363.68	2.13	50.76	1.803956718	4.047603055
Snora43		0	0	0	15.33	0	4.029452886
Bex1	protein BEX1	1.54	2.97	4.83	77.62	0.64431051	3.753328575
Krtap8-1	keratin-associated protein 8-1	0	0	0	10.32	0	3.500802053
C1s	complement C1s-A subcomponent	106.07	402.95	9.14	84.23	1.915622423	3.07130368
Nxf7	nuclear RNA export factor 7 isoform 2	0	4.17	0.91	13.78	2.370164281	2.952001726
Thpo	thrombopoietin precursor	0	1.09	0.45	9.61	1.063502942	2.871299851
Mlana	melanoma antigen recognized by T-cells 1	0	3.53	0	6	2.17951105	2.807354922
Krt73	keratin, type II cytoskeletal 73	2.32	1.08	0.79	11.44	-0.674599713	2.796954993
Lox12	lysyl oxidase homolog 2 precursor	9.21	42.79	2.27	21.7	2.100618584	2.795329757
1700084E18Rik		0	0	0	5.67	0	2.737686761
Lrrc4	leucine-rich repeat-containing protein 4	39.86	76.33	7.89	57.39	0.920339009	2.715465987
Krt85	keratin, type II cuticular Hb5	0	1.26	0	5.52	1.176322773	2.704871964
AB30018L16Rik	hypothetical protein LOC320492 isoform 1	0.22	0.9	0.71	9.95	0.639118271	2.67886264
Krtap7-1	keratin-associated protein 7-1	0	0	0	5.29	0	2.653060017
Sstr2	somatostatin receptor type 2 isoform A	0	0	0	5.17	0	2.625270489
Col12a1	collagen alpha-1(XII) chain	111.27	279.2	8.04	54.72	1.319484483	2.62380058
Krtap11-1	keratin associated protein 11-1	0	0	0	5.14	0	2.618238656
Ccnb1ip1	E3 ubiquitin-protein ligase CCNB1IP1	0	2.18	0	5.1	1.669026766	2.608809243
Cyp2g1	cytochrome P450, family 2, subfamily g,	38.18	83	30.35	187.36	1.10027193	2.58695528
Gm1673	neuropeptide-like protein C4orf48 homolog	0	0	0	4.86	0	2.550900665
Fmo2	dimethylalanine monooxygenase [N-oxide-forming]	2.01	2.04	5.61	37.63	0.014307837	2.546999501
S100a9	protein S100-A9	0	2.74	0	4.59	1.90303827	2.482848283
Pamr1	inactive serine protease PAMR1 precursor	2.83	4.4	1.14	10.86	0.495615015	2.470421308
Prr9	proline-rich protein 9	0	10.27	1.42	12.3	3.49441561	2.458347293
Sphkap	A-kinase anchor protein SPHKAP	19.75	174.31	0.36	6.42	3.078725051	2.447812535
Insl3	insulin-like 3 precursor	0.23	13.65	0.16	5.31	3.574170444	2.4435152
Ilnk	interferon kappa precursor	0	0	0	4.43	0	2.440952198
Rrad	GTP-binding protein RAD	4.75	12.32	5.73	35.39	1.211960221	2.434863641
Iyd	iodotyrosine dehalogenase 1 precursor	1.02	4.94	0	4.22	1.556107638	2.384049807
Tmem178	transmembrane protein 178 precursor	0	0	0	4.15	0	2.364572432
Nr1h5	nuclear receptor subfamily 1, group H, member 5	0	1.2	0	4.13	1.137503524	2.358958826
Itga8	integrin alpha-8 precursor	2.28	34.84	1.03	9.41	3.449802917	2.358418436
Mkx	homeobox protein Mohawk	11.15	18.13	2.18	15.01	0.65488056	2.331874637
Fam71a	hypothetical protein LOC619288	4.05	40.2	2.22	14.87	3.028289044	2.301169535
Tnc	tenascin	487.81	801.82	48.02	238.72	0.715802758	2.28990789
Fxyd4	FXYD domain-containing ion transport regulator 4	0	3.15	0	3.89	2.053111336	2.289834465
AW112010	hypothetical protein LOC107350	4.49	8.82	0	3.88	0.838916875	2.268881148
Ugt1a9	UDP-glucuronosyltransferase 1-9 precursor	0.03	0	2.59	16.4	-0.042644337	2.277031557
Relt	tumor necrosis factor receptor superfamily	0.66	1.36	0.81	7.71	0.507603618	2.266683022
Prtm3	myeloblastin precursor	2.96	3.61	0	3.81	0.21926632	2.266036894
Slc18a3	vesicular acetylcholine transporter	2.67	33.85	0	3.76	3.247306688	2.250961574
Aim		17.56	57.51	3.71	21.18	1.656486508	2.235460401
Dbn1	drebrin isoform 2	37.14	50.23	12	60.17	0.425684048	2.234312653
Stfa1	stefin-1	1.72	0	0	3.69	-1.443606651	2.229587923
Xlr3b	X-linked lymphocyte-regulated protein 3B	1.07	6.54	0.53	6.05	1.864933756	2.204091605
Pisd-ps1		82.57	182.47	13.64	66.33	1.13448714	2.201333911
Synpo2	synaptopodin-2	16.25	51.41	25.2	119.15	1.603245747	2.197197932
Fgf21	fibroblast growth factor 21 precursor	0	2.87	0	3.58	1.952333566	2.195347598
Gm5077	complement C1s-B subcomponent precursor	21.24	65.43	2.53	15.12	1.578678126	2.191111655
Fmod	fibromodulin precursor	43.76	204.85	5	26.21	2.201311507	2.181102551
Mcoln3	muclolin-3	3.07	5.88	2.11	12.78	0.75737977	2.147589403
Gm1045	hypothetical protein LOC381651 precursor	11.63	17.21	4.14	21.76	0.527876283	2.146660293
Nppc	C-type natriuretic peptide preproprotein	180.97	1130.03	71.35	315.96	2.635864668	2.131235863
Cpa6	carboxypeptidase A6 precursor	0	4.26	0	3.36	2.3950628	2.124328135
Itga1	integrin alpha-1 precursor	9.54	40.69	4.71	23.77	1.983826505	2.117031218
Col14a1	collagen alpha-1(XIV) chain	3.38	4.12	6.78	32.62	0.22521294	2.11477664
Fam198b	protein ENED	18.59	34.68	4.53	22.84	0.864998218	2.10803285
Serpnb6e	serine (or cysteine) peptidase inhibitor, clade	4.01	24.57	3.66	19.05	2.351569652	2.105200377
Fam70a	family with sequence similarity 70, member A	5.08	13.08	2.34	13.32	1.211504105	2.100111485
Prex2	phosphatidylinositol	1.87	6.56	1.49	9.61	1.397335498	2.091207009
Cpt1b	carnitine O-palmitoyltransferase 1, muscle	0	0	0	3.25	0	2.087462841
Tmem95	transmembrane protein 95	0	3.11	0	3.25	2.039138394	2.087462841
Ncam1	neural cell adhesion molecule 1 isoform 2	1.22	4.79	2.48	13.66	1.383003672	2.074725892
1700086O06Rik		10.52	34.08	6.46	30.39	1.606508031	2.073057493
Gm14403		8.52	28.07	4.6	22.21	1.610497593	2.05124779
2810429I04Rik		0	0	0	3.11	0	2.039138394
Krtap17-1	keratin-associated protein 17-1	245.56	365.04	37.99	158.56	0.570062545	2.032922969
Islr	immunoglobulin superfamily containing	2.82	4.26	0	2.97	0.461490161	1.989139007
Zfp618	zinc finger protein 618	0	1.75	0	2.97	1.459431619	1.989139007
Car2	carbonic anhydrase 2	0	7.52	1.38	8.39	3.09085343	1.980163584
5430421N21Rik	type II hair keratin	0.53	0	0	2.9	-0.613531653	1.963474124
Cmah	cytidine monophosphate-N-acetylneuraminic acid	1.47	3.29	1	6.77	0.796466606	1.957914599

3110021A11Rik		1.89	1.96	0	1.89	0.034527683	1.531069493
Ii24	interleukin-24	0	0	0	1.89	0	1.531069493
Slc10a1	sodium/bile acid cotransporter isoform 2	1.48	3.28	0	1.89	0.787270676	1.531069493
Bgn	biglycan precursor	175.19	499.83	87.56	254.79	1.507188939	1.530232737
Hist1h3d	histone H3.2	0	0.36	0.16	2.35	0.443606651	1.53003629
Kif26a	kinesin-like protein KIF26A	4.29	3.58	0.99	4.71	-1.207920124	1.520272315
Pmel	melanocyte protein PMEL precursor	11.29	31.31	14.02	41.97	1.394495835	1.516444964
Serpine1	plasminogen activator inhibitor 1 precursor	23.77	46.93	74.12	212.86	0.952335071	1.5093977
Fndc1	fibronectin type III domain-containing protein	8.64	5.15	1.73	6.77	-0.648446736	1.509013647
Stk32c	serine/threonine-protein kinase 32C isoform 2	2.04	1.84	0	1.84	-0.098180394	1.50589093
MyI9	myosin regulatory light polypeptide 9	193.68	385.51	52.62	151.07	0.989401061	1.503892445
Gm6498		2.19	2.39	0	1.83	0.087728849	1.500802053
Icam4	intercellular adhesion molecule 4 precursor	2.64	2.04	0	1.83	-0.259867127	1.500802053
Kif26b	kinesin-like protein KIF26B	1.7	4.45	7.48	22.95	1.013296823	1.497889486
1500015A07Rik		7.16	36.08	13.82	40.7	2.184000187	1.492501936
Wdr86	WD repeat domain 86	0	1.11	0	1.81	1.077242999	1.49057013
Gm438	hypothetical protein LOC329993	0	1.34	0	1.8	1.22650853	1.485426827
Plcl1	inactive phospholipase C-like protein 1	29.42	52	3.92	12.76	0.800972207	1.483750249
Cd3d	T-cell surface glycoprotein CD3 delta chain	1.45	2.34	0	1.79	0.447066353	1.480265122
C2cd4b	family with sequence similarity 148, member B	4.21	46.26	7.52	22.76	3.181264352	1.479609501
Tnfrsf11b	tumor necrosis factor receptor superfamily	183.14	359.85	74.77	210.09	0.970562003	1.478159582
Creb5	cyclic AMP-responsive element-binding protein 5	100.41	215.57	34.01	96.51	1.094633487	1.477783118
Krt33a	keratin, type I cuticular Ha3-I	0.52	0	1.16	5.01	-0.604071324	1.476333679
A630001G21Rik	hypothetical protein LOC319997	0	1.14	1.16	5	1.097610797	1.473931188
Shisa4	protein shisa-4 precursor	2.45	3.73	0	1.77	0.455243822	1.469885976
Whrn	whirlin isoform 6	20.33	44.98	8.91	26.25	1.1081225	1.459299267
Gli2	zinc finger protein GLI2	90.87	98.42	41.62	115.91	0.113942275	1.45795839
Klhl34	kelch-like protein 34	1.08	4.75	0	1.74	1.466978428	1.454175893
Nppa	atrial natriuretic factor	1.73	0	0	1.73	-1.448900951	1.448900951
C2	complement C2 precursor	15.85	104.06	5.32	16.24	2.640392993	1.447763311
Prdm5	PR domain zinc finger protein 5	8.55	9.13	4.33	13.51	0.085061536	1.444840081
Ct2f	cardiotrophin-2 precursor	0	0	0	1.71	0	1.438292852
9430076C15Rik		3.77	16.76	1.69	6.28	1.89657041	1.436332278
2610203C20Rik		13.77	31.63	10.73	30.67	1.143529161	1.432913854
Samd12	sterile alpha motif domain-containing protein	50.34	32.52	13.62	38.46	-0.615061147	1.432447645
Robo1	roundabout homolog 1 precursor	5.52	8.05	16.53	46.13	0.473045828	1.426819685
Efnb3	ephrin-B3 precursor	6.2	7.37	4.41	13.54	0.217230716	1.42632677
Sema3b	semaphorin-3B	9.5	20.53	2.08	7.26	1.035958992	1.423211431
Gm8773		1.12	1.49	0	1.66	0.232081478	1.411426246
Cps1	carbamoyl-phosphate synthase [ammonia]	0	0.8	0.24	2.29	0.847996907	1.407747463
Gpnm6	transmembrane glycoprotein NMB precursor	55.7	243.45	16.13	44.41	2.108118765	1.406484885
Tex19.2	testis-expressed protein 19.2	0.94	1.16	0	1.65	0.15497466	1.40599236
Hist2h2bb	histone H2B type 2-B	0	9.84	2.49	8.22	3.438292852	1.401539714
Phyh1d	phytanoyl-CoA dioxygenase domain-containing	7.53	13.48	3.46	10.77	0.763443956	1.399989705
Etfmp2	EGF-containing fibulin-like extracellular matrix	71.92	89.22	13.11	36.23	0.307132725	1.399747628
Grb10	growth factor receptor-bound protein 10 isoform	6.3	9.53	2.67	8.67	0.528537067	1.397735827
Susd3	sushi domain-containing protein 3	2.05	1.66	0	1.63	-0.197382997	1.3950628
Upk1b	uroplakin-1b	0	0	0	1.62	0	1.389566812
Kif21b	kinesin-like protein KIF21B	38.35	27.06	6.26	18	-0.487848627	1.387957965
Nkd1	protein naked cuticle homolog 1 isoform 1	41.66	14.66	10.61	29.32	-1.445799753	1.384901781
1700028P14Rik	hypothetical protein LOC67483	0	0	0	1.61	0	1.384049807
Thy1	thy-1 membrane glycoprotein preproprotein	84.33	301.04	27.86	74.08	1.823614669	1.37935735
Odz3	teneurin-3 isoform 1	23.88	39.14	6.51	18.53	0.690054131	1.378807136
Adamts1	ADAMTS-like protein 1	1.22	9.17	3.42	10.49	2.195688098	1.378260523
Fbn2	fibillin-2 precursor	1.21	3.73	2.82	8.93	1.097793814	1.378221079
Pdlim7	PDZ and LIM domain protein 7 isoform a	95.36	97.04	39.09	103.21	0.024936091	1.378179403
Kirrel	kin of IRRE-like protein 1 precursor	79.09	105.38	34.92	92.33	0.409532917	1.377553546
C2cd4a	family with sequence similarity 148, member A	4.95	9.11	2.65	8.48	0.764821424	1.376990595
Gm106	RPE-spondin precursor	6.2	20.86	4.22	12.55	1.602224589	1.37617114
Ramp1	receptor activity-modifying protein 1 isoform 3	133.79	153.81	36.26	95.6	0.199785198	1.374395515
Rab6b	ras-related protein Rab-6B	56.11	73.85	17.88	47.87	0.390258932	1.37209034
Mfap2	microfibrillar-associated protein 2	46.63	77.49	81.44	212.14	0.720638311	1.370384959
Gpr137c	G protein-coupled receptor 137C	0	0	0	1.58	0	1.367371066
Pkd1l3	polycystic kidney disease protein 1-like 3	1.02	2.76	0.46	2.75	0.896377369	1.360922227
Ldoc1	protein LDOC1	0	0	0	1.56	0	1.35614381
Ror2	tyrosine-protein kinase transmembrane receptor	35.7	38.39	15.38	40.84	0.102049354	1.352947495
Mme	neprilysin	92.61	62.2	25.63	66.82	-0.566738097	1.348658356
Xkr6	X Kell blood group precursor related family	1.91	1.57	0	1.54	-0.179250794	1.344828497
Dlg4	disks large homolog 4 isoform 1	34.03	38.64	7.61	20.83	0.178365974	1.342226988
Asb16	ankyrin repeat and SOCS box protein 16	0	0	0	1.52	0	1.333423734
Trim9	E3 ubiquitin-protein ligase TRIM9 isoform a	0.26	0.82	0	1.52	0.530514717	1.333423734
Plaur	urokinase plasminogen activator surface receptor	8.75	13.42	4.39	12.53	0.564597041	1.327804661
Cyp2a5	cytochrome P450 2A5	0	0	0.59	2.99	0	1.327361981
Procr	endothelial protein C receptor	9.55	20.64	6.2	17.05	1.0364575	1.325930025
4930578I06Rik	hypothetical protein LOC67750	0	0	0	1.5	0	1.321928095
Haao	3-hydroxyanthranilate 3,4-dioxygenase	0	0	0	1.5	0	1.321928095
Cnksr2	connector enhancer of kinase suppressor of ras	3.05	12.51	0.45	2.62	1.738033862	1.319936797
Prune2	protein prune homolog 2	6.94	8.81	1.65	5.6	0.305114129	1.316473665
Shank1	SH3 and multiple ankyrin repeat domains 1	19.03	32.99	7.57	20.34	0.762947941	1.316193067
Nts	neurotensin/neurodynin N	0	5.22	0	1.49	2.63691458	1.316145742
Ccdc60	coiled-coil domain-containing protein 60	3.56	3.66	0.9	3.73	0.03129613	1.315840765
Fhl1	four and a half LIM domains protein 1 isoform 2	134.89	156.56	34.82	88.17	0.213462028	1.31579308
Cnfr	ciliary neurotrophic factor receptor subunit	7.86	12.27	43.78	110.4	0.582789767	1.314822799
Phactr1	phosphatase and actin regulator 1 isoform 3	2.75	3.13	1.81	5.98	0.139251186	1.312656906
Wif1	wnt inhibitory factor 1 precursor	136.91	502.54	154.15	384.03	1.868379315	1.311307162
Gnt1	beta-1,3-galactosyl-O-glycosyl-glycoprotein	8.26	6.65	3.44	9.98	-0.275552446	1.306246473
Pid1	PTB-containing, cubilin and LRP1-interacting	30.94	34.98	3.25	9.51	0.171830874	1.306227923
Nckap5l	nck-associated protein 5-like	5.88	11.88	8.19	21.7	0.904652123	1.304555531
Magge2	melanoma antigen, family E, 2	1.39	3.32	0	1.47	0.854020694	1.304511042
Zbp2	zona pellucida-binding protein 2 isoform 1	2.08	1.24	0	1.47	-0.459431619	1.304511042
Sparc	SPARC precursor	3462.6	1983.38	230.49	569.32	-0.803584006	1.300821753
Ano7	anoctamin-7	1.32	1.91	2.97	8.76	0.326894348	1.29774214

