

Supplementary Table S1

shRNAs that deplete *in vivo* and *in vitro*. shRNAs targeting annotated genes, predicted genes, and predicted proteins that deplete an average of four-fold *in vivo* and *in vitro* are listed. The average fold change of each shRNA *in vitro* and *in vivo* was normalized to the median fold change of all shRNAs in that setting.

shRNA ID	accession number	gene symbol	gene name
V2MM_235925	NM_026914	1500032L24Rik	hypothetical protein LOC69029
V2MM_68910	NM_029639	1600029D21Rik	placenta expressed transcript 1
V2MM_105037	NM_029309	1700010A17Rik	hypothetical protein LOC75495
V2MM_104257	NM_029336.1	1700022P22Rik	RIKEN cDNA 1700022P22 gene
V2MM_99656	NM_001163521.1	1700034F02Rik	RIKEN cDNA 1700034F02 gene
V2MM_75928	NM_029697	1700128F08Rik	
V2MM_34899	NM_024249	1810073N04Rik	hypothetical protein LOC72055
V2MM_108828	NM_026961	2200002J24Rik	hypothetical protein LOC69147
V2MM_38299	NM_172280	2210018M11Rik	EMSY protein
V2MM_204483	NM_027155.1	2310061N02Rik	RIKEN cDNA 2310061N02 gene
V2MM_206017	NM_029741	2410127E16Rik	hypothetical protein LOC76787
V2MM_262492	NM_183119	2410141K09Rik	hypothetical protein LOC76803
V2MM_162618	NM_029366.2	2810422J05Rik	RIKEN cDNA 2810422J05 gene
V2MM_78039	NM_026063	2900010M23Rik	hypothetical protein LOC67267
V2MM_46523	NM_028455	3110043J09Rik	Rho GTPase activating protein 8
V2MM_12203	NM_026486	4432405B04Rik	tectonic 2
V2MM_73397	NM_030069	4432416J03Rik	hypothetical protein LOC78252
V2MM_106261	NM_029425	4833424O15Rik	phosphatidic acid phosphatase type 2d
V2MM_77999	NM_025724	4921510H08Rik	hypothetical protein LOC66716
V2MM_150781	NM_001081029	4930420K17Rik	hypothetical protein LOC652925
V2MM_103854	XM_003085237.1	4930442E04Rik	RIKEN cDNA 4930442E04 gene
V2MM_197564	XM_001474786.1	4930470H14Rik	RIKEN cDNA 4930470H14 gene
V2MM_204366	NM_001081096	4930500O09Rik	hypothetical protein LOC75811
V2MM_31717	NM_172450	4930539E08Rik	hypothetical protein LOC207819
V2MM_94203	NM_183104	4931429L15Rik	hypothetical protein LOC74361
V2MM_84694	NM_028908	4933403G14Rik	hypothetical protein LOC74393
V2MM_72714	NM_025751	4933425L06Rik	hypothetical protein LOC66763
V2MM_132926	NM_028872	5730559C18Rik	RIKEN cDNA 5730559C18 gene
V2MM_87859	NM_175261	5730596B20Rik	
V2MM_87734	NM_175234	6230409E13Rik	hypothetical protein LOC76132
V2MM_13057	NM_134022	6330403K07Rik	hypothetical protein LOC103712
V2MM_262473	NM_178796	A530064D06Rik	hypothetical protein LOC328830
V2MM_133986	NM_175437	A530088I07Rik	RIKEN cDNA A530088I07 gene
V2MM_71636	NM_026276	Aasdhppt	aminoadipate-semialdehyde dehydrogenase-phosphopantetheinyl transferase
V2MM_108916	NM_009596	Abpa	androgen binding protein alpha
V2MM_87207	NM_001039959	Ahnak	AHNAK nucleoprotein
V2MM_55182	NM_009650	Akap3	A-kinase anchor protein 3