Ccdc68	coiled-coil domain-containing protein 68	6.94	9.11	1.69	5.6	0.348572085	1.294859852
Acot7	cytosolic acyl coenzyme A thioester hydrolase	81.58	97.44	59.66	147.58	0.253452239	1.292422528
Heyl	hairly/enhancer-of-split related with YRPW	0.61	0.63	0.62	2.96	0.017811276	1.289506617
Kcnc4	potassium voltage-gated channel subfamily C	11.82	16.27	1.77	5.77	0.429871821	1.289269858
Gda	guanine deaminase	61.01	66.08	7.02	18.6	0.113381799	1.289179513
Vegfc	vascular endothelial growth factor C precursor	2.15	2.91	0	1.44	0.311816779	1.286881148
Rasl11b	ras-like protein family member 11B	19.23	10.82	7.37	19.42	-0.775266284	1.286683338
Acsm3	acyl-coenzyme A synthetase ACSM3, mitochondrial	1.37	4.74	3.37	9.65	1.276163678	1.285148246
Tgif2	homeobox protein TGIF2	5.84	20.16	12.98	32.98	1.629271397	1.281321492
1810024B03Rik	hypothetical protein LOC329509	1.35	1.71	0	1.43	0.205632095	1.280956314
Ccdc85a	coiled-coil domain-containing protein 85A	5.59	6.96	0	1.43	0.272489966	1.280956314
Dlx4	homeobox protein DLX-4	2.23	0.81	0	1.43	-0.835544468	1.280956314
Cyp21a1	steroid 21-hydroxylase	0	0.5	0.74	3.22	0.584962501	1.278155693
Mettl7a1	methyltransferase-like protein 7A	29.28	29.95	22.38	55.62	0.031574204	1.276036819
Bdh2	3-hydroxybutyrate dehydrogenase type 2 isoform	1.75	3.1	0	1.42	0.576192291	1.275007047
Lzts1	leucine zipper putative tumor suppressor 1	1.58	6.48	4.72	12.83	1.535667204	1.273714104
Rsp4a	radial spoke head protein 4 homolog A	25.07	56.16	3.53	9.94	1.132615334	1.272029783
Fblim1	filamin-binding LIM protein 1	16.02	20.48	5.22	14.02	0.335762956	1.271898327
Lgals6	galectin-6	6.57	9.95	6.73	17.66	0.532565665	1.271408667
Slc20a1	sodium-dependent phosphate transporter 1 isoform	33.31	136.72	59.44	144.45	2.005037055	1.266947731
Zc3h12c	probable ribonuclease ZC3H12C	17.71	32.87	24.8	61.03	0.856198428	1.265595059
Ndrgr1	protein NDRG1	560.51	1094.15	172.8	415.5	0.963744865	1.260888413
Ggt1	gamma-glutamyltranspeptidase 1 precursor	0	0	0	1.39	0	1.257010618
Procdh9	protocadherin beta 9	2.42	4.69	0.64	2.91	0.734432327	1.253472793
Tnni1	troponin I, slow skeletal muscle	0	0	0	1.38	0	1.250961574
Tmem88b	transmembrane protein 88B	1.87	6.82	1.61	5.21	1.446117871	1.250543462
Sdk1	protein sidekick-1 precursor	14.37	32.6	3.91	10.68	1.128344068	1.250245345
Ssd3	PH and SEC7 domain-containing protein 3 isoform	14.56	20.39	11.21	28.03	0.459094422	1.249481372
Igf2	insulin-like growth factor-binding protein 2	34.8	54.85	74.9	179.27	0.641597693	1.247987537
Msi1	RNA-binding protein Musashi homolog 1	1.11	1.59	3.8	10.39	0.295709099	1.246661436
Pitpnc1	cytoplasmic phosphatidylinositol transfer	4.06	12.87	3.77	10.31	1.454758498	1.245537758
Kih135	kelch-like protein 35	1.26	2.43	0	1.37	0.601885804	1.244887059
Mettl7a2	methyltransferase like 7A2	3.92	3.75	2.53	7.36	-0.050730802	1.243834759
Kcnn3	small conductance calcium-activated potassium	3.86	45.31	0.36	2.22	3.252295538	1.243454037
Sl3gal5	lactosylceramide alpha-2,3-sialyltransferase	1.76	10.68	1.63	5.21	2.081300102	1.239530469
Serpind1	heparin cofactor 2 precursor	0	0	0	1.36	0	1.23878686
Gm1987	predicted gene 1987	1.97	3.5	0.77	3.17	0.59946207	1.236298023
Hpcal4	hippocalcin-like protein 4	0	0.81	0	1.35	0.855989697	1.232606757
Gm8898	KRAB box and zinc finger C2H2 type domain	1.94	4.79	1.49	4.84	0.977747193	1.229822627
Pcdhb11	protocadherin beta 11	2.47	6.27	1.37	4.55	1.067019701	1.227600712
Hsd17b1	estradiol 17-beta-dehydrogenase 1	0	0	0	1.34	0	1.22650853
2810032G03Rik		24.46	20.34	1.99	5.98	-0.254672243	1.223081552
Adams20	A disintegrin and metalloproteinase with	0	2.06	0.23	1.87	1.613531653	1.22392421
Bves	blood vessel epicardial substance	5.42	16.23	0	1.33	1.424277499	1.220329955
Gnao1	guanine nucleotide-binding protein G(o) subunit	5.54	7.48	2.2	6.44	0.374773629	1.217230716
Pdnp	podoplanin precursor	6.1	15.95	4.65	12.12	1.255394344	1.215444947
Clec3b	tetranectin precursor	68.71	81.32	14.42	34.78	0.239877355	1.214350622
Hhpl1	HHIP-like protein 1 precursor	0	0	1.44	4.66	0	1.213920905
Anxa3	annexin A3	2.67	4.22	1.87	5.63	0.508269744	1.207958133
Csn3	kappa-casein precursor	0	0	0	1.31	0	1.207892852
Amt	aminomethyltransferase, mitochondrial precursor	11.52	14.02	4.24	11.08	0.262650251	1.204981738
Sdk2	protein sidekick-2 precursor	86.59	47.84	15.83	37.77	-0.842702969	1.203905558
Dgat2l6	diacylglycerol O-acyltransferase 2-like protein	1.22	4.12	0	1.3	1.205584134	1.201633861
Tspan10	tetraspanin-10	0	0	0	1.3	0	1.201633861
Krt71	keratin, type II cytoskeletal 71	4.35	0.87	3.84	10.13	-1.516500621	1.20137464
Ntrk3	NT-3 growth factor receptor isoform b	0.98	1.82	0	1.29	0.510194732	1.195347598
Phxr4		0	0	0	1.29	0	1.195347598
Tbx1	T-box transcription factor TBX1	983.76	1359.55	153.15	350.89	0.466345909	1.190789627
Hs6st2	heparan-sulfate 6-O-sulfotransferase 2 isoform	1.18	5.73	4.27	11	1.62627837	1.187159539
Ddah2	N(G),N(G)-dimethylarginine	172.7	148.29	39.25	90.63	-0.218480222	1.186831236
Krt8	keratin, type II cytoskeletal 8	6.53	18.61	8.31	20.19	1.380867766	1.186530515
Mylk	myosin light chain kinase, smooth muscle	20.72	47.6	5.27	13.2	1.161932211	1.179353582
Mgst2	microsomal glutathione S-transferase 2	14.85	17.19	50.76	116.11	0.198662703	1.17795475
Efhc2	EF-hand domain-containing family member C2	0	0.64	0	1.26	0.713695815	1.176322773
Gm12216		0	0	0	1.26	0	1.176322773
Gprc5d	G-protein coupled receptor family C group 5	0	0	0	1.26	0	1.176322773
Pcdhb5	protocadherin beta 5	1.31	1.06	0	1.26	-0.165248514	1.176322773
Pmepa1	transmembrane prostate androgen-induced protein	12.45	22.59	25.44	58.56	0.810569246	1.171621577
Trerf1	transcriptional-regulating factor 1 isoform 1	14.41	27.96	7.46	17.96	0.910194741	1.164229396
Serpina3j	serine (or cysteine) peptidase inhibitor, clade	25.58	26.31	35.57	80.94	0.039088209	1.163907266
Hlf	hepatic leukemia factor	8.01	23.09	7.99	19.14	1.418835382	1.163670662
AI428936	nesprin-4	0	1.45	0	1.24	1.292781749	1.163498732
Edn2	endothelin-2 precursor	11.99	43.53	35.72	81.25	1.777376181	1.16344962
Usp11	ubiquitin carboxyl-terminal hydrolase 11	20.05	34.82	13.48	31.4	0.766945104	1.161932211
Per2	period circadian protein homolog 2	1.73	4.39	2.68	7.23	0.981384322	1.161866664
Gm14431	KRAB box and zinc finger C2H2 type domain	2.13	5	1.66	4.94	0.938799844	1.159036685
Gm889	hypothetical protein LOC380755	0	2.04	0	1.23	1.604071324	1.15704371
Sh2d4b	SH2 domain-containing protein 4B	0	0	0	1.23	0	1.15704371
Dct	L-dopachrome tautomerase precursor	20.76	59.2	37.62	85.03	1.46808493	1.155491673
Slc38a2	sodium-coupled neutral amino acid transporter 2	2984.97	4637.41	781.11	1739.44	0.635430678	1.154008644
Nupr1	nuclear protein 1	64.8	118.62	86.82	194.41	0.862299134	1.153882859
1700125H03Rik		0	4.16	5.12	12.61	2.367371066	1.153063509
Ccno	cyclin-O	7.99	15.68	6.7	16.12	0.891726268	1.152752351
Lrrn2	leucine rich repeat protein 2, neuronal	0.34	0.65	0	1.22	0.300233024	1.150559677
Rarres2	retinoic acid receptor responder protein 2	49.98	81.15	16	36.52	0.688329202	1.142125081
Kih13	kelch-like protein 13	7.05	11.9	1.98	5.57	0.680310377	1.14058104
Ccl11	eotaxin precursor	11.5	23.51	3.43	8.76	0.971442389	1.139574449
1700019B03Rik	hypothetical protein LOC76406	0	0	0	1.2	0	1.137503524
Ttc7b	tetratricopeptide repeat domain 7B	7.21	12.85	3.91	9.79	0.754431849	1.135899935
Mex3a	RNA-binding protein MEX3A	5.14	6.01	12.85	29.43	0.191175789	1.135608358
Smoc1	SPARC-related modular calcium-binding protein 1	52.01	5.41	25.37	56.85	-3.047868279	1.133419388
Fxyd1	phospholemman isoform b precursor	12.39	25.64	7.53	17.71	0.992438122	1.133191912

Wnt9a	protein Wnt-9a precursor	3.63	6.32	2.08	5.32	0.660831455	1.036994207
Basp1	brain acid soluble protein 1	12.29	16.11	40.61	84.37	0.364498655	1.036798891
Fbln2	fibulin-2 isoform b	150.07	112.24	14.59	30.98	-0.415833539	1.036549011
Mapk15	mitogen-activated protein kinase 15	4.81	5.94	2.16	5.48	0.256397499	1.036069255
Hepacam2	HEPACAM family member 2 precursor	0.81	0.7	0	1.05	-0.090454951	1.03562391
Omd	osteomodulin precursor	1.33	2.12	0	1.05	0.421216074	1.03562391
2210404O07Rik	transmembrane protein C19orf77 homolog	9.25	18.27	7.62	16.67	0.910732662	1.035542265
Gmpr	GMP reductase 1	3.06	7.07	3.8	8.82	0.991088946	1.032688619
Gpx7	glutathione peroxidase 7 precursor	1.59	3.87	2.67	6.5	0.910969674	1.031110533
Xlr3a	X-linked lymphocyte-regulated protein 3A	1.09	2.86	0.67	2.41	0.885097905	1.029923637
Ccdc3	coiled-coil domain-containing protein 3	690.23	1663.94	160.91	329.3	1.268232449	1.028584876
Sp5	transcription factor Sp5	0	0	0	1.04	0	1.028569152
Spo11	meiotic recombination protein SPO11 isoform b	0	0	2.56	6.26	0	1.028092307
2700046A07Rik		1.36	2.62	3.81	8.79	0.617202838	1.025271966
Dnajb13	dnaJ homolog subfamily B member 13	0	1.74	1.18	3.43	1.454175893	1.022978564
Lmtk3	serine/threonine-protein kinase LMTK3 precursor	1.69	2.3	0.89	2.84	0.294859852	1.022720077
Vsig8		7.32	9.01	1.53	4.14	0.266786541	1.022630974
9930012K11Rik	hypothetical protein LOC268759 isoform 2	3.65	5.94	8.63	18.51	0.577704947	1.018606075
4930550C14Rik	hypothetical protein LOC75311	3.31	2.54	4.81	10.75	-0.283938509	1.016050688
Mdga1	MAM domain-containing	5.49	10.3	1.81	4.68	0.800032389	1.015320799
Tcp1111	T-complex protein 11-like protein 1	7.62	10.07	2.77	6.62	0.360895448	1.015226474
Cd69	early activation antigen CD69	1.07	2.16	0	1.02	0.610293791	1.014355293
C1ra	complement C1r-A subcomponent precursor	21.62	40.71	3.72	8.53	0.882794383	1.013689355
Icam1	intercellular adhesion molecule 1 precursor	129.26	164.56	194.27	392.8	0.345960022	1.011992791
Cald1	caldesmon 1	195.2	377.77	104.65	212.05	0.948997027	1.011899284
Penk	proenkephalin-A	4.69	9.82	3.32	7.7	0.927199942	1.009984089
Id2	DNA-binding protein inhibitor ID-2	2174.28	1606.45	222.14	447.97	-0.436427252	1.008669894
Pdgfd	platelet-derived growth factor D	3.82	8.94	0	1.01	1.044212705	1.007195501
Tyr	tyrosinase precursor	0.49	1.55	1.44	3.9	0.775184916	1.005900601
Slc1a4	neutral amino acid transporter A	18.48	20.1	9.17	19.42	0.115249322	1.005663187
Ly6c1	lymphocyte antigen 6C2 precursor	40.65	67.15	12.28	25.66	0.710397161	1.005421634
Cyp2d22	cytochrome P450, family 2, subfamily d,	62.98	44.22	7.9	16.86	-0.50066	1.004854839
A430110N23Rik	soluble scavenger receptor cysteine-rich	4.38	10.51	0.68	2.37	1.097209756	1.004287358
Cd302	CD302 antigen	6.71	12.64	4.8	10.63	0.823040879	1.003726291
Plod2	procollagen-lysine,2-oxoglutarate 5-dioxygenase	3.01	3.42	3.97	8.96	0.140444133	1.002899891
Hoxd8	homeobox protein Hox-D8	117.76	118.48	17.96	36.97	0.008720144	1.001901035
Inhbb	inhibin beta B chain precursor	121.35	99.19	57.34	115.83	-0.288275582	1.001853491
Sat2	diamine acetyltransferase 2	7.33	4.62	1.89	4.78	-0.567746365	1
Arid3b	AT-rich interactive domain-containing protein	4.11	5.07	0.74	2.48	0.248373225	1
Cdk15	cyclin-dependent kinase 15	0	0	0	1	0	1
Pla1a	phospholipase A1 member A precursor	1.21	0	0	1	-1.14404637	1
Stx1b	syntaxin-1B	0	0	0	1	0	1
Wnt2	protein Wnt-2 precursor	0	0	0	1	0	1

Bulge Down							
GENE	Description	WT Bulge	KO Bulge	WT HG	KO HG	Log2 KO Bulge/WT Bulge	Log2 KO HG/WT HG
Mir5114		70.08	0	0	79.43	-6.151371776	6.329661815
Skint4	selection and upkeep of intraepithelial T-cells	86.55	0.44	142.39	0	-5.925966462	-7.163800604
Mir568		43.3	0	0	0	-5.469234794	0
Krt13	keratin, type I cytoskeletal 13	89.24	1.22	30.2	0.85	-5.345135486	-4.075948853
Cck	cholecystokinin preproprotein	207.3	4.29	3.43	3.04	-5.299251307	-0.132951406
Mir1306		36.97	0	45.16	0	-5.246788094	-5.528571319
Krt27	keratin, type I cytoskeletal 27	123.6	2.32	42.75	11.95	-5.229977017	-1.756330919
Mir5122		34.36	0	0	28.32	-5.14404637	4.873813198
St6galnac5	alpha-N-acetylgalactosaminide	69.99	1.48	2.37	1.99	-4.839203788	-0.172603107
Mir671		27.61	0	25.04	0	-4.838447593	-4.702657543
Sval2	seminal vesicle antigen-like 2	21.01	0	11.13	0	-4.46008724	-3.600507645
Gdf10	bone morphogenetic protein 3B precursor	63.64	2.64	4.1	2.73	-4.150416843	-0.451321617
Myoc	myocilin precursor	586.87	35.65	33.32	3.58	-4.003612053	-2.905630049
Krt24	keratin, type I cytoskeletal 24	1264.3	83.79	5.59	4.86	-3.89944155	-0.169377801
Skint9	selection and upkeep of intraepithelial T-cells	12.04	0	46.94	0	-3.704871964	-5.583158004
Rpl34-ps1	ribosomal protein L34, pseudogene 1	14.04	0.29	13.07	23	-3.543361596	0.770412077
Slc33a1	large neutral amino acids transporter small	78.39	6.56	47.05	43.55	-3.392499157	-0.109110999
Skint3	selection and upkeep of intraepithelial T-cells	8.72	0	214.86	0	-3.280956314	-7.753952119
AA465934		8.04	0	8.1	7.15	-3.176322773	-0.159066486
Camk4	calcium/calmodulin-dependent protein kinase type	43	4.01	4.33	4.99	-3.134621015	0.16842047
Ltpb2	latent-transforming growth factor beta-binding	376.86	42.65	19.33	32.97	-3.113798245	0.740651003
Smoc1	SPARC-related modular calcium-binding protein 1	52.01	5.41	25.37	56.85	-3.047868279	1.133419388
Ccr1	C-C chemokine receptor type 11	857.26	109.4	518.48	150.46	-2.95867459	-1.778131373
Dpysl4	dihydropyrimidinase-related protein 4	6.77	0	2.29	0	-2.957914599	-1.718087584
Lrrc18	leucine-rich repeat-containing protein 18	18.74	1.61	4.89	1.42	-2.919000278	-1.283260587
Ngef	ephexin-1 isoform 1	85.59	10.71	13.49	6.07	-2.886459347	-1.035275475
BB123696		5.95	0	1.29	0	-2.797012978	-1.195347598
Scn5a	sodium channel protein type 5 subunit alpha	5.85	0	1.27	0.16	-2.776103988	-0.968567492
6030419C18Rik	hypothetical protein LOC319477	28.39	3.36	5.7	4.66	-2.752925319	-0.243359043
Ptchd3	patched domain-containing protein 3	5.59	0	1.37	0	-2.720278465	-1.244887059
Il3ra	interleukin-3 receptor subunit alpha precursor	19.46	2.24	14.9	2.89	-2.658740427	-2.031184705
Il1h4c	histone H4	5.25	0	2.27	0.55	-2.64385619	-1.077022242
Gfra1	GDNF family receptor alpha-1 precursor	238.92	38.03	29.12	12.89	-2.619898059	-1.116675171
Adora2a	adenosine receptor A2a	31.78	4.36	9.39	1.96	-2.612510949	-1.811526573
Abcb1b	multidrug resistance protein 1	23.35	3.01	14.33	4.89	-2.602247631	-1.380018158
Tmem196	transmembrane protein 196	4.65	0	0	0	-2.498250868	0
Serpina9	serpin A9 precursor	4.55	0	3.79	1.49	-2.472487771	-0.943879914
Krt2	keratin, type II cytoskeletal 2 epidermal	4.54	0	1.25	0.5	-2.469885976	-0.584962501
Wdfy4	WD repeat and FYVE domain containing 4	7.74	0.62	0.55	0.2	-2.431639467	-0.36923381
1110032A04Rik	small subunit of serine palmitoyltransferase B	4.17	0	5.73	6.5	-2.370164281	0.156284091
Xcl1	lymphotactin precursor	4.15	0	0	0	-2.364572432	0
1700019D03Rik	hypothetical protein LOC67080	65.33	12.34	1.52	3.4	-2.313902859	0.80407979
Aass	alpha-aminoadipic semialdehyde synthase,	8.15	0.85	1.24	0.44	-2.306246473	-0.637429921
Htr1b	5-hydroxytryptamine receptor 1B	3.84	0	0	0	-2.275007047	0
AI506816		3.78	0	3.26	5.75	-2.257010618	0.664034072
Trpc1	short transient receptor potential channel 1	19.48	3.3	2.77	1.98	-2.25180715	-0.339252193
Crp	C-reactive protein precursor	3.72	0	0	0	-2.23878686	0
Lhb	lutropin subunit beta precursor	3.71	0	0	0	-2.23572706	0
Ecm1	extracellular matrix protein 1 precursor	2342.99	500.06	379.66	164.88	-2.225911139	-1.198363026
Tll1	tolloid-like protein 1 precursor	13.34	2.07	6.03	4.59	-2.223734463	-0.330676406
Arsi	arylsulfatase I precursor	14.94	2.43	3.26	4.48	-2.216371148	0.363322463
Cybrd1	cytochrome b reductase 1	21.3	3.82	4.82	2	-2.209938659	-0.956056652
Htr1d	5-hydroxytryptamine receptor 1D	11.37	1.68	7.89	3.98	-2.206540595	-0.836037677
Tspan8	tetraspanin 8	91.55	19.31	20.1	15.08	-2.18804275	-0.391975592
Pvt1		22.44	4.26	13.41	4.51	-2.155837865	-1.386946112
Chst13	carbohydrate sulfotransferase 13	22.17	4.26	3.56	2.06	-2.13912334	-0.575502171
Spink2	serine protease inhibitor Kazal-type 2	149.27	33.34	3.71	3.61	-2.129595073	-0.030960309
Tbc1d30	TBC1 domain family member 30	8.25	1.13	2.91	3.13	-2.118599935	0.078973174
Zdhc2	palmitoyltransferase ZDHHC2	103.93	23.31	13.9	7.26	-2.109805412	-0.851098644
Anpep	aminopeptidase N	88.48	20.29	243.89	109.22	-2.071389307	-1.151747831
BC028528	hypothetical protein LOC229600 precursor	3.17	0	0	0	-2.060047384	0
Upp1	uridine phosphorylase 1	22.11	4.65	7.69	2.85	-2.032194487	-1.174497731
Arddc3	arrestin domain-containing protein 3	432.41	105.03	556.93	311.91	-2.031259924	-0.834336362
Unc79	protein unc-79 homolog	22.05	4.68	7.68	4.02	-2.020803916	-0.790007678
C1q3	complement C1q-like protein 3 precursor	6.56	0.88	0.48	0.23	-2.007653573	-0.26693886
Abcc3	canalicular multispecific organic anion	30.21	6.81	9.63	5.52	-1.998613904	-0.705197727
Fam83a	hypothetical protein LOC239463	33.26	7.63	76.28	60.95	-1.989092687	-0.318990812
Odf31	outer dense fiber protein 3-like protein 1	11.94	2.28	2.06	1.66	-1.980069897	-0.202105407
BC100530	stefin A-like protein	2.87	0	0	0	-1.952333566	0
Slc27a3	long-chain fatty acid transport protein 3	285.11	73.18	67.77	40.79	-1.94746775	-0.718621587
Cish	cytokine-inducible SH2-containing protein	349.56	90.48	463.92	185.62	-1.938133119	-1.316878882
7420461P10Rik	hypothetical protein LOC100038657	4.2	0.36	0.3	0	-1.934904972	-0.378511623
Slc7a2	low affinity cationic amino acid transporter 2	16.59	3.66	172.68	53.29	-1.916353623	-1.677673242
1700056E22Rik	hypothetical protein LOC73363	2.76	0	4.01	3.36	-1.910732662	-0.200482468
Pik3r1	phosphatidylinositol 3-kinase regulatory subunit	430.77	114.64	239.99	179.09	-1.900622492	-0.420255209
Npnt	nephronectin isoform b	482.66	129.76	139.8	142.86	-1.887071946	0.031018175
Cntrn5	contactin-5 isoform 1	2.68	0	0.47	0	-1.879705766	-0.555816155
Dmrtc1a	doublesex- and mab-3-related transcription	2.66	0	0	0	-1.871843649	0
Usp18	ubl carboxyl-terminal hydrolase 18	35.04	8.89	3.96	3.53	-1.865556585	-0.13082907
Mmp2	72 kDa type IV collagenase precursor	365.91	100.58	84.03	66.66	-1.852809846	-0.329668761
Nptx1	neuronal pentraxin-1 precursor	12.36	2.7	1.11	1.06	-1.852322832	-0.034598662
Adh7	alcohol dehydrogenase class 4 mu/sigma chain	526.18	145.22	473.24	223.87	-1.850154982	-1.076526149
Rps23	40S ribosomal protein S23	34.89	9.01	40.6	67.51	-1.842139949	0.719731057
Slc15a1	solute carrier family 15 member 1	67.44	18.2	116.55	63.9	-1.833733449	-0.856984156
Slc34a3	sodium-dependent phosphate transport protein 2C	2.56	0	0	0	-1.831877241	0
Tns1	tensin 1	448	125.41	165.48	68.25	-1.828604849	-1.265462894
Fut4-ps1		2.55	0	2.94	0	-1.827819025	-1.97819563

Trim12a	tripartite motif-containing protein 12	27.43	13.19	23.5	12.79	-1.00253951	-0.829159292
Tmeff2	tomoregulin-2 precursor	2.22	0.61	0.46	0	-1	-0.545968369
1110020A21Rik		10.94	4.97	4.06	5.61	-1	0.385512887
Gm5779		2.3	0.65	1.37	1.37	-1	0
Olfir856-ps1		1	0	0	0	-1	0

HG Down							
GENE	Description	WT Bulge	KO Bulge	WT HG	KO HG	Log2 KO Bulge/WT Bulge	Log2 KO HG/WT HG
Skint3	selection and upkeep of intraepithelial T-cells	8.72	0	214.86	0	-3.280956314	-7.753952119
Skint4	selection and upkeep of intraepithelial T-cells	86.55	0.44	142.39	0	-5.925966462	-7.163800604
Mir3074-1		80.19	93.07	51.02	0	0.21243266	-5.700994494
Skint9	selection and upkeep of intraepithelial T-cells	12.04	0	46.94	0	-3.704871964	-5.583158004
Mir1306		36.97	0	45.16	0	-5.246788094	-5.528571319
Pcp2	Purkinje cell protein 2 isoform 2	0	0	30.94	0	0	-4.997292408
Ear12	eosinophil-associated, ribonuclease A family,	0	0	28.86	0	0	-4.900142226
Mir671		27.61	0	25.04	0	-4.838447593	-4.702657543
Snora24		0	12.48	16.41	0	3.752748591	-4.121844298
Krt13	keratin, type I cytoskeletal 13	89.24	1.22	30.2	0.85	-5.345135486	-4.075948853
Snora75		0	39.71	15.14	0	5.347311316	-4.012568674
Ear10	eosinophil-associated, ribonuclease A family,	0	0	11.46	0	0	-3.639232163
Sval2	seminal vesicle antigen-like 2	21.01	0	11.13	0	-4.46008724	-3.600507645
Rptn	repelin	0.35	0	32.42	1.87	-0.432959407	-3.541589091
Btg3	protein BTG3	0.12	0.11	11.11	0.04	-0.012939056	-3.541543432
Amd1	S-adenosylmethionine decarboxylase proenzyme 1	0.85	1.22	29.16	1.76	0.263034406	-3.449896256
Gjc1	gap junction gamma-1 protein	2.04	1.97	9.05	0	-0.033608393	-3.329123596
Myoc	myocilin precursor	586.87	35.65	33.32	3.58	-4.003612053	-2.905630049
Grp	gastrin-releasing peptide precursor	0	0	28.57	3.03	0	-2.8752825
Ear2	eosinophil cationic protein 2 precursor	0	1.73	27.83	3.09	1.448900951	-2.817398089
Hmga1-rs1	high mobility group protein HMG-I/HMG-Y isoform	10.83	15.36	20.64	2.12	0.467722675	-2.794082565
Syn1	synapsin-1 isoform b	0	0	5.93	0	0	-2.792855352
Hf60b	histocompatibility 60b	2.06	0	5.75	0	-1.613531653	-2.754887502
Lgals2	galectin-2	2.63	2.28	5.22	0	-0.146273733	-2.63691458
Hamp2	hepcidin-2	8.44	3.29	5.19	0	-1.137809212	-2.629939409
BC090627		13.39	12.47	5.06	0	-0.095316741	-2.599317794
Klk10	kallikrein-10	6.89	10.69	201.36	32.42	0.567177725	-2.598140506
Skint11	selection and upkeep of intraepithelial T-cells	5.29	1.12	4.84	0	-1.568995752	-2.545968369
Col8a1	collagen alpha-1(VIII) chain precursor	6.4	4.1	32.21	5.02	-0.537028024	-2.463782331
Tslp		4.03	1.34	4.48	0	-1.10404987	-2.454175893
Gngt2	guanine nucleotide-binding protein	2.28	7.64	4.32	0	1.397335498	-2.411426246
Cd72	B-cell differentiation antigen CD72 isoform 4	16.28	34.26	22.16	3.44	1.028929257	-2.383003672
Il18r1	interleukin-18 receptor 1 isoform a	2.5	2.34	43.43	7.67	-0.067506819	-2.357430243
Cyp1b1	cytochrome P450 1B1	88.63	33.55	338.56	66.29	-1.375295986	-2.335202494
1700028B04Rik		0	0	3.94	0	0	-2.304511042
Acox2	peroxisomal acyl-coenzyme A oxidase 2	0.94	1.88	17.85	2.84	0.570012159	-2.295386307
Rriad1	Riia domain-containing protein 1	3.01	4.58	3.9	0	0.476662885	-2.292781749
Dmrt1	doublesex- and mab-3-related transcription	0	0	3.88	0	0	-2.286881148
Galt6	polypeptide N-acetylgalactosaminyltransferase 6	0.9	0.79	22.52	3.85	-0.086039831	-2.277831408
E030003E18Rik		1.59	0	15.87	2.49	-1.372952098	-2.273161032
Col6a6	collagen alpha-6(VI) chain isoform 1	0	0.16	3.77	0	0.214124805	-2.253989266
Il17b	interleukin-17B precursor	7.02	2.84	3.74	0	-1.062495926	-2.244887059
Ifitm5	interferon-induced transmembrane protein 5	0	4.02	3.71	0	2.327687364	-2.23572706
Crab2	crumbs homolog 2 precursor	0.36	0	3.66	0	-0.443606651	-2.220329955
Col9a2	collagen alpha-2(IX) chain precursor	0.35	0	3.65	0	-0.432959407	-2.217230716
BC021891	mitogen-activated protein kinase kinase	3.14	1.06	6.73	0.69	-1.00698643	-2.193445168
Il7	interleukin-7 precursor	4.55	1.74	48.1	9.75	-1.018311878	-2.191386365
Npbwr1	neuropeptides B/WV receptor type 1	0.8	0	3.56	0	-0.847996907	-2.189033824
Mrgprb3	mas-related G-protein coupled receptor member	5.01	2.78	3.54	0	-0.668978756	-2.182692298
Tmem190	transmembrane protein 190 precursor	0	0	3.42	0	0	-2.14404637
1700016C15Rik	hypothetical protein LOC69428	0	0	3.38	0	0	-2.13093087
Gm14005		0	3.25	3.2	0	2.087462841	-2.070389328
Acox1	acyl-coenzyme A oxidase-like protein	1.95	1.96	30.95	6.75	0.004882221	-2.043547716
Sic22a3	solute carrier family 22 member 3	51.5	36.19	38.12	8.55	-0.497402675	-2.034333732
Il3ra	interleukin-3 receptor subunit alpha precursor	19.46	2.24	14.9	2.89	-2.658740427	-2.031184705
4930415O20Rik	hypothetical protein LOC73863	2.21	3.44	3.08	0	0.467986379	-2.028569152
Grem1	gremlin-1 precursor	755.7	273.5	279.66	68.27	-1.462915296	-2.018520885
Dgkq	diacylglycerol kinase eta	1.03	0.64	10.77	1.93	-0.307783913	-2.006141751
Tox2	TOX high mobility group box family member 2	0	0	2.99	0	0	-1.996388746
Fut4-ps1		2.55	0	2.94	0	-1.827819025	-1.97819563
Gjd3	gap junction delta-3 protein	2.03	0	2.91	0	-1.599317794	-1.967168608
Fads6	fatty acid desaturase 6	5.97	1.17	2.87	0	-1.683463613	-1.952333566
Cyb5r2	NADH-cytochrome b5 reductase 2 isoform 1	0.6	0.56	7.54	1.22	-0.036525876	-1.943676393
Eda2r	tumor necrosis factor receptor superfamily	2.51	0	22.69	5.16	-1.811471031	-1.943275943
Gsdma2	gasdermin-A2	0.65	0.67	18.25	4.04	0.017382078	-1.933362807
Tnfrsf14	tumor necrosis factor receptor superfamily	0	0	2.81	0	0	-1.929790998
Il33	interleukin-33 precursor	18.82	11.39	157.04	40.5	-0.677780775	-1.92910651
Krtap3-2	keratin-associated protein 3-2	2.26	0	2.8	0	-1.704871964	-1.925999419
Serpina4-ps1		0	0	2.77	0	0	-1.914564523
Dbil5	diazepam-binding inhibitor-like 5	2.77	3.55	2.76	0	0.271302022	-1.910732662
C1qtnf1	complement C1q tumor necrosis factor-related	71.09	43.87	63.91	16.27	-0.684047965	-1.910172673
Rasgrf1	ras-specific guanine nucleotide-releasing factor	2.67	0.7	31.23	7.6	-1.110245317	-1.905995623
Slain1	SLAIN motif-containing protein 1	0.63	0.66	9.31	1.78	0.026311277	-1.890887545
1700030C10Rik		5.32	1.22	8.3	1.58	-1.509364882	-1.849859651
Orm1	alpha-1-acid glycoprotein 1 precursor	24.42	8.79	65.81	17.61	-1.376583265	-1.843986003
Chac1	cation transport regulator-like protein 1	8.84	2.2	2.59	0	-1.62058641	-1.843983844
Ptprcap	protein tyrosine phosphatase receptor type	1.37	5.26	2.59	0	1.401275598	-1.843983844
Cdo1	cysteine dioxygenase type 1	1.31	2.35	14.06	3.2	0.536268244	-1.842260537
Ppy	peptide YY precursor	0	0	2.58	0	0	-1.839959587
Rwd2a	RWD domain-containing protein 2A	4.7	2.78	2.58	0	-0.592575685	-1.839959587
Arhgap40	rho GTPase-activating protein 18-like	1.25	1.75	22.11	5.5	0.289506617	-1.830005637
Gjb6	gap junction beta-6 protein	6.68	1.8	81.6	22.37	-1.456679484	-1.821484048
Stmn1-rs1		1.9	1.93	2.53	0	0.014847764	-1.819668183
Dab1	disabled homolog 1 isoform 2	1.55	0.82	8.27	1.64	-0.486558797	-1.812031409
Cyp2b10	cytochrome P450 2B10 isoform 2	36.86	20.49	273.47	77.19	-0.817008928	-1.811592456
Adora2a	adenosine receptor A2a	31.78	4.36	9.39	1.96	-2.612510949	-1.811526573
Pla2g2a	phospholipase A2, membrane associated precursor	0	0	2.5	0	0	-1.807354922

Apobec1	C->U-editing enzyme APOBEC-1 isoform 2	11.87	3.01	28.75	12.79	-1.682337912	-1.109267212
Adrb3	beta-3 adrenergic receptor	2.59	1.46	11.01	4.57	-0.545325528	-1.108486918
Trim72	tripartite motif-containing protein 72	1.52	1.39	9.19	3.73	-0.076413116	-1.107241963
Ppil6	peptidyl-prolyl cis-trans isomerase-like 6	31.39	12.76	27.22	12.1	-1.235067998	-1.107151176
Rarres1	retinoic acid receptor responder (tazarotene)	34.53	23.11	92.5	42.41	-0.559406038	-1.106938942
Cst6	cystatin-M	43.68	57.8	1999.6	928.46	0.396186699	-1.105968059
2310007B03Rik	hypothetical protein LOC71874	1.7	1.41	30.89	13.83	-0.163926261	-1.1045855
Uchl1	ubiquitin carboxyl-terminal hydrolase isozyme	0	0	1.15	0	0	-1.10433666
Spns2	protein spinster homolog 2	4.11	5.05	22.39	9.89	0.243611851	-1.102887908
Angpt2	angiopoietin-2 precursor	0.71	2.29	4.9	1.75	0.944091259	-1.101283336
Grik1	glutamate receptor, ionotropic kainate 1 isoform	24.91	6.95	2.74	0.75	-1.704482225	-1.095683348
Irgm2	interferon inducible GTPase 2	23.59	20.03	25.48	11.42	-0.225622885	-1.092237949
Piwi2	piwi-like protein 2	26.32	13.26	34.62	15.71	-0.937983502	-1.091975783
Syt16	synaptotagmin-16	0.46	0	1.13	0	-0.545968369	-1.09085343
Tc2n	tandem C2 domains nuclear protein	2.11	2.22	1.13	0	0.050146108	-1.09085343
Alpk1	alpha-protein kinase 1	1.03	1.38	6.19	2.38	0.229481846	-1.088968524
Smagg	small cell adhesion glycoprotein	21.66	19.03	83.86	39.01	-0.17798544	-1.08472405
Cd1631	CD163 molecule-like 1	1.06	0.54	1.12	0	-0.419713986	-1.084064265
Rgs18	regulator of G-protein signaling 18	1.14	1.65	1.12	0	0.308381563	-1.084064265
Heph1	hephaestin-like protein 1	2.34	0.73	10.67	4.51	-0.949076065	-1.082680337
Rnase1	ribonuclease pancreatic precursor	5.13	5.14	24.9	11.23	0.002351582	-1.082527694
Irx3	iroquois-class homeodomain protein IRX-3	234.7	153.93	260.51	122.5	-0.60533523	-1.082355074
2210020M01Rik	hypothetical protein LOC66528	26.85	19.05	56.25	26.04	-0.474075091	-1.082180542
Chrm5	muscarinic acetylcholine receptor M5	0	0.78	1.11	0	0.831877241	-1.077242999
Krtap3-3	keratin-associated protein 3-2	0	0	1.11	0	0	-1.077242999
Maob	amine oxidase [flavin-containing] B	6.08	7.2	23.75	10.73	0.211874549	-1.077225512
Hist1h4c	histone H4	5.25	0	2.27	0.55	-2.64385619	-1.07702242
Fam26e	hypothetical protein LOC103511	68.83	78.31	83.57	39.09	0.18365581	-1.076903561
Adh7	alcohol dehydrogenase class 4 mu/sigma chain	526.18	145.22	473.24	223.87	-1.850154982	-1.076526149
1600029D21Rik	placenta-expressed transcript 1 protein	160.71	130.03	1230.67	584.34	-0.303511734	-1.073268992
Card10	caspase recruitment domain-containing protein	27.4	23.45	74.38	34.87	-0.216056465	-1.07140405
Rab11fip1	rab11 family-interacting protein 1 isoform 1	12.16	7.91	28.06	12.83	-0.562662152	-1.071233546
Cldn4	claudin-4	30.62	33.37	338.44	160.62	0.120312484	-1.070550845
3930402G23Rik		0	0	1.1	0	0	-1.070389328
Tspan15	tetraspanin 15	0.99	1.34	13.61	5.96	0.233740099	-1.069796967
LOC547349	MHC class I family member	0.03	0.06	1.18	0.04	0.041419927	-1.067744607
Als2cl	ALS2 C-terminal-like protein	21.06	17.77	27.27	12.49	-0.233004141	-1.067381535
Aldh3a1	aldehyde dehydrogenase, dimeric NADP-preferring	126.64	77.75	1185.89	565.54	-0.696728685	-1.066936509
Chit1	chitinotriase-1 precursor	31.39	32.22	109.31	51.72	0.036503605	-1.065141307
Art3	ecto-ADP-ribosyltransferase 3	10.17	8.61	50.1	23.43	-0.21702085	-1.064669428
Zfp365	protein ZNF365	38.87	11.99	55.67	26.11	-1.617902175	-1.063760089
Ear5	eosinophil cationic-type ribonuclease 5	33.11	14.47	24.25	11.08	-1.140721558	-1.063662933
Mtmr7	myotubularin-related protein 7	3.96	16.43	25.38	11.63	-0.909802191	-1.062589925
Arhgap25	rho GTPase-activating protein 25 isoform a	1.3	1.6	3.49	1.15	0.176877762	-1.062378785
Dlk2	protein delta homolog 2	21.07	18.99	87.52	41.43	-0.142808158	-1.060918773
Sulf1	extracellular sulfatase Sulf-1 precursor	1.75	2.45	19.49	8.83	0.327164743	-1.059656663
Rel1	RELT-like protein 1 precursor	108.86	116.81	348.08	166.49	0.100795807	-1.05948274
Sic6a14	sodium- and chloride-dependent neutral and basic	2.76	2.04	20.69	9.41	-0.306661338	-1.059059984
Gm11202		7.86	12.61	5.04	1.9	0.619288463	-1.058495649
5730469M10Rik	hypothetical protein LOC70564 precursor	300.17	179.36	650.47	312.63	-0.739698653	-1.054635179
Tmprss2	transmembrane protease serine 2	0.83	0.76	8.49	3.57	-0.05626822	-1.054213922
Gpr111	G protein-coupled receptor 111	2.34	2.5	44.2	20.82	0.067506819	-1.050671671
Amz1	archaemetzincin-1	1.03	2.23	3.93	1.38	0.670054438	-1.050626073
Pcsk9	proprotein convertase subtilisin/kexin type 9	0	0	1.07	0	0	-1.049630768
Ptpn22	tyrosine-protein phosphatase non-receptor type	0.58	2.09	1.07	0	0.96768228	-1.049630768
Ube2t	ubiquitin-conjugating enzyme E2 T	12.51	18.43	47.67	22.54	0.524258226	-1.047918454
Bend4	BEN domain-containing protein 4	1.09	0.83	1.93	0.42	-0.191659294	-1.045009735
2010110P09Rik	calcineurin B homologous protein 2	2.04	3.15	1.06	0	0.449040013	-1.042644337
Arhgap15	rho GTPase-activating protein 15 isoform 2	0.89	1.68	1.06	0	0.503846766	-1.042644337
Card9	caspase recruitment domain-containing protein 9	1.57	1.56	1.06	0	-0.005624549	-1.042644337
Clec4a1	C-type lectin domain family 4, member a1	2.84	2.38	1.06	0	-0.184083064	-1.042644337
Frem3	FRAS1-related extracellular matrix protein 3	0	0	1.06	0	0	-1.042644337
Ncf4	neutrophil cytosol factor 4	0	1.28	1.06	0	1.189033824	-1.042644337
Sic9a7	sodium/hydrogen exchanger 7	0	0	4.54	1.69	0	-1.042279803
Crtac1	cartilage acidic protein 1 precursor	0	0	2.17	0.54	0	-1.041552489
Podn	podocan precursor	12.94	9.63	7.87	3.31	-0.391088964	-1.041246235
Tnfrsf4	tumor necrosis factor receptor superfamily	65.95	40.65	83.58	40.22	-0.68476756	-1.036972055
Orm3	alpha-1-acid glycoprotein 3 precursor	0	1.48	1.05	0	1.310340121	-1.03562391
Ngf	ephexin-1 isoform 1	85.59	10.71	13.49	6.07	-2.886459347	-1.035275475
Grb7	growth factor receptor-bound protein 7	36.26	24.1	76.02	36.58	-0.56994031	-1.035268056
Hist1h4b	histone H4	1.89	0	1.91	0.42	-1.531069493	-1.035128223
Adamts4	ADAMTS-like protein 4 precursor	404.65	176.82	65.17	31.3	-1.18981789	-1.034643115
Dusp26	dual specificity protein phosphatase 26	0.84	0	9.42	4.09	-0.879705766	-1.033617716
Sec14a4	SEC14-like protein 4	80.15	39.94	111.11	53.92	-0.987079992	-1.029511439
Ccna1	cyclin-A1	0	0	1.04	0	0	-1.028569152
Il1f9	interleukin-1 family member 9	1.18	1.93	1.04	0	0.42657253	-1.028569152
Nrgn	neurogranin	0	0	1.04	0	0	-1.028569152
Panx3	pannexin-3	4.7	2.22	15.29	6.99	-0.823901231	-1.027719196
Oxtr	oxytocin receptor	24.29	29.1	32.52	15.48	0.25119645	-1.024305907
Crabp2	cellular retinoic acid-binding protein 2	21.18	34.56	340.28	167	0.680995959	-1.022494638
Omp	olfactory marker protein	0.74	0.71	1.03	0	-0.025090981	-1.021479727
Ociad2	OClA domain-containing protein 2	73.63	38.62	97.14	47.41	-0.913526806	-1.019536177
Ccnf	cyclin-F	5.95	8.83	22.29	10.52	0.500178439	-1.015569923
Ccl27a	C-C motif chemokine 27 isoform 1	734.29	388.84	1611.94	797.21	-0.915431237	-1.014852514
Gad1	glutamate decarboxylase-like protein 1	1.06	0	1.02	0	-1.042644337	-1.014355293
Kcne3	potassium voltage-gated channel subfamily E	0.94	0	1.02	0	-0.956056652	-1.014355293
Rasal1	rasGAP-activating-like protein 1	0.74	0.84	2.17	0.57	0.08061846	-1.013718281
Ncaph	condensin complex subunit 2	7.34	16.78	53.52	26.02	1.092136035	-1.012757887
Depdc1b	DEP domain-containing protein 1B	1.07	3.48	8.24	3.58	1.113867965	-1.012545253
Itga4	integrin alpha-4	4.55	4.16	7.39	3.16	-0.105116706	-1.012087282
Tmem56	transmembrane protein 56	16.33	5.68	33.72	16.23	-1.375351647	-1.010844246
Tgfb3	transforming growth factor beta-3 preproprotein	75.36	94.82	163.91	80.88	0.327509711	-1.010095878