V2MM_74366	NM_007426	Angpt2	angiopoietin 2
V2MM_211486	NM_145154	Angptl6	angiopoietin-related protein 5
V2MM_104809	NM_177268.4	Ankrd16	ankyrin repeat domain 16
V2MM_20637	NM_144790	Ankrd33	ankyrin repeat domain 33
V2MM_11962	NM_018758	Apba3	amyloid beta (A4) precursor protein-binding, family A, member 3
V2MM_96124	NM_001163621.1	Apol6	apolipoprotein L 6
V2MM_193277	NM_145985	Arcn1	archain 1
V2MM_104836	NM_001081364	Arhgap21	Rho GTPase activating protein 21
V2MM_33730	NM_146161	Arhgap24	Rho GTPase activating protein 24
V2MM_12436	NM_029847	Arsk	arylsulfatase K
V2MM_92171	NM_178662	Atcay	ataxia, cerebellar, Cayman type homolog
V2MM_134016	NM_001002897.3	Atg9b	ATG9 autophagy related 9 homolog B (<i>S. cerevisiae</i>) (Atg9b), mRNA
V2MM_53606	NM_009735	B2m	beta-2-microglobulin
V2MM_57262	NM_177188	B430209F14Rik	
V2MM_100866	NM_027404	Bag5	BCL2-associated athanogene 5
V2MM_23748	NM_130452	Bbox1	gamma-butyrobetaine dioxygenase
V2MM_75586	NM_026116	Bbs2	Bardet-Biedl syndrome 2 homolog
V2MM_57688	NM_021486	Bcmo1	beta-carotene 15,15'-monooxygenase
V2MM_12345	NM_027371	Bxdc5	RNA processing factor 1
V2MM_69834	NM_009777	C1qb	complement component 1, q subcomponent, B chain
V2MM_221502	NM_172924	C230081A13Rik	hypothetical protein LOC244895
V2MM_76759	NM_011274	C80913	expressed sequence C80913
V2MM_215233	NM_001195094.1	Ccdc42b	coiled-coil domain containing 42B
V2MM_10641	NM_026439	Ccdc80	steroid-sensitive protein 1
V2MM_95464	NM_001081291	Ccdc88b	coiled-coil domain containing 88B
V2MM_72623	NM_009838	Cct6a	chaperonin subunit 6a (zeta)
V2MM_71106	NM_009860	Cdc25c	cell division cycle 25 homolog C (<i>S. pombe</i>)
V2MM_63592	NM_009871	Cdk5r1	cyclin-dependent kinase 5, regulatory subunit (p35) 1
V2MM_133014	NM_001081363	Cenpf	leucine, glutamic acid, lysine family 1 protein
V2MM_50794	NM_172723	Centa1	centaurin, alpha 1
V2MM_95511	NM_198019	Cep78	IP63 protein
V2MM_241460	NM_145475	Cerk	ceramide kinase
V2MM_203726	NM_199055	Chst9	carbohydrate (N-acetylgalactosamine 4-0) sulfotransferase 9
V2MM_61861	NM_053155	Clmn	calmin
V2MM_68821	NM_026036	Cmtm6	chemokine-like factor superfamily 6