Krt77	keratin, type II cytoskeletal 1b	746.97	382.17	1522.06	755.47	-0.964995796	-1.009618003
BC006965		3.35	2.5	6.65	2.8	-0.313660479	-1.009460329
Tifa	TRAF-interacting protein with FHA	1.86	2.68	7.43	3.19	0.363690619	-1.008582387
Mmp17	matrix metalloproteinase-17 precursor	8.11	3.86	5.92	2.44	-0.90649474	-1.008363473
Was	wiskott-Aldrich syndrome protein homolog	1.05	0.76	1.01	0	-0.220048481	-1.007195501
Tec	tyrosine-protein kinase Tec isoform a	34.95	29.07	63.19	30.98	-0.257666903	-1.005178622
Gm13363		2.22	8.62	29.53	14.22	1.578976206	-1.004259231
Ifngr1	interferon gamma receptor 1 precursor	79.35	61.82	184.51	91.52	-0.355074081	-1.003659787
Ptgs2	prostaglandin G/H synthase 2	167.04	223.32	131.64	65.2	0.416753564	-1.00261279
Acss1	acetyl-coenzyme A synthetase 2-like,	11.6	3.32	21.72	10.34	-1.544320516	-1.002542195
Elovl6	elongation of very long chain fatty acids	58.84	34.78	335.27	167.07	-0.741956788	-1.000557845
Arg1	arginase-1	4.89	6.18	19.5	9.25	0.28571621	-1
Arhgef26	Rho guanine nucleotide exchange factor (GEF) 26	6.1	2.94	13.02	6.01	-0.849623395	-1
BB019430		0	0	1	0	0	-1
Cfr	cystic fibrosis transmembrane conductance	0	0	4.18	1.59	0	-1
Sash3	SAM and SH3 domain-containing protein 3	0.79	0	1	0	-0.839959587	-1
Uts2r	urotensin-2 receptor	0	0	1	0	0	-1

Supplementary Table 2 | Gene list from NFIB ChIP-seq analysis. Genes are sorted according to NFIB bound peak distribution relative to functional structure of a gene.

PROMOTERS(±2kb)

Transcript Name	Gene name	Gene Description
NM_172505	A730008H23Rik	Holliday junction recognition protein
NM_030210	Aacs	acetoacetyl-CoA synthetase
NM_022419	Abhd8	abhydrolase domain-containing protein 8
NM_001033606	Acsf3	long-chain-fatty-acid-CoA ligase 3 isoform a
NM_027827	Acfmid	probable arylformamidase
NM_026375	Ahctf1	protein ELYS
NM_009667	Ampd3	AMP deaminase 3
NM_024213	Anapc4	anaphase-promoting complex subunit 4
NM_011923	Angptl2	angiopoietin-related protein 2 precursor
NR_030781	Ankrd10	
NM_013473	Anxa8	annexin A8
NM_023631	Aox4	aldehyde oxidase 4
NM_001080819	Arid1a	AT-rich interactive domain-containing protein
NM_001172205	Arid5a	AT-rich interactive domain-containing protein 5A
NM_023066	Asph	aspartyl/asparaginyl beta-hydroxylase isoform 1
NM_001039939	Asx1	putative Polycomb group protein ASXL1
NM_007498	Atf3	cyclic AMP-dependent transcription factor ATF-3
NM_146065	Atf7	cyclic AMP-dependent transcription factor ATF-7
NM_153389	Atp10d	probable phospholipid-transporting ATPase VD
NM_001081182	Atp8b2	probable phospholipid-transporting ATPase ID
NM_175183	Atxn7l2	ataxin-7-like protein 2
NM_198423	Bahcc1	BAH and coiled-coil domain-containing protein 1
NM_025833	Baiap2l1	brain-specific angiogenesis inhibitor
NM_001033284	BC026585	quinone oxidoreductase-like protein 2
NR_015528	BC029722	
NM_001003910	BC030307	tetratricopeptide repeat protein GNN isoform 3
NM_172295	BC037703	hypothetical protein LOC242125
NM_016778	Bok	bcl-2-related ovarian killer protein
NM_009770	Btg3	protein BTG3
NR_029450	C530005A16Rik	
NM_009795	Capns1	calpain small subunit 1
NM_007616	Cav1	caveolin-1
NM_016900	Cav2	caveolin-2
NM_001033238	Cblb	E3 ubiquitin-protein ligase CBL-B
NM_001037916	Ccdc17	coiled-coil domain-containing protein 17
NM_013654	Ccl7	C-C motif chemokine 7
NM_001033342	Cdc42bpg	serine/threonine-protein kinase MRCK gamma
NM_007665	Cdh3	cadherin-3 isoform b
NM_007668	Cdk5	cell division protein kinase 5
NM_177270	Cdkl2	cyclin-dependent kinase-like 2 isoform 2
NM_177224	Chd9	chromodomain-helicase-DNA-binding protein 9
NM_001136240	Chdh	choline dehydrogenase, mitochondrial precursor
NM_134078	Chmp7	charged multivesicular body protein 7
NM_022890	Cldn12	claudin-12
NM_007713	Clk3	dual specificity protein kinase CLK3
NM_028266	Col16a1	collagen alpha-1(XVI) chain precursor
NM_009929	Col18a1	collagen alpha-1(XVIII) chain isoform 2
NM_001161854	Csde1	cold shock domain-containing protein E1 isoform
NM_028836	Ctbs	di-N-acetylchitinase
NM_001113470	Ctdsp2	carboxy-terminal domain RNA polymerase II
NM_007795	Ctcf	cardiotrophin-1
NM_001165902	Ctnnb1	catenin beta-1
NM_001085449	Ctnd1	catenin delta-1 isoform 3
NM_030560	Cwc22	pre-mRNA-splicing factor CWC22 homolog
NM_010010	Cyp46a1	cholesterol 24-hydroxylase
NM_010516	Cyr61	protein CYR61 precursor
NM_010015	Dad1	dolichyl-diphosphooligosaccharide--protein
NM_001037999	Dbi	acyl-CoA-binding protein isoform 1
NM_010024	Dct	L-dopachrome tautomerase precursor
NM_007837	Ddit3	DNA damage-inducible transcript 3 protein
NM_177564	Dhrs11	dehydrogenase/reductase SDR family member 11
NM_011303	Dhrs4	short-chain dehydrogenase/reductase 3 isoform 1
NM_027287	Dnajb4	dnaJ homolog subfamily B member 4
NM_172338	Dnajc16	dnaJ homolog subfamily C member 16 precursor
NM_007882	Dsc3	desmocollin-3
NM_001081316	Dsel	dermatan-sulfate epimerase-like protein
NM_013642	Dusp1	dual specificity protein phosphatase 1
NR_029447	E130317F20Rik	
NM_026598	Ebpl	emopamil-binding protein-like
NM_007902	Edn2	endothelin-2 precursor
NM_010109	Efn5	ephrin-A5 isoform 2
NM_010112	Efs	embryonal Fyn-associated substrate
NM_007913	Egr1	early growth response protein 1
NM_182840	Emilin3	EMILIN-3
NM_007680	Ephb6	ephrin type-B receptor 6
NM_010145	Ephx1	epoxide hydrolase 1
NM_176838	Esrp2	epithelial splicing regulatory protein 2
NM_028731	Esys2	extended synaptotagmin-2
NM_008815	Etv4	ETS translocation variant 4
NM_145359	Fam100a	hypothetical protein LOC207740
NM_153782	Fam20a	family with sequence similarity 20, member A
NM_134087	Fam83h	family with sequence similarity 83, member H
NM_001122603	Fcgbp	Fc fragment of IgG binding protein
NM_057172	Fubp1	far upstream element-binding protein 1
NM_008059	G0s2	putative lymphocyte G0/G1 switch protein 2
NR_029457	G530011O06Rik	
NM_030166	Galnt12	polypeptide
NM_001113345	Gatad2a	transcriptional repressor p66 alpha isoform b
NM_028022	Gatsl3	GATS-like protein 3
NM_008112	Gdi2	rab GDP dissociation inhibitor beta
NM_145929	Gga1	ADP-ribosylation factor-binding protein GGA1
NR_002700	Gm7334	

NM_175193	Golim4	Golgi integral membrane protein 4
NM_026672	Gstm7	glutathione S-transferase Mu 7
NM_145546	Gtf2b	transcription initiation factor IIB
NM_172810	Gucy1b2	guanylate cyclase soluble subunit beta-2
NM_001166633	Gytl1b	glycosyltransferase-like protein LARGE2 isoform
NM_027168	Hddc2	HD domain-containing protein 2
NM_019479	Hes6	transcription cofactor HES-6
NM_198652	Hjurp	Holliday junction recognition protein
NM_021877	Hr	protein hairless
NM_001130444	Hras1	GTPase HRas isoform 2
NM_011631	Hsp90b1	endoplasmic
NM_008300	Hspa4	heat shock 70 kDa protein 4
NM_030704	Hspb8	heat shock protein beta-8
NM_010499	ler2	immediate early response gene 2 protein
NM_030694	Ifitm2	interferon-induced transmembrane protein 2
NM_019583	Il17rb	interleukin-17 receptor B precursor
NM_146152	Ipo13	importin-13
NM_022655	Ireb2	iron-responsive element-binding protein 2
NM_018826	Irx5	iroquois-class homeodomain protein IRX-5
NM_027534	Kdsr	3-ketodihydroshingosine reductase precursor
NM_001166651	Klhl33	kelch-like 33
NM_027011	Krt5	keratin, type II cytoskeletal 5
NM_028770	Krt80	keratin, type II cytoskeletal 80
NM_001113406	Krtap11-1	keratin associated protein 11-1
NM_008484	Lamb3	laminin subunit beta-3 precursor
NM_025622	Lgals2	galectin-2
NM_010710	Lhx2	LIM/homeobox protein Lhx2
NM_010720	Lipg	endothelial lipase precursor
NM_001081109	Lmtk2	serine/threonine-protein kinase LMTK2 precursor
NR_028378	LOC100034739	
NM_177152	Lrig3	leucine-rich repeats and immunoglobulin-like
NM_001172064	Lrrc56	leucine-rich repeat-containing protein 56
NM_001111311	Lrrrip1	leucine-rich repeat flightless-interacting
NM_010771	Matr3	matrin-3
NM_033072	Mbd6	methyl-CpG binding domain protein 6
NM_175341	Mbnl2	muscleblind-like protein 2 isoform 1
NM_008617	Mdh2	malate dehydrogenase, mitochondrial precursor
NM_008587	Mertk	tyrosine-protein kinase Mer precursor
NM_001045489	Mfge8	lactadherin isoform 2
NM_172499	Mfsd9	major facilitator superfamily domain-containing
NR_029822	Mir125b-1	
NR_029739	Mir22	
NR_030494	Mir715	
NM_027973	Mif1ip	centromere protein U
NM_008608	Mmp14	matrix metalloproteinase-14
NM_024431	Morf4l1	mortality factor 4-like protein 1 isoform b
NM_053162	Mrp134	39S ribosomal protein L34, mitochondrial
NM_013602	Mt1	metallothionein-1
NM_181409	Mttr11	myotubularin-related protein 11
NM_138656	Mvd	diphosphomevalonate decarboxylase
NM_016662	Mxd3	max dimerization protein 3
NM_008681	Ndrp1	protein NDRG1
NR_003513	Neat1	
NM_010907	Nfkbia	NF-kappa-B inhibitor alpha
NM_008738	Nrtn	neurturin precursor
NM_027289	Nt5dc2	5'-nucleotidase domain containing 2
NM_198190	Ntf5	neurotrophin-4 precursor
NM_175749	Nup153	nucleoporin 153
NM_010956	Ogdh	2-oxoglutarate dehydrogenase, mitochondrial
NM_153122	Oplah	5-oxoprolinase
NM_025661	Ormdl3	ORM1-like protein 3
NM_008772	P2ry1	P2Y purinoceptor 1
NM_023245	Palmd	palmdelphin
NM_033581	Pcdhgc3	protocadherin gamma subfamily C, 3
NM_008808	Pdgfra	platelet-derived growth factor subunit A
NM_011066	Per2	period circadian protein homolog 2
NR_028114	Pex16	
NM_021453	Pga5	pepsinogen 5, group I
NR_003519	Pisd-ps2	
NM_144859	Pja2	E3 ubiquitin-protein ligase Praja-2 isoform b
NM_019762	Pkp3	plakophilin-3 isoform 1
NM_016915	Pla2g6	85 kDa calcium-independent phospholipase A2
NM_024413	Plekhh1	pleckstrin homology domain-containing family F
NM_146030	Plekhh3	pleckstrin homology domain-containing family H
NM_001033225	Pnrc1	proline-rich nuclear receptor coactivator 1
NM_001081247	Poli3a	DNA-directed RNA polymerase III subunit RPC1
NM_001034085	Ppp2r1b	serine/threonine-protein phosphatase 2A 65 kDa
NM_008913	Ppp3ca	serine/threonine-protein phosphatase 2B
NM_001161111	Pqlc3	PQ-loop repeat-containing protein 3 isoform 2
NM_011104	Prkce	protein kinase C epsilon type
NM_175249	Psap1	proactivator polypeptide-like 1
NM_008956	Ptbp1	polypyrimidine tract-binding protein 1 isoform
NM_008973	Ptn	pleiotrophin
NM_009009	Rad21	double-strand-break repair protein rad21
NM_027933	Ranbp3	ran-binding protein 3
NM_001146174	Rangap1	ran GTPase-activating protein 1
NM_028712	Rap2b	ras-related protein Rap-2b precursor
NM_009030	Rbtp4	histone-binding protein RBBP4
NM_001045807	Rbm15	RNA binding motif protein 15
NM_001029938	Rilp	rab-interacting lysosomal protein
NM_028810	Rnd3	rho-related GTP-binding protein RhoE precursor
NM_001099632	Rnf39	ring finger protein 39
NM_031248	Robld3	mitogen-activated protein-binding
NM_001013376	Rpp38	ribonuclease P protein subunit p38
NM_026467	Rps27l	40S ribosomal protein S27-like

NM_011305	Rxra	retinoic acid receptor RXR-alpha
NM_025393	S100a14	protein S100-A14 isoform a
NM_011310	S100a3	protein S100-A3
NM_011311	S100a4	protein S100-A4
NM_138665	Sardh	sarcosine dehydrogenase, mitochondrial
NM_007644	Scarb2	lysosome membrane protein 2
NM_198885	Scx	basic helix-loop-helix transcription factor
NM_013657	Sema3c	semaphorin-3C precursor
NM_001160307	Serpib10	serpin B10 isoform 2
NM_009257	Serpib5	serpin B5
NM_009825	Serpinh1	serpin H1 precursor
NM_030109	Sf3b2	splicing factor 3b, subunit 2
NM_028148	Sfrs2ip	splicing factor, arginine/serine-rich 2,
NM_172276	Sfrs8	splicing factor, arginine/serine-rich 8
NM_025858	Shisa5	protein shisa-5 isoform 1
NM_029415	Slc10a6	solute carrier family 10 member 6
NM_144893	Slc35c2	solute carrier family 35 member C2
NM_153142	Slc35e4	solute carrier family 35 member E4
NM_026721	Slc39a13	zinc transporter ZIP13
NM_001081349	Slc43a1	large neutral amino acids transporter small
NM_027872	Slc46a3	solute carrier family 46 member 3 precursor
NM_009207	Slc4a2	anion exchange protein 2
NM_033314	Slco2a1	solute carrier organic anion transporter family
NM_008541	Smad5	mothers against decapentaplegic homolog 5
NM_026003	Smarca2	probable global transcription activator SNF2L2
NM_025891	Smarca3	SWI/SNF-related matrix-associated
NM_153115	Spag11a	sperm-associated antigen 11
NM_172561	Spag7	sperm-associated antigen 7 isoform 1
NM_025287	Spop	speckle-type POZ protein
NM_009272	Srm	spermidine synthase
NM_009179	St3gal2	CMP-N-acetylneuraminic-beta-galactosamide-
NM_011488	Stat5a	signal transducer and activator of transcription
NM_013515	Stom	erythrocyte band 7 integral membrane protein
NM_175162	Stox2	storkhead-box protein 2 isoform 2
NM_029659	Styx11	serine/threonine/tyrosine-interacting-like
NM_194342	Sun2	SUN domain-containing protein 2
NM_153484	Tef	thyrotroph embryonic factor isoform 2
NM_009369	Tgfb1	transforming growth factor-beta-induced protein
NM_029431	Them4	thioesterase superfamily member 4
NM_025372	Tipin	TIMELESS-interacting protein
NM_009387	Tk1	thymidine kinase, cytosolic
NM_026669	Tmbim6	bax inhibitor 1
NM_026734	Tmem126b	transmembrane protein 126B
NM_001098271	Tmem176a	transmembrane protein 176A
NM_023056	Tmem176b	transmembrane protein 176B
NM_020588	Tmem183a	transmembrane protein 183 isoform a
NM_178625	Tmem209	transmembrane protein 209
NM_144794	Tmem63a	transmembrane protein 63A
NM_001033535	Tnfrsf83	tumor necrosis factor alpha-induced protein
NM_013837	Tpst1	protein-tyrosine sulfotransferase 1 isoform 2
NM_001081055	Trappc10	trafficking protein particle complex subunit 10
NM_023910	Tsc22d4	TSC22 domain family protein 4
NM_146116	Tubb2c	tubulin beta-2C chain
NM_019803	Ube2g2	ubiquitin-conjugating enzyme E2 G2
NM_001039157	Ube2j2	ubiquitin-conjugating enzyme E2 J2 isoform a
NM_033526	Ubqln4	ubiquilin-4
NM_001136226	Utp14b	U3 small nucleolar RNA-associated protein 14
NM_175158	Utp20	small subunit processome component 20 homolog
NM_023054	Utp3	something about silencing protein 10
NM_013933	Vapa	vesicle-associated membrane protein-associated
NM_147776	Vwa1	von Willebrand factor A domain-containing
NM_028875	Xrcc3	DNA repair protein XRCC3
NM_025970	Zbtb8os	protein archease
NM_178404	Zc3h6	zinc finger CCCH domain-containing protein 6
NM_175160	Zdhhc1	probable palmitoyltransferase ZDHHC1
NM_001039198	Zfhx2	zinc finger homeobox protein 2
NM_013866	Zfp385a	zinc finger protein 385A
NM_146183	Zfp428	zinc finger protein 428
NM_030074	Zfp687	zinc finger protein 687
NM_146202	Zfp768	zinc finger protein 768
NM_026752	Zfyve21	zinc finger FYVE domain-containing protein 21
NM_183208	Zmiz1	zinc finger MIZ domain-containing protein 1
NM_001017955	Zscan18	zinc finger and SCAN domain containing 18
NM_029821	1190003J15Rik	5-hydroxyisourate hydrolase
NM_028166	1600014C10Rik	hypothetical protein LOC72244
NR_030711	2210403K04Rik	hypothetical protein LOC68235
NM_026629	2410066E13Rik	
NR_028428	2610005L07Rik	
NR_015483	2610203C20Rik	
NM_029366	2810422J05Rik	hypothetical protein LOC75620
NM_001172074	3110009E18Rik	hypothetical protein LOC73103 isoform 2
NM_025699	3230401D17Rik	oxidative stress responsive 1
NM_001080709	4930402F06Rik	hypothetical protein LOC74854
NM_177265	6330512M04Rik	CD225 family protein FLJ76511 homolog
NM_175521	6430598A04Rik	neuronal tyrosine phosphorylated adaptor for
NM_175398	6530418L21Rik	hypothetical protein LOC109050 isoform 1
NR_030708	6820431F20Rik	
NM_177205	9430015G10Rik	hypothetical protein LOC230996
NM_175417	9530008L14Rik	hypothetical protein LOC109254 isoform 1
NM_177003	9630033F20Rik	probable fructose-2,6-bisphosphatase TIGAR

DOWNSTREAM (± 2 kb)

Transcript Name	Gene name	Gene Description
NM_016689	Aqp3	aquaporin-3
NM_025338	Aurkaip1	aurora kinase A-interacting protein
NM_146082	BC027072	hypothetical protein LOC225004
NM_153544	BC030867	hypothetical protein LOC217216
NM_001122683	Bdh1	D-beta-hydroxybutyrate dehydrogenase,
NM_178116	Camta2	calmodulin-binding transcription activator 2
NM_027112	Capns2	calpain small subunit 2
NM_001033455	Ccdc27	coiled-coil domain-containing protein 27
NM_021339	Cdon	cell adhesion molecule-related/down-regulated by
NM_015734	Col5a1	collagen alpha-1(V) chain precursor
NM_019877	Copz2	coatamer subunit zeta-2
NM_001042611	Cp	ceruloplasmin isoform a
NM_153679	Cpt1c	carnitine O-palmitoyltransferase 1, brain
NM_153287	Csrnp1	cysteine/serine-rich nuclear protein 1
NM_153088	Ctdsp1	carboxy-terminal domain RNA polymerase II
NM_009983	Ctsd	cathepsin D precursor
NM_010055	Dlx3	homeobox protein DLX-3
NM_010100	Edar	tumor necrosis factor receptor superfamily
NM_153068	Ehd2	EH domain-containing protein 2
NM_010579	Eif6	eukaryotic translation initiation factor 6
NM_207706	Elmo2	engulfment and cell motility protein 2 isoform
NM_029001	Elovl7	elongation of very long chain fatty acids
NM_144866	Etf1	eukaryotic peptide chain release factor subunit
NM_194345	Fam160b2	family with sequence similarity 160, member B2
NM_015795	Fbxo16	F-box only protein 16
NM_008655	Gadd45b	growth arrest and DNA damage-inducible protein
NM_010815	Grap2	GRB2-related adaptor protein 2
NM_001013385	Grm4	metabotropic glutamate receptor 4
NM_010451	Hoxa2	homeobox protein Hox-A2
NM_010458	Hoxb3	homeobox protein Hox-B3
NM_138646	Hps4	Hermansky-Pudlak syndrome 4 protein homolog
NM_019508	Il17b	interleukin-17B precursor
NM_178257	Il22ra1	interleukin-22 receptor subunit alpha-1
NM_008916	Inpp5k	inositol polyphosphate 5-phosphatase K
NM_001163528	Itpril1	inositol 1,4,5-triphosphate receptor-interacting
NM_008416	Junb	transcription factor jun-B
NM_021342	Kcne4	potassium voltage-gated channel subfamily E
NM_199364	Lzts1	leucine zipper putative tumor suppressor 1
NM_183195	Marveld1	putative MARVEL domain-containing protein 1
NM_010797	Mid1	midline-1
NM_010798	Mif	macrophage migration inhibitory factor
NM_021462	Mknk2	MAP kinase-interacting serine/threonine-protein
NM_010808	Mmp24	matrix metalloproteinase-24
NM_010849	Myc	myc proto-oncogene protein isoform a
NM_153136	Nudt18	nucleoside diphosphate-linked moiety X motif 18
NM_001025614	Otud7b	zinc finger, A20 domain containing 1
NM_148917	Pabpc4	polyadenylate-binding protein 4 isoform 2
NM_027995	Paqr7	membrane progesterin receptor alpha
NM_011563	Prdx2	peroxiredoxin-2
NM_138659	Prpf8	pre-mRNA-processing-splicing factor 8
NM_175022	Prr12	proline rich 12
NM_177721	Ranbp6	ran-binding protein 6
NM_177572	Rimk1a	ribosomal protein S6 modification-like protein
NM_030112	Rtf1	Paf1/RNA polymerase II complex component
NM_009113	S100a13	protein S100-A13
NM_009162	Scg5	neuroendocrine protein 7B2
NM_010831	Sik1	serine/threonine-protein kinase SIK1
NM_172892	Slc13a4	solute carrier family 13, member 4
NM_177243	Slc26a9	solute carrier family 26 member 9
NM_011988	Slc27a3	long-chain fatty acid transport protein 3
NM_031183	Sp6	transcription factor Sp6
NM_020564	Sult5a1	sulfotransferase family 5A, member 1
NM_008596	Sypl2	synaptophysin-like protein 2
NM_134023	Tbc1d10a	TBC1 domain family member 10A
NM_198020	Trmt1	N(2),N(2)-dimethylguanosine tRNA
NM_001077591	Tsks	testis-specific serine kinase substrate isoform
NM_011656	Tuft1	tuffelin
NM_019392	Tyro3	tyrosine-protein kinase receptor TYRO3
NM_198899	Uggt1	UDP-glucose:glycoprotein glucosyltransferase 1
NM_025407	Uqcrc1	cytochrome b-c1 complex subunit 1, mitochondrial
NM_011756	Zfp36	tristetraprolin
NM_028601	Zmiz2	zinc finger MIZ domain-containing protein 2
NM_026150	4921536K21Rik	hypothetical protein LOC67430
NR_029475	4930581F22Rik	
NM_001166394	4931428F04Rik	hypothetical protein LOC74356
NR_015459	4933431E20Rik	
NR_015497	9330133O14Rik	

EXONS

Transcript Name	Gene name	Gene Description
NM_033474	Arycf	armadillo repeat protein deleted in
NM_030561	BC004004	hypothetical protein LOC80748
NM_020486	Bcam	basal cell adhesion molecule
NM_010238	Brd2	bromodomain-containing protein 2 isoform a
NM_017392	Celsr2	cadherin EGF LAG seven-pass G-type receptor 2
NM_012018	Cep110	centriolin
NM_013811	Dnahc8	dynein heavy chain 8, axonemal
NM_015794	Fbxl17	F-box/LRR-repeat protein 17
NM_001033312	Fbxl18	F-box and leucine-rich repeat protein 18
NM_001085549	Gm12824	UPF0632 protein A precursor
NM_001039472	Kif21b	kinesin-like protein KIF21B
NM_016693	Map3k6	mitogen-activated protein kinase kinase kinase
NM_001085373	Mcc	mutated in colorectal cancers isoform 1
NM_177855	Med12l	mediator of RNA polymerase II transcription
NM_011424	Ncor2	nuclear receptor corepressor 2
NM_030152	Nol3	nucleolar protein 3
NM_133947	Numa1	nuclear mitotic apparatus protein 1
NM_021512	Nup160	nuclear pore complex protein Nup160
NM_026936	Oxa1l	mitochondrial inner membrane protein OXA1L
NM_144920	Plekha5	phosphoinositol 3-phosphate-binding protein-2
NM_019688	Rapgef4	rap guanine nucleotide exchange factor 4
NM_146042	Rnf144b	E3 ubiquitin-protein ligase RNF144B
NM_028182	Sh2d4a	SH2 domain-containing protein 4A
NM_009195	Slc12a4	solute carrier family 12 member 4
NM_152808	Slc44a2	choline transporter-like protein 2 isoform 2
NM_001004468	Tacc2	transforming acidic coiled-coil-containing
NM_011547	Tcfap2a	transcription factor AP-2-alpha isoform a
NM_001081664	4833423E24Rik	fatty acid desaturase 2-like protein

INTRONS

Transcript Name	Gene name	Gene Description
NR_028376	A93004D18Rik	
NM_007378	Abca4	retinal-specific ATP-binding cassette
NM_008576	Abcc1	multidrug resistance-associated protein 1
NM_001103177	Ablim1	actin-binding LIM protein 1 isoform 2
NM_001164491	Ablim3	actin-binding LIM protein 3
NM_198895	Abr	active breakpoint cluster region-related protein
NM_175324	Acad11	acyl-CoA dehydrogenase family member 11
NM_207668	Acpp	prostatic acid phosphatase long isoform
NM_053178	Acsbg1	long-chain-fatty-acid--CoA ligase ACSBG1
NM_027976	Acsf5	long-chain-fatty-acid--CoA ligase 5
NM_134156	Actn1	alpha-actinin-1
NM_021895	Actn4	alpha-actinin-4
NR_021486	Adarb1	
NM_139153	Agap3	arf-GAP with GTPase, ANK repeat and PH
NM_146155	Ahdc1	AT-hook DNA-binding motif-containing protein 1
NM_198111	Akap6	A kinase (PRKA) anchor protein 6
NM_177859	Aknad1	AKNA domain containing 1
NM_178655	Ank2	ankyrin-2 isoform 2
NM_001081379	Ankrd11	ankyrin repeat domain 11
NM_001081139	Ankrd35	ankyrin repeat domain-containing protein 35
NM_007585	Anxa2	annexin A2
NM_001110211	Anxa6	annexin A6 isoform b
NM_175164	Arhgap26	rho GTPase-activating protein 26
NM_001130152	Arhgef1	rho guanine nucleotide exchange factor 1 isoform
NM_027871	Arhgef3	rho guanine nucleotide exchange factor 3
NM_001034858	Armc2	armadillo repeat-containing protein 2
NM_010026	Asap1	arf-GAP with SH3 domain, ANK repeat and PH
NM_025770	Atg10	ubiquitin-like-conjugating enzyme ATG10
NM_080640	Baalc	brain and acute leukemia cytoplasmic protein
NM_007521	Bach2	
NM_013800	Barx2	homeobox protein BarH-like 2
NM_172378	BC026439	prostaglandin-specific organic anion
NM_009954	Bcar1	breast cancer anti-estrogen resistance protein 1
NM_016707	Bcl11a	B-cell lymphoma/leukemia 11A isoform 1
NM_001079883	Bcl11b	B-cell lymphoma/leukemia 11B isoform a
NM_001081412	Bcr	breakpoint cluster region protein
NM_001039179	Bicd2	protein bicaudal D homolog 2 isoform 1
NM_172506	Boc	brother of CDO precursor
NM_028709	Btdb11	ankyrin repeat and BTB/POZ domain-containing
NM_025295	Btd	biotinidase
NM_181344	C1rl	complement C1r subcomponent-like protein
NM_020263	Cacna2d2	voltage-dependent calcium channel subunit
NM_001037099	Cacnb4	voltage-dependent L-type calcium channel subunit
NM_018883	Camkk1	calcium/calmodulin-dependent protein kinase
NM_007602	Capn5	calpain-5
NM_027195	Cas21	zinc finger protein castor homolog 1 isoform 2
NM_001161458	Cbfb	core-binding factor subunit beta isoform 4
NM_029212	Ccdc33	coiled-coil domain-containing protein 33 isoform
NM_029586	Ccdc46	coiled-coil domain-containing protein 46 isoform
NM_025689	Ccdc51	coiled-coil domain-containing protein 51
NM_001039150	Cd44	CD44 antigen isoform b precursor
NM_183016	Cdc42bpb	serine/threonine-protein kinase MRCK beta
NM_027219	Cdc42ep1	cdc42 effector protein 1
NM_009864	Cdh1	cadherin-1
NM_153599	Cdk8	cell division protein kinase 8
NM_173370	Cds1	phosphatidate cytidyltransferase 1
NM_009886	Celsr1	cadherin EGF LAG seven-pass G-type receptor 1
NM_146019	Chd3	chromodomain helicase DNA binding protein 3
NM_027979	Chit1	chitinase-1 precursor
NM_027928	Chst13	carbohydrate sulfotransferase 13
NM_019765	Clip1	CAP-Gly domain-containing linker protein 1
NM_030179	Clip4	CAP-Gly domain-containing linker protein 4
NM_029556	Clybl	citrate lyase subunit beta-like protein,
NM_001160211	Cnih3	protein cornichon homolog 3 isoform 2
NM_146105	Cnsl	consortin
NM_139001	Cspg4	chondroitin sulfate proteoglycan 4 precursor
NM_198013	Cuedc1	CUE domain-containing protein 1 isoform 1
NM_009999	Cyp2b10	cytochrome P450 2B10 isoform 2
NM_007823	Cyp4b1	cytochrome P450 4B1
NM_001114125	Dab2ip	disabled homolog 2-interacting protein isoform
NM_010019	Dapk2	death-associated protein kinase 2
NM_027030	Dcps	scavenger mRNA-decapping enzyme DcpS
NM_007584	Ddr1	epithelial discoidin domain-containing receptor
NM_001159361	Dip2b	disco-interacting protein 2 homolog B isoform 1
NM_027712	Dlgap1	disks large-associated protein 1 isoform 2
NM_001163537	Dnajc5b	dnaJ homolog subfamily C member 5B
NM_027878	Dram1	DNA damage-regulated autophagy modulator protein
NM_023842	Dsp	desmoplakin
NM_019819	Dusp14	dual specificity protein phosphatase 14
NM_199307	Ece1	endothelin-converting enzyme 1
NM_001162425	Efn1	ephrin-A1 isoform 2
NM_007912	Egfr	epidermal growth factor receptor isoform 2
NM_172813	Enox1	ecto-NOX disulfide-thiol exchanger 1
NM_177304	Enpp6	ectonucleotide pyrophosphatase/phosphodiesterase
NM_007940	Ephx2	epoxide hydrolase 2
NM_001003817	ErbB2	receptor tyrosine-protein kinase erbB-2
NM_026170	Ergic1	endoplasmic reticulum-Golgi intermediate
NM_177775	Esy1	extended synaptotagmin-3
NM_010162	Ext1	exostosin-1
NM_146119	Fam129b	niban-like protein 1
NM_153574	Fam13a	family with sequence similarity 13, member A1
NM_024244	Fam13c	hypothetical protein LOC71721 isoform 1

NM_177628	Fam167a	hypothetical protein LOC219148
NM_145570	Fam176a	transmembrane protein 166
NM_026062	Fam69a	family with sequence similarity 69, member A
NM_025850	Fank1	fibronectin type 3 and ankyrin repeat domains 1
NM_025386	Fbxo36	F-box only protein 36
NM_010206	Fgfr1	basic fibroblast growth factor receptor 1
NM_175276	Fhod3	FH1/FH2 domain-containing protein 3
NM_030163	Filip1l	
NM_021899	Foxi2	forkhead box protein J2
NM_199068	Foxk1	forkhead box protein K1
NM_019740	Foxo3	forkhead box protein O3
NM_053202	Foxp1	forkhead box protein P1 isoform 1
NM_145148	Frm4d4b	FERM domain-containing protein 4B
NM_172887	Fry	furry homolog
NM_028194	Fryl	protein furry homolog-like
NM_173739	Galnt4	putative polypeptide
NM_011820	Ggt5	gamma-glutamyltransferase 5
NM_001081125	Gli2	GLI-Kruppel family member GLI2
NM_023120	Gnb1l	guanine nucleotide-binding protein subunit
NM_027694	Golga7b	Golgin subfamily A member 7B
NM_001081126	Gpr161	G-protein coupled receptor 161
NM_146072	Grik1	glutamate receptor, ionotropic kainate 1 isoform
NM_001145897	Gse1	genetic suppressor element 1 isoform 3
NM_207225	Hdac4	histone deacetylase 4
NM_010412	Hdac5	histone deacetylase 5 isoform 2
NM_010657	Hivep3	transcription factor HIVEP3
NM_001024720	Hmnc1	hemimentin 1
NM_001146323	Hps3	Hermansky-Pudlak syndrome 3 protein homolog
NM_183148	Iffo2	intermediate filament family orphan 2
NM_010513	Igf1r	insulin-like growth factor 1 receptor
NM_029646	Il3a	interleukin-34 isoform 2
NM_001008700	Il4ra	interleukin-4 receptor subunit alpha precursor
NM_198411	Inf2	inverted formin-2
NM_001134383	Iqsec1	IQ motif and SEC7 domain-containing protein 1
NM_001126490	Ism1	isthmin-1 precursor
NM_013565	Itga3	integrin alpha-3
NM_001159564	Itgb6	integrin beta-6 precursor
NM_172471	Itih5	inter-alpha-trypsin inhibitor heavy chain H5
NM_022417	Itim2c	integral membrane protein 2C
NM_001081175	Itpkb	inositol-trisphosphate 3-kinase B
NM_181593	Itpkc	inositol-trisphosphate 3-kinase C
NM_010586	Itp2	inositol 1,4,5-trisphosphate receptor type 2
NM_080553	Itp3	inositol 1,4,5-trisphosphate receptor type 3
NM_021878	Jarid2	protein Jumonji
NM_010590	Jub	protein ajuba
NM_010593	Jup	junction plakoglobin
NM_020005	Kat2b	histone acetyltransferase KAT2B isoform 1
NM_001039056	Kcnj15	ATP-sensitive inward rectifier potassium channel
NM_029911	Kcnk10	potassium channel subfamily K member 10
NM_130867	Kirrel	kin of IRRE-like protein 1 precursor
NM_021366	Klf13	Kruppel-like factor 13
NM_008453	Klf3	Kruppel-like factor 3
NM_032396	Kremen1	kremen protein 1 precursor
NM_010680	Lama3	laminin subunit alpha-3
NM_008485	Lamc2	laminin subunit gamma-2
NM_173379	Leprel1	prolyl 3-hydroxylase 2 precursor
NM_008494	Lfng	beta-1,3-N-acetylglucosaminyltransferase lunatic
NM_010195	Lgr5	leucine-rich repeat-containing G-protein coupled
NM_172589	Lhfp12	lipoma HMGIC fusion partner-like 2 protein
NM_010718	Limk2	LIM domain kinase 2 isoform a
NM_001111102	Lmna	prelamin-A/C isoform C
NM_022983	Lpar3	lysophosphatidic acid receptor 3
NM_001033439	Lrch1	leucine-rich repeat and calponin homology
NM_008377	Lrig1	leucine-rich repeats and immunoglobulin-like
NM_001170788	Lrrc36	leucine-rich repeat-containing protein 36
NM_175641	Ltbp4	latent-transforming growth factor beta-binding
NR_033304	Lypd6	
NM_009600	Macf1	microtubule-actin cross-linking factor 1
NM_001004176	Maml3	mastermind-like 3
NM_010789	Meis1	homeobox protein Meis1 isoform A
NM_027756	Mfap3l	microfibrillar-associated protein 3-like
NM_153396	Mical3	protein MICAL-3
NM_00113198	Mitf	microphthalmia-associated transcription factor
NM_029797	Mnd1	meiotic nuclear division protein 1 homolog
NM_001081100	Morn1	MORN repeat-containing protein 1
NM_021509	Moxd1	DBH-like monooxygenase protein 1 precursor
NM_080456	Mrps6	28S ribosomal protein S6, mitochondrial
NM_001043355	Mtap6	microtubule-associated protein 6 isoform 3
NM_008635	Mtap7	ensconsin isoform 1
NM_001008542	Mxi1	max-interacting protein 1 isoform b
NM_028021	Myh14	myosin-14
NM_181072	Myo1e	myosin IE
NM_010865	Myoc	myocilin precursor
NM_00113204	Ncam1	neural cell adhesion molecule 1 isoform 3
NM_178772	Nceh1	neutral cholesterol ester hydrolase 1
NM_019681	Ncs1	neuronal calcium sensor 1
NM_00111324	Nedd9	enhancer of filamentation 1 isoform 1
NM_021605	Nek7	serine/threonine-protein kinase Nek7
NM_001081656	Neurl1B	E3 ubiquitin-protein ligase NEURL1B
NM_001113210	Nfib	nuclear factor 1 B-type isoform 2
NM_008688	Nfic	nuclear factor 1 C-type isoform a
NM_010906	Nfix	nuclear factor 1 X-type isoform 2
NM_001112698	Ngf	beta-nerve growth factor isoform B
NM_001163592	Nhs1l	NHS-like protein 1 isoform 2
NM_001008421	Nol10	nucleolar protein 10