V2MM_85264	NM_133850	Commd7	COMM domain containing 7
V2MM_35603	NM_144874	Cox15	COX15 homolog, cytochrome c oxidase assembly protein
V2MM_194685	NM_001013391	Cpsf6	cleavage and polyadenylation specific factor 6
V2MM_197085	NM_001013391	Cpsf6	cleavage and polyadenylation specific factor 6
V2MM_70761	NM_030004	Cryl1	crystallin, lambda 1
V2MM_82627	NM_009968	Cryz	crystallin, zeta
V2MM_102251	NM_001081391	Csmd3	CUB and Sushi multiple domains 3
V2MM_28500	NM_146087	Csnk1a1	casein kinase 1, alpha 1
V2MM_73661	NM_013808	Csrp3	cysteine and glycine-rich protein 3
V2MM_66196	NM_133196	Cstf2	cleavage stimulation factor, 3'pre-RNA subunit 2
V2MM_38289	NM_173012	D030041N04Rik	hypothetical protein LOC270035
V2MM_77935	NM_176997	D130020L05Rik	
V2MM_52489	NM_028523	Dcbld2	discoidin, CUB and LCCL domain containing 2
V2MM_93702	NM_181683	Defb37	defensin beta 37
V2MM_33218	NM_026866	Disp1	dispatched homolog 1
V2MM_62817	NM_001163513.1	Dlg5	discs, large homolog 5 (Drosophila)
V2MM_196126	NM_183312	Dmn	desmuslin
V2MM_58241	NM_001038619	Dnm3	dynamamin 3
V2MM_43670	NM_031843	Dpp7	dipeptidylpeptidase 7
V2MM_82668	NM_010076	Drd1a	dopamine receptor D1A
V2MM_11009	NM_025947	Dynlrb1	dynein, cytoplasmic, light chain 2A
V2MM_191352	XM_003085558.1	E030019B06Rik	RIKEN cDNA E030019B06 gene
V2MM_88995	NM_175540	Eda2r	X linked ectodysplasin receptor
V2MM_90509	NM_177808	EG328231	hypothetical protein LOC328231
V2MM_90646	NM_177833	EG329070	hypothetical protein LOC329070
V2MM_95054	NM_183313	EG330602	predicted gene, EG330602
V2MM_262192	NM_198635	EG333669	hypothetical protein LOC333669
V2MM_221203	NM_001034902	EG545861	hypothetical protein LOC545861
V2MM_240206	NM_026114	Eif2s1	eukaryotic translation initiation factor 2, subunit 1 alpha
V2MM_35554	NM_144958	Eif4a1	eukaryotic translation initiation factor 4A1
V2MM_225271	NM_181582	Eif5a	eukaryotic translation initiation factor 5A
V2MM_104414	NM_198303	Eif5b	eukaryotic translation initiation factor 5B
V2MM_110275	NM_001037298.1	Fam38a	family with sequence similarity 38, member A
V2MM_96180	NM_001081034	Fbxo11	F-box protein 11
V2MM_11455	NM_175127	Fbxo28	F-box protein 28

V2MM_134183	NM_199068	Foxk1	forkhead box K1
V2MM_70094	NM_008073	Gabrg2	gamma-aminobutyric acid (GABA-A) receptor, subunit gamma 2
V2MM_68176	NM_008078	Gad2	glutamic acid decarboxylase 2
V2MM_70771	NM_153569	Gak	cyclin G associated kinase
V2MM_65067	NM_008097	Gcdh	glutaryl-Coenzyme A dehydrogenase
V2MM_83522	NM_019506	Gdf2	growth differentiation factor 2
V2MM_3256	NM_020014	Gfra4	glial cell line derived neurotrophic factor family receptor alpha 4
V2MM_178140	NM_001177832.1	Gm10324	predicted gene 10324
V2MM_239707	XM_001476794.1	Gm6408	predicted gene 6408
V2MM_117894	XM_003085977.1	Gm8973	predicted gene 8973
V2MM_197660	NM_001033234	Gm9	hypothetical protein LOC194854
V2MM_161764	XR_106334.1	Gm9944	predicted gene 9944
V2MM_105919	NM_001033300	Gmps	guanine monphosphate synthetase
V2MM_64588	NM_026367	Gpatch2	G patch domain containing 2
V2MM_157689	NM_001033351.1	Grin3a	glutamate receptor ionotropic, NMDA3A
V2MM_38304	NM_148928	Gtf3c5	general transcription factor III polypeptide 5
V2MM_11745	NM_025942	Gtpbp9	GTP-binding protein PTD004
V2MM_120803	NM_178724.4	Harbi1	harbinger transposase derived 1
V2MM_73994	NM_010423	Hey1	hairy/enhancer-of-split related with YRPW motif 1
V2MM_161933	NM_177873.2	Hfm1	HFM1, ATP-dependent DNA helicase homolog (<i>S. cerevisiae</i>) (Hfm1), mRNA
V2MM_16105	NM_008246	Hiat1	hippocampus abundant gene transcript 1
V2MM_108487	NM_026489	Hormad1	HORMA domain containing 1
V2MM_69844	NM_010477	Hspd1	heat shock protein 1 (chaperonin)
V2MM_76981	NM_010510	Ifnb1	interferon beta, fibroblast
V2MM_196659	NM_177915	Igsf1	immunoglobulin superfamily, member 1
V2MM_9224	NM_018738	Igtp	interferon gamma induced GTPase
V2MM_213479	NM_026748	Ints1	integrator complex subunit 1
V2MM_71157	NM_176843	Ints5	integrator complex subunit 5
V2MM_187402	NM_029665	Ipo11	importin 11
V2MM_69084	NM_026090	Iqcf4	IQ motif containing F4
V2MM_110739	NM_030068.1	Iqch	IQ motif containing H
V2MM_72905	NM_010576	Itga4	integrin alpha 4
V2MM_114808	NM_028708.1	Jakmip3	janus kinase and microtubule interacting protein 3
V2MM_70593	NM_025734	Kcng4	voltage-gated potassium channel subunit Kv6.3

V2MM_88533	NM_175429	Kctd12b	potassium channel tetramerisation domain containing 12b
V2MM_47352	NM_177155	Klri2	killer cell lectin-like receptor family I member 2
V2MM_196150	NM_133357	Krt75	keratinocyte associated protein 1
V2MM_27480	NM_146063	Krt79	keratin 6L
V2MM_26366	NM_030717	Lactb	lactamase, beta
V2MM_16964	NM_008479	Lag3	lymphocyte-activation gene 3
V2MM_220069	NM_025410	Lage3	Eso3 protein
V2MM_66575	NM_172842	Lax1	lymphocyte transmembrane adaptor 1
V2MM_72729	NM_025501	Lce3b	small proline rich-like 6A
V2MM_79705	NM_010702	Lect2	leukocyte cell-derived chemotaxin 2
V2MM_73847	NM_023063	Lima1	epithelial protein lost in neoplasm
V2MM_226059	NM_175186	Lin9	type I interferon receptor beta chain-associated
V2MM_84033	NM_026719	Lmbrd1	liver regeneration p-53 related protein
V2MM_219092	NM_010722	Lmnb2	lamin B2
V2MM_202323	XM_001477593.1	LOC100047183	protein AHNAK2-like
V2MM_129393	XM_003084762.1	LOC100502846	low-density lipoprotein receptor-related protein 2-like
V2MM_239355	XM_003085439.1	LOC100504155	zinc finger protein 709-like
V2MM_127911	XM_003086807.1	LOC100505014	60S ribosomal protein L15-like
V2MM_127911	XM_003086807.1	LOC100505014	60S ribosomal protein L15-like
V2MM_118043	XM_003086031.1	LOC100505223	carbonyl reductase [NADPH] 1-like
V2MM_214440	NM_199302	Lrsam1	leucine rich repeat and sterile alpha motif containing 1
V2MM_84475	NM_028185	Lsm11	U7 snRNA-associated Sm-like protein Lsm11
V2MM_36285	NM_008529	Ly6e	lymphocyte antigen 6 complex, locus E
V2MM_188041	NM_010367	Magi1	membrane associated guanylate kinase, WW and PDZ domain containing 1
V2MM_86939	NM_174857	Mamdc2	MAM domain containing 2
V2MM_11301	NM_020007	Mbnl1	muscleblind-like 1
V2MM_5058	NM_026656	Mcoln2	mucolipin 2
V2MM_38768	NM_008575	Mdm4	transformed mouse 3T3 cell double minute 4
V2MM_12565	NM_020000	Med8	mediator of RNA polymerase II transcription, subunit 8 homolog
V2MM_8841	NM_145385	Mlf2	myeloid leukemia factor 2 homolog
V2MM_109034	NM_205810	Mrgprb1	MAS-related GPR, member B1