NM_008719	Npas2	neuronal PAS domain-containing protein 2
NM_001167891	Nrg2	pro-neuregulin-2, membrane-bound isoform
NM_001004363	Nuak1	NUAK family SNF1-like kinase 1
NM_028778	Nuak2	NUAK family SNF1-like kinase 2 isoform B
NM_008750	Nxn	nucleoredoxin
NM_008751	Nxph1	neurexophilin-1 precursor
NM_011856	Odz2	teneurin-2
NM_001033254	Pak6	serine/threonine-protein kinase PAK 6
NM_053117	Pard6g	partitioning defective 6 homolog gamma
NM_054056	Pawr	PRKC apoptosis WT1 regulator protein
NM_029357	Pcdh1	protocadherin-1
NM_001174154	Pcdha4-g	protocadherin alpha 4-gamma
NM_033584	Pcdhga1	protocadherin gamma-A1
NM_033593	Pcdhga10	protocadherin gamma-A10
NM_033594	Pcdhga11	protocadherin gamma-A11
NM_033595	Pcdhga12	protocadherin gamma subfamily A, 12
NM_033585	Pcdhga2	protocadherin gamma-A2
NM_033586	Pcdhga3	protocadherin gamma-A3
NM_033587	Pcdhga4	protocadherin gamma-A4
NM_033588	Pcdhga5	protocadherin gamma-A5
NM_033589	Pcdhga6	protocadherin gamma-A6
NM_033590	Pcdhga7	protocadherin gamma subfamily A, 7
NM_033591	Pcdhga8	protocadherin gamma subfamily A, 8
NM_033592	Pcdhga9	protocadherin gamma subfamily A, 9
NM_033574	Pcdhgb1	protocadherin gamma-B1
NM_033575	Pcdhgb2	protocadherin gamma-B2
NM_033576	Pcdhgb4	protocadherin gamma-B4
NM_033577	Pcdhgb5	protocadherin gamma-B5
NM_033578	Pcdhgb6	protocadherin gamma subfamily B, 6
NM_033579	Pcdhgb7	protocadherin gamma-B7
NM_033580	Pcdhgb8	protocadherin gamma subfamily B, 8
NM_011048	Pcsk6	paired basic amino acid cleaving system 4
NM_011057	Pdgfb	platelet-derived growth factor subunit B
NM_019417	Pdlim4	PDZ and LIM domain protein 4
NM_022554	Pdlim5	PDZ and LIM domain protein 5 isoform ENH3b
NM_001081064	Pdzd2	PDZ domain-containing protein 2
NM_001164594	Pdzrn4	PDZ domain containing RING finger 4 isoform 2
NM_019781	Pex14	peroxisomal membrane protein PEX14
NM_008841	Pik3r2	phosphatidylinositol 3-kinase regulatory subunit
NM_026880	Pink1	serine/threonine-protein kinase PINK1,
NM_145823	Pitpnc1	cytoplasmic phosphatidylinositol transfer
NM_013630	Pkd1	polycystin-1 precursor
NM_019645	Pkp1	plakophilin-1
NM_021280	Plcg1	1-phosphatidylinositol-4,5-bisphosphate
NM_172285	Plcg2	1-phosphatidylinositol-4,5-bisphosphate
NM_001114663	Plcl1	inactive phospholipase C-like protein 1
NM_008875	Pld1	phospholipase D1
NM_013738	Plek2	pleckstrin-2
NM_031257	Plekha2	pleckstrin homology domain-containing family A
NM_001033253	Plekha1	pleckstrin homology domain containing, family G
NM_028199	Plxdc1	plexin domain-containing protein 1 isoform 2
NM_001039509	Pnkd	probable hydrolase PNKD isoform 3
NM_001034885	Pnpla1	patatin-like phospholipase domain-containing
NM_176833	Ppm1f	protein phosphatase 1F
NM_001135001	Ppp2r5c	serine/threonine-protein phosphatase 2A 56 kDa
NM_011155	Ppp5c	serine/threonine-protein phosphatase 5
NM_001134460	Prickle2	prickle-like protein 2 isoform b
NM_011101	Prkca	protein kinase C alpha type
NM_008856	Prkch	protein kinase C eta type
NM_008983	Ptprk	receptor-type tyrosine-protein phosphatase kappa
NM_011215	Ptprn2	receptor-type tyrosine-protein phosphatase N2
NM_011218	Ptprs	receptor-type tyrosine-protein phosphatase S
NR_003368	Pvt1	
NM_009014	Rad51l1	DNA repair protein RAD51 homolog 2
NM_001166408	Rai14	ankycorbin
NM_001145834	Ralgds	ral guanine nucleotide dissociation stimulator
NM_001039087	Rapgef1	Rap guanine nucleotide exchange factor (GEF) 1
NM_001080925	Rapgef1l	rap guanine nucleotide exchange factor-like 1
NM_001172122	Rbms3	RNA-binding motif, single-stranded-interacting
NM_001081549	Rcan1	calcipressin-1 isoform 1
NM_007874	Reep5	receptor expression-enhancing protein 5
NM_001085492	Rere	arginine-glutamic acid dipeptide repeats
NM_028713	Rftn2	raftlin-2
NM_177740	Rgma	repulsive guidance molecule A precursor
NM_173402	Rgs12	regulator of G-protein signalling 12 isoform A
NM_013646	Rora	nuclear receptor ROR-alpha
NM_146246	Rp111	retinitis pigmentosa 1-like 1 protein
NM_026830	Rreb1	ras-responsive element-binding protein 1 isoform
NM_009821	Runx1	runt-related transcription factor 1 isoform 4
NM_177225	Samd12	sterile alpha motif domain-containing protein
NM_175021	Samd4b	protein Smaug homolog 2
NM_175155	Sash1	SAM and SH3 domain-containing protein 1
NM_022886	Scel	sciiellin
NM_013883	Scmh1	polycomb protein SCM1 isoform 1
NM_011519	Sdc1	syndecan-1 precursor
NM_011521	Sdc4	syndecan-4 precursor
NM_172800	Sdk2	protein sidekick-2 precursor
NM_011349	Sema3f	semaphorin-3F
NM_009154	Sema5a	semaphorin-5A
NM_001113486	Sept9	septin-9 isoform a
NM_026535	Serpina12	serpin A12 precursor
NM_198247	Sertad4	SERTA domain-containing protein 4
NM_001162908	Sesn1	sestrin-1 isoform 1
NM_053099	Setbp1	SET-binding protein
NM_028385	Setd5	SET domain-containing protein 5

NM_013834	Sfrp1	secreted frizzled-related protein 1 precursor
NM_133220	Sgk3	serine/threonine-protein kinase Sgk3
NM_011893	Sh3bp2	SH3 domain-binding protein 2 isoform a
NM_133816	Sh3bp4	SH3 domain-binding protein 4
NM_177364	Sh3pxd2b	SH3 and PX domain-containing protein 2B
NM_001146299	Sh3rf2	putative E3 ubiquitin-protein ligase SH3RF2
NM_001113373	Shank2	SH3 and multiple ankyrin repeat domains protein
NM_011385	Ski	ski oncogene
NM_207651	Slc14a2	urea transporter 2 isoform a
NM_026244	Slc39a9	zinc transporter ZIP9
NM_009209	Slc6a2	sodium-dependent noradrenaline transporter
NM_178798	Slc7a6	Y+L amino acid transporter 2
NM_008542	Smad6	mothers against decapentaplegic homolog 6
NM_022315	Smoc2	SPARC-related modular calcium-binding protein 2
NM_178362	Sorbs1	sorbin and SH3 domain-containing protein 1
NM_030889	Sorcs2	VPS10 domain-containing receptor SorCS2
NM_001025560	Sox6	transcription factor SOX-6 isoform 3
NM_001144987	Spg20	spartin isoform a
NM_001166463	Spock1	testican-1 isoform 3 precursor
NM_145134	Spsb4	SPRY domain-containing SOCS box protein 4
NM_009177	St3gal1	CMP-N-acetylneuraminic acid-6-sialyltransferase 1
NM_145465	Stk24	serine/threonine-protein kinase 24
NM_029858	Ston1	stonin-1
NM_028072	Sulf2	extracellular sulfatase Sulf-2 precursor
NM_178046	Svil	
NM_018802	Syt8	synaptotagmin-8
NM_001166584	Tead1	transcriptional enhancer factor TEF-1 isoform 1
NM_011566	Tead3	transcriptional enhancer factor TEF-5 isoform 2
NM_001080979	Tead4	transcriptional enhancer factor TEF-3 isoform b
NM_001113464	Tec	tyrosine-protein kinase Tec isoform a
NM_001099275	Tekt5	tektin-5
NM_031199	Tgfa	protransforming growth factor alpha
NM_178060	Thra	thyroid hormone receptor alpha
NM_009384	Tiam1	T-lymphoma invasion and metastasis-inducing
NM_011594	Timp2	metalloproteinase inhibitor 2 precursor
NM_027154	Tmbim1	transmembrane BAX inhibitor motif-containing
NM_178874	Tmcc2	transmembrane and coiled-coil domains protein 2
NM_019631	Tmem45a	transmembrane protein 45A
NM_011609	Tnfrsf1a	tumor necrosis factor receptor superfamily
NM_027884	Tns1	tensin 1
NM_001083587	Tns3	tensin-3
NM_172564	Tns4	tensin-4 precursor
NM_175165	Tprq	tumor protein p63-regulated gene 1 protein
NM_013718	Trappc3	trafficking protein particle complex subunit 3
NM_023655	Trim29	tripartite motif-containing protein 29
NM_001127262	Trp63	tumor protein 63 isoform f
NM_022017	Trpv4	transient receptor potential cation channel
NM_175414	Tspan9	tetraspanin-9
NM_026132	Txndc8	thioredoxin domain-containing protein 8
NM_001160319	Ubr4	E3 ubiquitin-protein ligase UBR4
NM_016808	Usp2	ubiquitin carboxyl-terminal hydrolase 2 isoform
NM_030180	Usp54	inactive ubiquitin carboxyl-terminal hydrolase
NM_177387	Ust	uronyl 2-sulfotransferase
NM_020505	Vav3	guanine nucleotide exchange factor VAV3 isoform
NM_009504	Vdr	vitamin D3 receptor
NM_177683	Vgll4	transcription cofactor vestigial-like protein 4
NM_026664	Vps53	vacuolar protein sorting-associated protein 53
NM_012038	Vsn1	visinin-like protein 1
NM_028640	Whrn	whirlin isoform 1
NM_212438	Wiz	protein Wiz isoform 1
NM_009523	Wnt4	protein Wnt-4 precursor
NM_019573	Wwox	WW domain-containing oxidoreductase
NM_207255	Zfp532	zinc finger protein 532
NM_177086	Zmat4	zinc finger matrin-type protein 4
NM_027230	Zmynd8	protein kinase C-binding protein 1
NM_001168622	Znrf1	E3 ubiquitin-protein ligase ZNRF1 isoform b
NM_028275	1700112E06Rik	leucine-rich repeat-containing protein C10orf11
NM_025599	2610528E23Rik	hypothetical protein LOC66497
NM_172884	2900026A02Rik	hypothetical protein LOC243219
NM_028473	3110079O15Rik	hypothetical protein LOC73234 precursor
NM_028732	4632428N05Rik	platelet receptor G124 isoform 1 precursor
NM_026359	4930578I06Rik	hypothetical protein LOC67750
NM_178682	4933426M11Rik	hypothetical protein LOC217684
NM_178801	6030446N20Rik	transmembrane protein C18orf45 homolog
NM_145448	9030617O03Rik	hypothetical protein LOC217830 precursor

PROXIMAL (2-50kb)

Transcript Name	Gene name	Gene Description
NM_183188	A2bp1	fox-1 homolog A isoform alpha
NM_145415	AA408296	digestive organ expansion factor homolog
NM_013454	Abca1	ATP-binding cassette sub-family A member 1
NM_172678	Acad9	acyl-CoA dehydrogenase family member 9,
NM_023735	Actr3	actin-related protein 3
NM_144899	Adamtsl4	ADAMTS-like protein 4 precursor
NM_133919	Aff1	AF4/FMR2 family member 1 isoform 2
NM_145566	Aqf2	arf-GAP domain and FG repeats-containing protein
NR_024189	AI837181	
NM_172645	AI848100	AI848100
NM_172393	Aim1	absent in melanoma 1 protein
NM_029332	Akap13	A kinase (PRKA) anchor protein 13
NM_007436	Aldh3a1	aldehyde dehydrogenase, dimeric NADP-preferring
NM_009663	Alox5ap	arachidonate 5-lipoxygenase-activating protein
NM_019764	Amotl2	angiominin-like protein 2
NM_144524	Angel1	protein angel homolog 1
NM_009670	Ank3	ankyrin 3, epithelial isoform g
NM_153589	Ano2	anoctamin-2
NM_133237	Apcdd1	protein APCDD1 precursor
NM_007473	Aqp7	aquaporin-7
NM_013476	Ar	androgen receptor
NM_133674	Arhgef5	Rho guanine nucleotide exchange factor (GEF) 5
NM_001085355	Arid1b	AT rich interactive domain 1B (Swi1 like)
NM_007494	Ass1	argininosuccinate synthase
NM_026402	Atg3	ubiquitin-like-conjugating enzyme ATG3
NM_053069	Atg5	autophagy protein 5
NM_144900	Atp1a1	sodium/potassium-transporting ATPase subunit
NM_213616	Atp2b4	plasma membrane calcium ATPase 4 isoform x/e
NM_026468	Atp5g2	ATP synthase lipid-binding protein,
NM_016843	Atxn10	ataxin-10
NR_028382	B230319C09Rik	
NM_177897	B4galnt4	N-acetyl-beta-glucosaminyl-glycoprotein
NM_007520	Bach1	transcription regulator protein BACH1
NM_013863	Bag3	BAG family molecular chaperone regulator 3
NM_001044750	Banf2	barrier-to-autointegration factor-like protein
NR_027893	BB123696	
NR_024085	BC006965	
NM_145601	BC016201	cDNA sequence BC016201 isoform 2
NM_145972	BC027231	hypothetical protein LOC212547
NM_173022	BC048403	hypothetical protein LOC270802
NM_001164369	Bcas1	breast carcinoma-amplified sequence 1 homolog
NM_207681	Bcl2l11	bcl-2-like protein 11 isoform 2
NM_030256	Bcl9l	B-cell CLL/lymphoma 9-like protein
NM_199028	Bend3	BEN domain-containing protein 3
NM_007556	Bmp6	bone morphogenetic protein 6 precursor
NM_007559	Bmp8b	bone morphogenetic protein 8B precursor
NM_009758	Bmpr1a	bone morphogenetic protein receptor type-1A
NM_007562	Bnc1	zinc finger protein basoanudin-1
NM_172870	Bnc2	zinc finger protein basoanudin-2
NM_027453	Btf3l4	transcription factor BTF3 homolog 4
NM_177584	Btla	B- and T-lymphocyte attenuator isoform 2
NR_015546	C130026L21Rik	
NM_198037	Cachd1	VWFA and cache domain-containing protein 1
NM_001008706	Calm5	calmodulin 5
NM_027416	Calm3	calmodulin-like protein 3
NM_144817	Camk1g	calcium/calmodulin-dependent protein kinase type
NM_001039139	Camk2g	calcium/calmodulin-dependent protein kinase type
NM_145595	Cbr4	carbonyl reductase family member 4
NM_175369	Ccdc122	coiled-coil domain-containing protein 122
NM_007631	Ccnd1	G1/S-specific cyclin-D1
NM_007635	Ccng2	cyclin-G2
NM_019937	Ccn1	cyclin-L1
NM_007719	Ccr7	C-C chemokine receptor type 7 precursor
NM_153098	Cd109	CD109 antigen precursor
NM_010818	Cd200	OX-2 membrane glycoprotein precursor
NM_001111059	Cd34	hematopoietic progenitor cell antigen CD34
NM_001033122	Cd69	early activation antigen CD69
NM_009856	Cd83	CD83 antigen precursor
NM_007657	Cd9	CD9 antigen
NM_007658	Cdc25a	M-phase inducer phosphatase 1
NM_001033373	Cdk15	cell division protein kinase 15
NM_008795	Cdk18	cell division protein kinase 18
NM_001111099	Cdkn1a	cyclin-dependent kinase inhibitor 1
NM_009884	Cebpg	CCAAT/enhancer-binding protein gamma
NM_145475	Cerk	ceramide kinase
NM_172759	Ces5	carboxylesterase 5
NM_001081345	Chd2	chromodomain helicase DNA binding protein 2
NM_001081417	Chd7	chromodomain-helicase-DNA-binding protein 7
NM_027882	Cic	protein capicua homolog isoform a
NM_010828	Cited2	cbp/p300-interacting transactivator 2
NM_175451	Ckap4	cytoskeleton-associated protein 4
NM_171826	Cldnd1	claudin domain-containing protein 1
NM_013748	Clnk	cytokine-dependent hematopoietic cell linker
NM_027294	Cntm8	CKLF-like MARVEL transmembrane domain-containing
NM_033570	Cnnm4	metal transporter CNNM4
NM_009931	Col4a1	collagen alpha-1(IV) chain precursor
NM_027904	Cpn2	carboxypeptidase N subunit 2
NM_007759	Crabp2	cellular retinoic acid-binding protein 2
NM_015800	Crim1	cysteine-rich motor neuron 1 protein precursor
NM_024223	Crip2	cysteine-rich protein 2
NM_146087	Csnk1a1	casein kinase I isoform alpha
NM_007791	Csrp1	cysteine and glycine-rich protein 1