V2MM_76927	NM_025500	Mrpl37	mitochondrial ribosomal protein L37
V2MM_64548	NM_025440	Mrps16	mitochondrial ribosomal protein S16
V2MM_159268	NM_054043.3	Msi2	Musashi homolog 2 (Drosophila) (Msi2), mRNA
V2MM_20575	NM_144941	Mtap7d1	proline arginine rich coiled coil 1
V2MM_197048	NM_001081219	Myo1a	myosin IA
V2MM_107373	NM_019438.1	Ncapg	non-SMC condensin I complex, subunit G
V2MM_68179	NM_025597	Ndufb3	NADH dehydrogenase (ubiquinone) 1 beta subcomplex 3
V2MM_10830	NM_025843	Ndufb7	NADH dehydrogenase (ubiquinone) 1 beta subcomplex, 7
V2MM_205185	NM_027707	Nipbl	delangin
V2MM_33053	NM_008703	Nmbr	neuromedin B receptor
V2MM_88662	NM_175460	Nmnat2	nicotinamide nucleotide adenylyltransferase 2
V2MM_100372	NM_001008421	Nol10	nucleolar protein 10
V2MM_197105	NM_001081350	Nol8	nucleolar protein 8
V2MM_188988	NM_022979	Nup98	nucleoporin 98
V2MM_43136	NM_130869	OG2	OG2 homeobox
V2MM_219820	NM_146844	Olfr1107	olfactory receptor 1107
V2MM_86243	NM_146659	Olfr1136	olfactory receptor 1136
V2MM_78640	NM_146641	Olfr1164	olfactory receptor 1164
V2MM_75028	NM_146902	Olfr1221	olfactory receptor 1221
V2MM_68358	NM_146851	Olfr295	olfactory receptor 295
V2MM_232054	NM_207158.1	Olfr427	olfactory receptor 427
V2MM_63767	NM_146773	Olfr508	olfactory receptor 508
V2MM_48609	NM_147079	Olfr547	olfactory receptor 547
V2MM_128554	NM_207621	Olfr553	olfactory receptor 553
V2MM_52402	NM_147091	Olfr568	olfactory receptor 568
V2MM_61534	NM_147050	Olfr659	olfactory receptor 659
V2MM_69575	NM_146749	Olfr875	olfactory receptor 875
V2MM_72624	NM_146871	Olfr898	olfactory receptor 898
V2MM_262327	NM_205822	Omt2b	oocyte maturation, beta
V2MM_114571	NM_001013783	OTTMUSG0000000	hypothetical protein LOC432552
V2MM_72936	NM_011060	Padi3	peptidyl arginine deiminase, type III
V2MM_40608	NM_177326	Pak2	p21-activated kinase 2
V2MM_76321	NM_021567	Pcbp4	poly(rC) binding protein 4
V2MM_77687	NM_053143	Pcdhb18	protocadherin beta 18
V2MM_74408	NM_053145	Pcdhb20	protocadherin beta 20
V2MM_19979	NM_011995	Pclo	piccolo (presynaptic cytomatrix protein)
V2MM_120553	NM_001081033	Pde11a	phosphodiesterase 11A
V2MM_190814	NM_199299	Phf15	PHD finger protein 15

V2MM_46709	NM_008847	Pip5k1a	phosphatidylinositol-4-phosphate 5-kinase, type 1 alpha
V2MM_50791	NM_016927	Pkd2l2	polycystic kidney disease 2-like 2
V2MM_79027	NM_011123	Plp1	proteolipid protein 1
V2MM_41163	NM_021451	Pmaip1	phorbol-12-myristate-13-acetate-induced protein 1
V2MM_11945	NM_134021	Pnpo	pyridoxine 5'-phosphate oxidase
V2MM_47797	NM_153798	Polr2b	polymerase (RNA) II (DNA directed) polypeptide B
V2MM_9232	NM_026651	Pomgnt1	O-mannosyl N-acetylglucosaminyltransferase
V2MM_80415	NM_026340	Pop1	processing of precursors 1 homolog
V2MM_122588	NM_011147	Ppef1	protein phosphatase with EF hand calcium-binding domain 1
V2MM_104021	NM_001144855.1	Ppfia4	protein tyrosine phosphatase, receptor type, f polypeptide (PTPRF), interacting protein (liprin), alpha 4 (Ppfia4), mRNA
V2MM_1623	NM_025896	Prl3a1	prolactin family 3, subfamily a, member 1
V2MM_20386	NM_025894	Psmc12	proteasome 26S non-ATPase subunit 12
V2MM_43565	NM_008974	Ptp4a2	protein tyrosine phosphatase 4a2
V2MM_74748	NM_025412	Pycrl	pyrroline-5-carboxylate reductase-like
V2MM_79017	NM_029576	Rab1b	RAB1B, member RAS oncogene family
V2MM_160230	NM_177375.1	Rab26	RAB26, member RAS oncogene family
V2MM_81933	NM_011228	Rab33a	RAB33A, member of RAS oncogene family
V2MM_72240	NM_011240	Ranbp2	RAN binding protein 2
V2MM_91870	NM_178608	Reep1	receptor expression enhancing protein 1
V2MM_10428	NM_009044	Rel	reticuloendotheliosis oncogene
V2MM_93143	NM_178916	Rfesd	Rieske (Fe-S) domain containing
V2MM_196716	NM_001024918	Rfx4	regulatory factor X, 4
V2MM_148	NM_133231	Rfxap	regulatory factor X-associated protein
V2MM_192220	NM_001081105	RhoH	ras homolog gene family, member H
V2MM_190118	NM_027187	Rnaseh2a	ribonuclease H2, large subunit
V2MM_152592	NM_001113413.1	Rnf13	ring finger protein 13
V2MM_76744	NM_011291	Rpl7	ribosomal protein L7
V2MM_66643	NM_011295	Rps12	ribosomal protein S12
V2MM_79400	NM_011321	Sbp	spermine binding protein