NM_133710	Ctdspl	CTD small phosphatase-like protein
NM_023465	Ctnnbp1	beta-catenin-interacting protein 1
NM_019568	Cxcl14	C-X-C motif chemokine 14 precursor
NM_007722	Cxcr7	C-X-C chemokine receptor type 7
NM_025558	Cyb5b	cytochrome b5 type B precursor
NM_029787	Cyb5r3	NADH-cytochrome b5 reductase 3
NM_007814	Cyp2b19	cytochrome P450 2B19
NM_001101478	D3Erttd254e	hypothetical protein LOC241944
NM_026102	Daam1	disheveled-associated activator of morphogenesis
NM_029723	Dapl1	death-associated protein-like 1
NM_207533	Dbx2	developing brain homeobox 2
NM_178896	Dcun1d4	DCN1-like protein 4 isoform B
NM_026993	Ddah1	N(G),N(G)-dimethylarginine
NM_007916	Ddx19a	ATP-dependent RNA helicase DDX19A
NM_007853	Degs1	sphingolipid delta(4)-desaturase DES1
NM_024440	Derl3	derlin-3
NM_015814	Dkk3	dickkopf-related protein 3 precursor
NM_007865	Dll1	delta-like protein 1 precursor
NM_001081371	Dmx1	dmx-like protein 1
NM_018808	Dnajb1	dnaJ homolog subfamily B member 1
NM_020266	Dnajb2	dnaJ homolog subfamily B member 2 isoform 1
NM_019759	Dpt	dermatopontin precursor
NM_181680	Dsg1c	desmoglein-1-gamma precursor
NR_015511	E030011O05Rik	
NR_015614	E230029C05Rik	
NM_010332	Ednra	endothelin-1 receptor precursor
NM_007910	Efna4	ephrin-A4 precursor
NM_178444	Egfl7	epidermal growth factor-like protein 7 isoform 1
NM_145139	Eif3l	eukaryotic translation initiation factor 3
NM_145625	Eif4b	eukaryotic translation initiation factor 4B
NM_023479	Elac2	zinc phosphodiesterase ELAC protein 2
NM_148941	Elov14	elongation of very long chain fatty acids
NM_134255	Elov15	elongation of very long chain fatty acids
NM_023119	Eno1	alpha-enolase
NM_019427	Epb4.114b	band 4,1-like protein 4B
NM_010143	Ephb3	ephrin type-B receptor 3 precursor
NM_026067	Eri1	3'-5' exonuclease 1
NM_133753	Errf1	ERBB receptor feedback inhibitor 1
NM_011809	Ets2	protein C-ets-2
NM_010165	Eya2	eyes absent homolog 2
NM_172647	F11r	junctional adhesion molecule A precursor
NM_010171	F3	tissue factor precursor
NM_178764	Fam168a	hypothetical protein LOC319604
NM_175514	Fam171b	family with sequence similarity 171, member B
NM_138746	Fam50b	DNA segment, human D6S2654E
NM_026143	Far1	fatty acyl-CoA reductase 1
NM_175127	Fbxo28	F-box only protein 28
NM_010193	Fem1b	protein fem-1 homolog B
NM_010197	Fgf1	heparin-binding growth factor 1 precursor
NM_008010	Fgfr3	fibroblast growth factor receptor 3 isoform 1
NM_001033301	Fhd1	FH2 domain-containing protein 1
NM_018881	Fmo2	dimethylaniline monooxygenase [N-oxide-forming]
NM_010234	Fos	proto-oncogene c-Fos
NM_008037	Fosl2	fos-related antigen 2
NM_183298	Foxe1	forkhead box protein E1
NM_194060	Foxo6	forkhead box protein O6
NM_013522	Frg1	protein FRG1
NM_028127	Frmf6	FERM domain-containing protein 6
NM_016893	Fut8	alpha-(1,6)-fucosyltransferase
NM_020510	Fzd2	frizzled-2 precursor
NM_008086	Gas1	growth arrest-specific protein 1
NM_008091	Gata3	trans-acting T-cell-specific transcription
NM_153564	Gbp5	guanylate-binding protein 5
NM_010276	Gem	GTP-binding protein GEM
NM_010279	Gfra1	GDNF family receptor alpha-1 precursor
NM_020014	Gfra4	GDNF family receptor alpha-4 isoform 2
NM_008130	Gli3	zinc finger protein GLI3
NR_027829	Gm10638	
NR_026944	Gm10941	
NR_015474	Gm14047	
NM_001127576	Gm1564	hypothetical protein LOC268491
NM_201366	Gm1631	hypothetical protein LOC381371
NM_001033403	Gm1968	hypothetical protein LOC328657
NR_028424	Gm2176	
NM_001033333	Gm239	hypothetical protein LOC237558
NM_198657	Gm5148	hypothetical protein LOC381438
NM_001101609	Gm9376	hypothetical protein LOC668814
NM_001042672	Gpcpd1	putative glycerophosphocholine phosphodiesterase
NM_133776	Gpr110	G-protein coupled receptor 110 precursor
NM_001033493	Gpr111	G protein-coupled receptor 111
NM_019925	Gpr132	probable G-protein coupled receptor 132
NM_177366	Gpr157	probable G-protein coupled receptor 157
NM_181444	Gprc5a	retinoic acid-induced protein 3
NM_183209	Gprin2	G protein-regulated inducer of neurite outgrowth
NM_001033498	Gramd2	GRAM domain-containing protein 2
NM_019518	Grasp	general receptor for phosphoinositides
NM_001033426	Grxcr2	glutaredoxin domain-containing cysteine-rich
NM_146120	Gsn	gelsolin precursor
NM_001080746	Gtf2i	general transcription factor II-I isoform 1
NM_010376	H13	minor histocompatibility antigen H13 isoform 2
NM_175000	Hbq1	hemoglobin, theta T2
NM_145567	Hibadh	3-hydroxyisobutyrate dehydrogenase,
NM_010431	Hif1a	hypoxia-inducible factor 1-alpha
NM_025812	Hmg20a	high mobility group protein 20A
NM_010439	Hmqb1	high mobility group protein B1

NM_053263	Hnrnpa3	heterogeneous nuclear ribonucleoprotein A3
NM_175606	Hopx	homeodomain-only protein
NM_008266	Hoxb1	homeobox protein Hox-B1
NM_016677	Hpcal1	hippocalcin-like protein 1
NM_021429	Hs1bp3	HCLS1-binding protein 3
NM_010480	Hsp90aa1	heat shock protein HSP 90-alpha
NM_010479	Hspa1a	heat shock 70 kDa protein 1A
NM_031166	Id4	DNA-binding protein inhibitor ID-4
NM_008329	Ifi204	interferon-activable protein 204
NM_009879	Ifit81	intraflagellar transport protein 81 homolog
NM_001122737	Igf2	insulin-like growth factor II isoform 2
NM_010518	Igfbp5	insulin-like growth factor-binding protein 5
NM_010550	Il11ra2	interleukin-11 receptor subunit alpha-2
NM_001127363	Inpp5a	inositol polyphosphate-5-phosphatase A isoform
NM_016721	Iqgap1	ras GTPase-activating-like protein IQGAP1
NM_001164598	Irf2bp2	interferon regulatory factor 2 binding protein
NM_015783	Isg15	ubiquitin-like protein ISG15 precursor
NM_008410	Itn2b	integral membrane protein 2B
NM_001033380	Itprip12	inositol 1,4,5-triphosphate receptor-interacting
NM_027391	Iyd	iodotyrosine dehalogenase 1 precursor
NM_010592	Jund	transcription factor jun-D
NM_001081140	Kcna10	potassium voltage-gated channel subfamily A
NM_025734	Kcng4	potassium voltage-gated channel subfamily G
NR_027627	Kcnk2	
NM_001097621	Kif26a	kinesin-like protein KIF26A
NM_178357	Kif11	Krueppel-like factor 11
NM_023184	Kif15	Krueppel-like factor 15
NM_010637	Kif4	Krueppel-like factor 4
NM_011803	Kif6	Krueppel-like factor 6
NM_010638	Kif9	Krueppel-like factor 9
NM_001039042	Kik13	kallikrein 13 precursor
NM_001159374	Krt32	keratin, type I cuticular Ha2
NM_212483	Krt42	keratin, type I cytoskeletal 42
NM_008476	Krt6a	keratin, type II cytoskeletal 6A
NM_212487	Krt78	keratin Kb40
NM_031170	Krt8	keratin, type II cytoskeletal 8
NM_008477	Ktn1	kinectin
NM_008640	Laptm4a	lysosomal-associated transmembrane protein 4A
NM_010691	Lbx1	transcription factor Lbx1
NM_010699	Ldha	L-lactate dehydrogenase A chain isoform 1
NM_001081272	Ldlrad1	low-density lipoprotein receptor class A
NM_178886	Ldlrad3	low-density lipoprotein receptor class A
NM_145554	Ldlrap1	low density lipoprotein receptor adapter protein
NM_027042	Lepl1	late cornified envelope-like proline-rich
NM_001083188	Lig1	DNA ligase 1
NM_019980	Litaf	lipopolysaccharide-induced tumor necrosis
NM_001081150	Lonrf1	LON peptidase N-terminal domain and RING finger
NM_178665	Lpp	lipoma-preferred partner homolog isoform 1
NM_153542	Lrrc20	leucine-rich repeat-containing protein 20
NM_026309	Lsm3	U6 snRNA-associated Sm-like protein LSM3
NM_026915	Lyzl4	lysozyme-like protein 4 precursor
NM_001013813	Maml2	mastermind like 2 isoform 1
NM_145569	Mat2a	S-adenosylmethionine synthase isoform type-2
NM_001081160	Mdga1	MAM domain-containing
NM_172424	Med13l	mediator of RNA polymerase II transcription
NM_026039	Med18	mediator of RNA polymerase II transcription
NM_026119	Med4	mediator of RNA polymerase II transcription
NM_153749	Mill1	MHC I like leukocyte 1
NR_029567	Mir129-1	
NR_029587	Mir200b	
NR_029592	Mir205	
NR_029773	Mir345	
NR_030491	Mir710	
NR_030439	Mir760	
NM_008626	Mrc2	C-type mannose receptor 2 precursor
NM_025796	Mrp133	39S ribosomal protein L33, mitochondrial
NM_025927	Mrp145	39S ribosomal protein L45, mitochondrial
NM_023331	Mrp146	39S ribosomal protein L46, mitochondrial
NM_001024917	N4bp2	Nedd4 binding protein 2
NM_194335	Naif1	nuclear apoptosis-inducing factor 1
NM_008675	Nbl1	neuroblastoma suppressor of tumorigenicity 1
NM_025424	Nenf	neudesin precursor
NM_001047159	Net1	neuroepithelial cell-transforming gene 1 protein
NM_010903	Nfe2l3	nuclear factor erythroid 2-related factor 3
NM_017373	Nfil3	nuclear factor interleukin-3-regulated protein
NM_008689	Nfkb1	nuclear factor NF-kappa-B p105 subunit
NM_001109985	Nos1ap	carboxyl-terminal PDZ ligand of neuronal nitric
NM_001163504	Nr1h4	bile acid receptor isoform 2
NM_008173	Nr3c1	glucocorticoid receptor
NM_001036293	Nrbf2	nuclear receptor-binding factor 2
NM_019761	Nxt1	NTF2-related export protein 1
NM_145153	Oas1f	2'-5'-oligoadenylate synthetase 1F
NM_175360	Obfc1	CST complex subunit STN1
NM_008757	Odf1	outer dense fiber protein 1
NM_172143	Ofcc1	orofacial cleft 1 candidate gene 1 protein
NM_052976	Ophn1	oligophrenin-1
NM_007538	Opn1sw	blue-sensitive opsin
NM_144500	Osbpl2	oxysterol-binding protein-related protein 2
NM_027950	Osgin1	oxidative stress-induced growth inhibitor 1
NM_001159509	Pacsin2	protein kinase C and casein kinase substrate in
NM_145962	Pank3	pantothenate kinase 3
NM_029595	Pbp2	phosphatidylethanolamine-binding protein 2
NM_018814	Pcnx	pecanex-like protein 1
NM_016798	Pdlim3	PDZ and LIM domain protein 3
NM_018884	Pdzrn3	E3 ubiquitin-protein ligase PDZRN3

NM_033602	Peli2	protein pellino homolog 2
NM_011065	Per1	period circadian protein homolog 1
NM_001042407	Pex10	peroxisome biogenesis factor 10
NM_133232	Pfkfb3	6-phosphofructo-2-kinase/fructose-2,6-phosphofructokinase
NM_019703	Pfkfb3	6-phosphofructokinase type C
NM_008831	Phb	prohibitin
NM_007905	Phc1	polyhomeotic-like protein 1 isoform A
NM_013750	Phlda3	pleckstrin homology-like domain family A member
NM_133821	Phlpp1	PH domain leucine-rich repeat-containing protein
NM_026078	Piqc	phosphatidylinositol
NM_013784	Pign	GPI ethanolamine phosphate transferase 1
NM_029094	Pik3cb	phosphatidylinositol-4,5-bisphosphate 3-kinase
NM_001146200	Pik3cg	phosphatidylinositol-4,5-bisphosphate 3-kinase
NM_177905	Piwil4	piwi-like protein 4
NM_001164203	Plec	plectin isoform 1hij
NM_153804	Plekhg3	pleckstrin homology domain-containing family G
NM_008882	Plxna2	plexin-A2 precursor
NM_011141	Pou3f1	POU domain, class 3, transcription factor 1
NM_008904	Ppargc1a	peroxisome proliferator-activated receptor gamma
NM_008909	Ppl	perioplakin
NM_133485	Ppp1r14c	protein phosphatase 1 regulatory subunit 14C
NM_133819	Ppp1r15b	protein phosphatase 1 regulatory subunit 15B
NM_016854	Ppp1r3c	protein phosphatase 1 regulatory subunit 3C
NM_001161362	Ppp2r3a	protein phosphatase 2, regulatory subunit B"
NM_011103	Prkcd	protein kinase C delta type
NM_008859	Prkcc	protein kinase C theta type
NM_011170	Prnp	major prion protein precursor
NM_001128605	Psen2	presenilin-2
NM_011968	Psmc6	proteasome subunit alpha type-6
NM_022415	Ptges	prostaglandin E synthase
NM_001130409	Ptk2	focal adhesion kinase 1 isoform 2
NM_008977	Ptpn2	tyrosine-protein phosphatase non-receptor type 2
NM_001160221	Pum2	pumilio homolog 2 isoform 2
NM_001033206	Pwwp2b	PWWP domain containing 2 isoform 2
NM_001033267	Qrich2	glutamine rich 2
NM_153559	Qsox2	sulfhydryl oxidase 2
NM_016676	Rab10	ras-related protein Rab-10
NM_009003	Rab4a	ras-related protein Rab-4A
NM_145510	Rabif	guanine nucleotide exchange factor MSS4
NM_009021	Rai1	retinoic acid-induced protein 1
NM_022327	Ralb	ras-related protein Ral-B precursor
NM_011244	Rarg	retinoic acid receptor gamma isoform 1
NM_138956	Rassf3	ras association domain-containing protein 3
NM_009826	Rb1cc1	RB1-inducible coiled-coil protein 1
NM_145923	Rel1	RELT-like protein 1 precursor
NM_026380	Rgs8	regulator of G-protein signaling 8
NM_139228	Rhbdl3	rhomoid-related protein 3
NM_007483	Rhob	rho-related GTP-binding protein RhoB precursor
NM_026357	Ribc2	RIB43A-like with coiled-coils protein 2
NM_177158	Rinl	ras and Rab interactor-like protein
NM_024242	Riok1	serine/threonine-protein kinase RIO1
NM_001162863	Rnase10	ribonuclease-like protein 10 isoform 2
NM_013846	Ror2	tyrosine-protein kinase transmembrane receptor
NM_026533	Rps13	40S ribosomal protein S13
NM_019924	Rps6ka4	ribosomal protein S6 kinase alpha-4
NM_028040	Rpusd4	RNA pseudouridylylase domain-containing
NM_009104	Rrm2	ribonucleoside-diphosphate reductase subunit M2
NM_019743	Rybp	RING1 and YY1-binding protein
NM_016741	Scarb1	scavenger receptor class B member 1
NM_011325	Scnn1b	amiloride-sensitive sodium channel subunit beta
NM_011348	Sema3e	semaphorin-3E precursor
NM_023475	Serhl	serine hydrolase-like protein
NM_008458	Serpina3c	serine protease inhibitor A3C precursor
NM_018754	Sfn	14-3-3 protein sigma
NM_001136080	Sqca	alpha-sarcoglycan isoform 1
NM_001161845	Sgk1	serine/threonine-protein kinase Sgk1 isoform A
NM_027921	Slc16a14	monocarboxylate transporter 14
NM_011395	Slc22a3	solute carrier family 22 member 3
NM_018824	Slc23a2	solute carrier family 23 member 2
NM_022880	Slc29a1	equilibrative nucleoside transporter 1 isoform
NM_011400	Slc2a1	solute carrier family 2, facilitated glucose
NM_009579	Slc30a1	zinc transporter 1
NM_028123	Slc37a3	sugar phosphate exchanger 3
NM_027052	Slc38a4	sodium-coupled neutral amino acid transporter 4
NM_009320	Slc6a6	sodium- and chloride-dependent taurine
NM_007513	Slc7a1	high affinity cationic amino acid transporter 1
NM_029949	Snapc3	snRNA-activating protein complex subunit 3
NM_175483	Snx33	sorting nexin-33
NM_007707	Socs3	suppressor of cytokine signaling 3
NM_011434	Sod1	superoxide dismutase [Cu-Zn]
NM_172752	Sorbs2	sorbin and SH3 domain-containing protein 2
NM_025312	Sostdc1	sclerostin domain-containing protein 1
NM_009242	Sparc	SPARC precursor
NM_027609	Speer4f	spermatogenesis associated glutamate (E)-rich
NM_001164140	Spert	spermatid-associated protein isoform 4
NM_183284	Spink2	serine protease inhibitor Kazal-type 2
NM_029012	Spp13	signal peptide peptidase-like 3
NM_001025395	Src	neuronal proto-oncogene tyrosine-protein kinase
NM_012058	Srp9	signal recognition particle 9 kDa protein
NM_021403	Srrm3	serine/arginine repetitive matrix protein 3
NM_010656	Sspn	sarcospan
NM_009182	St8sia3	sia-alpha-2,3-Gal-beta-1,4-GlcNAc-R:alpha
NM_025288	Stfa3	stefin-3
NM_138649	Syt17	synaptotagmin-17
NM_031394	Syt12	synaptotagmin-like protein 2 isoform 3

NM_001040435	Tacc3	transforming acidic coiled-coil-containing
NM_011530	Tap2	antigen peptide transporter 2
NM_001159907	Tarbp1	TAR (HIV-1) RNA binding protein 1
NM_172310	Tarsl2	probable threonyl-tRNA synthetase 2,
NM_175225	Tasp1	threonine aspartase 1 isoform a
NM_019636	Tbc1d1	TBC1 domain family member 1
NM_001163455	Tbck	TBC domain-containing protein kinase-like
NM_011544	Tcf12	transcription factor 12
NM_031182	Tcfap4	transcription factor AP-4
NM_023755	Tcfcp211	transcription factor CP2-like protein 1
NM_172605	Tdrd3	tudor domain-containing protein 3
NM_011902	Tekt2	tektin-2
NM_009357	Tex261	protein TEX261
NM_177588	Thns11	threonine synthase-like 1 isoform a
NM_011597	Tjp2	tight junction protein ZO-2 isoform 2
NM_019725	Tle2	transducin-like enhancer protein 2
NM_025453	Tm4sf20	transmembrane 4 L6 family member 20
NM_172051	Tmcc3	transmembrane and coiled-coil domains protein 3
NM_028336	Tmem107	transmembrane protein 107 isoform 2
NM_018872	Tmem131	transmembrane protein 131
NM_177260	Tmem154	transmembrane protein 154 precursor
NM_001081283	Tmem28	transmembrane protein FAM155B
NM_001163172	Tmem92	transmembrane protein 92 isoform 1
NM_198967	Tmtc1	transmembrane and TPR repeat-containing protein
NM_011607	Tnc	tenascin
NM_009397	Tnfaip3	tumor necrosis factor alpha-induced protein 3
NM_001159503	Tnfsf12-Tnfsf13	tumor necrosis factor (ligand) superfamily,
NM_001110147	Tnk2	activated CDC42 kinase 1 isoform 2
NM_001130180	Tnnt2	troponin T, cardiac muscle isoform e
NM_178242	Tnrc18	trinucleotide repeat-containing gene 18 protein
NM_020507	Tob2	protein Tob2
NM_011906	Tpra1	transmembrane protein adipocyte-associated 1
NM_194343	Trim45	tripartite motif-containing protein 45 isoform
NM_178110	Trim62	tripartite motif-containing protein 62
NM_001160412	Triml2	tripartite motif family-like 2
NM_001085421	Tsply5	testis-specific Y-encoded-like protein 5
NM_027238	Ttc39b	tetratricopeptide repeat protein 39B
NM_029264	Ttl10	protein polyglycolase TTL10
NM_017379	Tuba8	tubulin alpha-8 chain
NM_019913	Txn2	thioredoxin, mitochondrial precursor
NM_010633	Uhmk1	serine/threonine-protein kinase Kist
NM_026031	Utp111	probable U3 small nucleolar RNA-associated
NM_011694	Vdac1	voltage-dependent anion-selective channel
NM_172255	Wdr11	WD repeat-containing protein 11
NM_145514	Wdr26	WD repeat-containing protein 26
NM_030215	Wmip1	ATPase WRNIP1
NM_019653	Wsb1	WD repeat and SOCS box-containing protein 1
NM_011724	Xirp1	xin actin-binding repeat-containing protein 1
NM_001005341	Ypel2	protein yippee-like 2
NM_011740	Ywhaz	14-3-3 protein zeta/delta
NM_001122676	Zcchc2	zinc finger CCHC domain-containing protein 2
NM_001033261	Zfc3h1	proline/serine-rich coiled-coil 2
NM_199029	Zfp395	zinc finger protein 395
NM_172867	Zfp462	zinc finger protein 462
NM_201609	Zfp652	zinc finger protein 652
NM_001146000	Zfp710	zinc finger protein 710 isoform b
NM_153194	Zfp740	zinc finger protein 740
NM_172919	Zfp846	zinc finger protein 846
NM_145456	Zswim6	zinc finger SWIM domain-containing protein 6
NM_001045536	Zzef1	zinc finger ZZ-type and EF-hand
NM_025319	0610009B22Rik	hypothetical protein LOC66050
NM_001164210	1110032A04Rik	small subunit of serine palmitoyltransferase B
NM_001081005	1500012F01Rik	hypothetical protein LOC68949
NM_024283	1500015O10Rik	augurin precursor
NM_027063	1700013G24Rik	hypothetical protein LOC69380
NM_027966	1700019O17Rik	hypothetical protein LOC71863
NR_003953	1700022A21Rik	
NM_027970	1700023E05Rik	hypothetical protein LOC71868
NR_027909	1700029M20Rik	
NM_028851	1700080O16Rik	hypothetical protein LOC74279
NM_133998	1810008A18Rik	hypothetical protein LOC108707
NM_027129	2310035K24Rik	hypothetical protein LOC69596
NM_025621	2310050C09Rik	hypothetical protein LOC66533
NM_001007581	2810408M09Rik	hypothetical protein LOC381406
NR_015489	2900041M22Rik	
NR_030715	3930402G23Rik	
NR_015510	4632427E13Rik	
NM_172500	4831426I19Rik	nesprin-3 isoform beta
NM_029440	4930434E21Rik	hypothetical protein LOC381693
NR_015535	4930567H12Rik	
NM_001145759	4930571K23Rik	hypothetical protein LOC75861
NR_027879	4930583K01Rik	
NM_001081063	4933401F05Rik	serine protease 55 precursor
NM_028908	4933403G14Rik	hypothetical protein LOC74393
NM_001081101	4933407H18Rik	hypothetical protein LOC71101
NR_027843	4933432I09Rik	
NM_176921	6030419C18Rik	hypothetical protein LOC319477
NM_172859	6330439K17Rik	ankyrin repeat-containing protein C20orf12
NM_026377	6330577E15Rik	hypothetical protein LOC67788
NM_145836	6430527G18Rik	enhanced at puberty protein 1
NR_015553	9430076C15Rik	

DISTAL(>50kb)

Transcript Name	Gene name	Gene Description
NM_001081067	A1bg	alpha-1B-glycoprotein precursor
NM_177039	A530016L24Rik	transmembrane protein C14orf180 homolog
NM_025271	Act17b	actin-like protein 7B
NM_007396	Acvr2a	activin receptor type-2A precursor
NM_009623	Adcy8	adenylate cyclase type 8
NM_020332	Ank	progressive ankylosis protein
NM_001080933	Ankfn1	ankyrin repeat and fibronectin type-III
NM_001167883	Ankrd50	ankyrin repeat domain 50
NM_007481	Arf6	ADP-ribosylation factor 6
NM_183019	Arhgef4	rho guanine nucleotide exchange factor 4
NM_007487	Arl4a	ADP-ribosylation factor-like protein 4A
NM_001042592	Aradc4	arrestin domain containing 4 isoform 1
NM_176999	Atp10b	probable phospholipid-transporting ATPase VB
NM_007502	Atp1b3	sodium/potassium-transporting ATPase subunit
NM_175015	Atp5g3	ATP synthase lipid-binding protein,
NM_001001488	Atp8b1	probable phospholipid-transporting ATPase IC
NM_015732	Axin2	axin-2
NM_001102458	Azin1	antizyme inhibitor 1
NM_001033350	Bank1	B-cell scaffold protein with ankyrin repeats
NM_016812	Banp	protein BANP isoform 2
NM_130452	Bbox1	gamma-butyrobetaine dioxygenase
NM_013867	Bcar3	breast cancer anti-estrogen resistance protein
NM_007553	Bmp2	bone morphogenetic protein 2 precursor
NM_007557	Bmp7	bone morphogenetic protein 7 precursor
NM_028472	Bmper	BMP-binding endothelial regulator protein
NM_009782	Cacna1e	voltage-dependent R-type calcium channel subunit
NM_018770	Cadm1	cell adhesion molecule 1 isoform c
NM_001160399	Ccdc112	coiled-coil domain-containing protein 112
NM_201362	Ccdc68	coiled-coil domain-containing protein 68
NM_009866	Cdh11	cadherin-11 preproprotein
NM_198656	Cdh26	cadherin-like protein 26 precursor
NM_009868	Cdh5	cadherin-5 precursor
NM_144536	Cdkal1	CDK5 regulatory subunit-associated protein
NM_001024624	Cdkl5	cyclin-dependent kinase-like 5
NM_029976	Cdkn2aipnl	CDKN2AIP N-terminal-like protein
NM_028850	Chic2	cysteine-rich hydrophobic domain 2 protein
NM_009893	Chrd	chordin precursor
NM_027998	Cldn23	claudin-23
NM_173422	Colec10	collectin-10 precursor
NM_133805	Cops8	COP9 signalosome complex subunit 8
NM_025815	Cpne8	copine-8 isoform 1
NM_001080809	Cps1	carbamoyl-phosphate synthase [ammonia],
NM_010217	Ctgf	connective tissue growth factor precursor
NM_021704	Cxcl12	stromal cell-derived factor 1 isoform alpha
NM_144853	Cyrr1	cysteine and tyrosine-rich protein 1 precursor
NM_001109990	D0H4S114	neuronal protein 3.1
NM_001008702	Dab2	disabled homolog 2 isoform b
NM_029653	Dapk1	death-associated protein kinase 1
NM_019967	Dbc1	deleted in bladder cancer protein 1 homolog
NM_173419	Dleu7	leukemia-associated protein 7 homolog
NM_007862	Dlq1	disks large homolog 1
NM_029297	Dynlrb2	dynein light chain roadblock-type 2
NM_001014390	Dyrk2	dual specificity
NM_021469	Dysf	dysferlin isoform 1
NM_010104	Edn1	endothelin-1 precursor
NM_001001932	Eea1	early endosome antigen 1
NM_025769	Efcab1	EF-hand calcium-binding domain-containing
NM_010111	Efnb2	ephrin-B2 precursor
NM_025829	Eif4e3	eukaryotic translation initiation factor 4E type
NM_007930	Enc1	ectoderm-neural cortex protein 1
NM_013511	Epb4.1l2	band 4.1-like protein 2
NM_007961	Etv6	transcription factor ETV6
NM_010164	Eya1	eyes absent homolog 1
NM_173426	Fam110b	hypothetical protein LOC242297
NM_134096	Fam19a5	TAF45 protein
NM_019995	Fam48a	family with sequence similarity 48, member A
NM_178390	Fam53a	dorsal neural-tube nuclear protein
NM_201361	Fam82a1	regulator of microtubule dynamics protein 2
NM_001045518	Fam83b	hypothetical protein LOC208994
NM_001033980	Fam92b	hypothetical protein LOC436062
NM_183221	Fat4	protocadherin Fat 4 precursor
NM_198029	Fermt1	fermitin family homolog 1
NM_201601	Fgfr2	fibroblast growth factor receptor 2 isoform
NM_001113412	Fggy	FGGY carbohydrate kinase domain-containing
NM_201518	Flrt2	fibronectin leucine rich transmembrane protein
NM_207636	Fndc3a	fibronectin type-III domain-containing protein
NM_019739	Foxo1	forkhead box protein O1
NM_008239	Foxq1	forkhead box protein Q1
NM_008057	Fzd7	frizzled-7 precursor
NM_011817	Gadd45g	growth arrest and DNA damage-inducible protein
NM_008082	Galn1	galanin receptor type 1
NM_030719	Gatsl2	GATS-like protein 2
NM_010267	Gdap1	ganglioside-induced differentiation-associated
NM_008115	Gfra2	GDNF family receptor alpha-2
NM_008131	Glul	glutamine synthetase
NM_001005422	Gm1574	hypothetical protein LOC380842
NM_001005420	Gm347	hypothetical protein LOC241289
NM_001033266	Gm525	hypothetical protein LOC217071 precursor
NM_001033411	Gm826	hypothetical protein LOC329554
NM_008149	Gpm	glycerol-3-phosphate acyltransferase 1,
NM_001002268	Gpr126	G-protein coupled receptor 126 precursor
NM_025325	Haao	3-hydroxyanthranilate 3,4-dioxygenase

NM_008216	Has2	hyaluronan synthase 2
NM_010437	Hivep2	transcription factor HIVEP2
NM_010481	Hspa9	stress-70 protein, mitochondrial
NM_019960	Hspb3	heat shock protein beta-3
NM_008316	Hus1	checkpoint protein HUS1
NM_010496	Id2	DNA-binding protein inhibitor ID-2
NM_008343	Igfbp3	insulin-like growth factor-binding protein 3
NM_008381	Inhbb	inhibin beta B chain precursor
NM_133748	Insiq2	insulin-induced gene 2 protein isoform 1
NM_010573	Irx1	iroquois-class homeodomain protein IRX-1
NM_010574	Irx2	iroquois-class homeodomain protein IRX-2
NM_008393	Irx3	iroquois-class homeodomain protein IRX-3
NM_013822	Jag1	protein jagged-1 precursor
NM_001102670	Kbtbd8	kelch repeat and BTB domain-containing protein 8
NM_013692	Klf10	Krueppel-like factor 10
NM_001166659	Lekr1	leucine, glutamate and lysine rich 1 isoform 1
NM_001081298	Lphn2	latrophilin-2
NM_178725	Lrrc4c	leucine-rich repeat-containing protein 4C
NM_001025577	Maf	transcription factor Maf
NM_008548	Man1a	mannosyl-oligosaccharide 1,2-alpha-mannosidase
NM_011945	Map3k1	mitogen-activated protein kinase kinase kinase
NM_016700	Mapk8	mitogen-activated protein kinase 8
NM_001146176	Max	protein max isoform 2
NM_020007	Mbn1	muscleblind-like protein 1
NM_008560	Mc2r	adrenocorticotrophic hormone receptor
NM_001024703	Mctp2	multiple C2 and transmembrane domain-containing
NR_029540	Mir125b-2	
NR_029719	Mir148a	
NM_008604	Mme	nepriylisin
NM_001113374	Mocs2	molybdopterin synthase sulfur carrier subunit
NM_010820	Mpdz	multiple PDZ domain protein
NM_016804	Mtx2	metaxin-2
NM_153789	Myliip	E3 ubiquitin-protein ligase MYLIP isoform 1
NM_001166030	Mylk4	myosin light chain kinase family member 4
NM_176957	Nckap5	Nck-associated protein 5 isoform 3
NM_022996	Ndfip1	NEDD4 family-interacting protein 1
NM_028757	Nebi	nebulin
NM_010894	Neurod1	neurogenic differentiation factor 1
NM_153079	Nmur2	neuromedin-U receptor 2
NM_023456	Npy	neuropeptide Y precursor
NM_011851	Nt5e	5'-nucleotidase precursor
NM_172290	Ntm	neurotrimin precursor
NM_027722	Nudt4	diphosphoinositol polyphosphate phosphohydrolase
NM_028696	Obfc2a	SOSS complex subunit B2
NM_011857	Odz3	teneurin-3 isoform 1
NM_011019	Osmr	oncostatin-M-specific receptor subunit beta
NM_001081164	Otud4	OTU domain-containing protein 4
NM_011033	Pabpc2	poly A binding protein, cytoplasmic 2
NM_181402	Parp11	poly [ADP-ribose] polymerase 11
NM_008781	Pax3	paired box protein Pax-3 isoform a
NM_008783	Pbx1	pre-B-cell leukemia transcription factor 1
NM_009344	Phlda1	pleckstrin homology-like domain family A member
NM_001024955	Pik3r1	phosphatidylinositol 3-kinase regulatory subunit
NR_003202	Pinc	
NM_011097	Pitx1	pituitary homeobox 1
NM_001083110	Pja1	E3 ubiquitin-protein ligase Praja-1 isoform 1
NM_153179	Pkhd1	polyductin
NM_008869	Pla2g4a	cytosolic phospholipase A2
NM_018797	Plxnc1	plexin-C1 precursor
NM_080555	Ppap2b	lipid phosphate phosphohydrolase 3
NM_177741	Ppp1r3b	protein phosphatase 1 regulatory subunit 3B
NM_177698	Psd3	PH and SEC7 domain-containing protein 3 isoform
NM_019550	Ptbp2	polypyrimidine tract-binding protein 2
NM_008960	Pten	phosphatidylinositol-3,4,5-trisphosphate
NM_008966	Ptqfr	prostaglandin F2-alpha receptor
NM_011201	Ptpn1	tyrosine-protein phosphatase non-receptor type
NM_001081432	Ptprq	phosphotidylinositol phosphatase PTPRQ
NM_021424	Pvrl1	poliovirus receptor-related protein 1 precursor
NM_001163303	Pxmp3	peroxisome biogenesis factor 2
NM_027455	Qpc1	glutaminy-peptide cyclotransferase precursor
NM_011246	Rasgrp1	RAS guanyl-releasing protein 1
NM_001080928	Rbpj	recombining binding protein suppressor of
NM_178606	Reep3	receptor expression-enhancing protein 3
NM_009061	Rqs2	regulator of G-protein signaling 2
NM_178779	Rnf152	RING finger protein 152
NM_025974	Rpl14	60S ribosomal protein L14
NM_011297	Rps24	40S ribosomal protein S24 isoform 1
NM_017475	Rragc	ras-related GTP-binding protein C
NM_172769	Sc5d	lathosterol oxidase
NM_030261	Sesn3	sestrin-3
NM_009144	Sfrp2	secreted frizzled-related protein 2 precursor
NM_013665	Shox2	short stature homeobox protein 2
NM_181590	Shq1	protein SHQ1 homolog
NM_015829	Slc25a13	calcium-binding mitochondrial carrier protein
NM_001033286	Slc30a10	zinc transporter 10
NM_022885	Slc30a5	zinc transporter 5
NM_175121	Slc38a2	sodium-coupled neutral amino acid transporter 2
NM_009208	Slc4a3	anion exchange protein 3
NM_011415	Snai2	zinc finger protein SNAI2
NM_028874	Snrx19	sorting nexin-19
NM_025696	Sorcs3	VPS10 domain-containing receptor SorCS3
NM_011436	Sorl1	sortilin-related receptor
NM_001098425	Sp3	transcription factor Sp3 isoform 2
NR_001582	Speer5-ps1	
NM_033523	Spred2	sprouty-related, EVH1 domain-containing protein

NM_011372	St6galnac3	alpha-N-acetylgalactosaminide
NM_027399	Steap1	metalloreductase STEAP1
NM_054098	Steap4	metalloreductase STEAP4
NM_138667	Tab2	TGF-beta-activated kinase 1 and MAP3K7-binding
NM_177089	Tacc1	transforming acidic coiled-coil-containing
NM_030732	Tbl1xr1	F-box-like/WD repeat-containing protein TBL1XR1
NM_013685	Tcf4	transcription factor 4 isoform a
NM_207176	Tes	testin
NM_009371	Tgfbr2	TGF-beta receptor type-2 isoform 1
NM_001164074	Tgif1	homeobox protein TGIF1 isoform c
NM_011580	Thbs1	thrombospondin-1
NM_011581	Thbs2	thrombospondin-2 precursor
NM_178413	Thnsl2	threonine synthase-like 2
NM_012033	Tinag	tubulointerstitial nephritis antigen
NM_001163574	Tjp1	tight junction protein ZO-1 isoform 2
NM_001083928	Tle3	transducin-like enhancer protein 3 isoform 3
NM_178056	Tm2d3	TM2 domain-containing protein 3 isoform 2
NM_015775	Tmprss2	transmembrane protease serine 2
NM_177368	Tmtc2	transmembrane and TPR repeat-containing protein
NM_028339	Tmx1	thioredoxin-related transmembrane protein 1
NM_183391	Tnfrsf18	tumor necrosis factor (ligand) superfamily,
NM_009408	Top1	DNA topoisomerase 1
NM_144549	Trib1	tribbles homolog 1
NM_030706	Trim2	tripartite motif-containing protein 2
NM_001039104	Trpm1	transient receptor potential cation channel
NM_001081300	Tshz1	teashirt homolog 1
NM_029321	Ttc32	tetratricopeptide repeat protein 32
NM_028283	Uaca	uveal autoantigen with coiled-coil domains and
NM_183225	Usp24	ubiquitin carboxyl-terminal hydrolase 24
NM_144826	Utp6	U3 small nucleolar RNA-associated protein 6
NM_027614	Wdr20b	WD repeat-containing protein 20
NM_080848	Wdr5	WD repeat-containing protein 5
NM_001014981	Wdr7	WD repeat-containing protein 7
NM_028599	Wdr75	WD repeat-containing protein 75
NM_026858	Xrcc6bp1	mitochondrial inner membrane protease ATP23
NM_023311	Yipf5	protein YIPF5
NM_022985	Zfand6	AN1-type zinc finger protein 6
NM_146224	Zfp280d	zinc finger protein 280D
NM_001001806	Zfp3612	zinc finger protein 36, C3H1 type-like 2
NM_183033	Zfp516	zinc finger protein 516
NM_145492	Zfp521	zinc finger protein 521
NM_175751	Zfp608	zinc finger protein 608
NM_134054	1110002B05Rik	small subunit of serine palmitoyltransferase A
NM_001145198	1500009L16Rik	hypothetical protein LOC69784
NM_177718	1600021P15Rik	hypothetical protein LOC239796
NR_027968	1700020N01Rik	
NM_026931	1810011O10Rik	thyroid cancer-1
NM_001081236	2410131K14Rik	hypothetical protein LOC76792 precursor
NR_015556	2610035D17Rik	
NR_015579	2810032G03Rik	
NR_015605	2900052N01Rik	
NM_027637	4931428L18Rik	
NR_015512	4933406K04Rik	
NM_027668	4933412E24Rik	hypothetical protein LOC71088
NM_001081963	9430020K01Rik	hypothetical protein LOC240185