V2MM_61345	NM_172769	Sc5d	sterol-C5-desaturase (fungal ERG3, delta-5-desaturase) homolog
V2MM_20673	NM_009130	Scg3	secretogranin III
V2MM_210895	NM_001012322	Sctr	secretin receptor
V2MM_11287	NM_026563	Sdccag3	serologically defined colon cancer antigen 3
V2MM_164864	NM_011343	Sec61g	SEC61, gamma subunit
V2MM_202500	NM_027997	Serpina9	serine (or cysteine) proteinase inhibitor, clade A (alpha-1 antiproteinase, antitrypsin), member 9
V2MM_84153	NM_026989	Sfrs11	splicing factor, arginine/serine-rich 11
V2MM_101495	NM_177816	Sh2d4b	SH2 domain containing 4B
V2MM_75040	NM_011387	Slc10a1	solute carrier family 10 (sodium/bile acid cotransporter family), member 1
V2MM_77996	NM_053079	Slc15a1	solute carrier family 15 (oligopeptide transporter), member 1
V2MM_12468	NM_153054	Slc18a1	solute carrier family 18, member 1
V2MM_34235	NM_015829	Slc25a13	solute carrier family 25 (mitochondrial carrier, adenine nucleotide translocator), member 13
V2MM_224962	NM_178675	Slc35f1	solute carrier family 35, member F1
V2MM_49822	NM_031842	Smarcd1	SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily d, member 1
V2MM_62515	NM_021535	Smu1	smu-1 suppressor of mec-8 and unc-52 homolog
V2MM_78592	NM_013914	Snai3	snail homolog 3
V2MM_56692	NM_019973	Son	Son cell proliferation protein
V2MM_71495	NM_007463	Speg	SPEG complex locus
V2MM_126074	NM_183284	Spink2	serine protease inhibitor, Kazal type 2
V2MM_79207	NM_033524	Spred1	sprouty-related protein 1 with EVH-1 domain
V2MM_118883	NM_030133.3	Srbd1	S1 RNA binding domain 1
V2MM_20594	NM_009220	Ssty1	spermiogenesis specific transcript on the Y 1
V2MM_64930	NM_175031	Stk36	serine/threonine kinase36
V2MM_51685	NM_025285	Stmn2	stathmin-like 2
V2MM_22835	NM_144796	Susd4	sushi domain containing 4

V2MM_96046	NM_199196	Suz12	suppressor of zeste 12 homolog (Drosophila)
V2MM_87377	NM_175151	Tatdn1	TatD DNase domain containing 1
V2MM_87377	NM_175151	Tatdn1	TatD DNase domain containing 1
V2MM_30412	NM_145476	Tbc1d22a	TBC1 domain family, member 22a
V2MM_208988	NM_009333	Tcf7l2	transcription factor 7-like 2, T-cell specific, HMG-box
V2MM_17838	NM_153154	Tcfap2d	transcription factor AP-2, delta
V2MM_38244	NM_148949	Tdpoz1	TD and POZ domain containing 1
V2MM_33666	NM_031374	Tex15	testis expressed gene 15
V2MM_83203	NM_011583	Theg	testicular haploid expressed gene product
V2MM_80640	NM_026067	Thex1	histone mRNA 3'end-specific exonuclease
V2MM_95870	NM_001080931	Thrap1	mediator of RNA polymerase II transcription, subunit 13 homolog
V2MM_95870	NM_001080931	Thrap1	mediator of RNA polymerase II transcription, subunit 13 homolog
V2MM_92707	NM_178759	Timd4	T-cell immunoglobulin and mucin domain containing 4
V2MM_6140	NM_019432	Tmem37	protein distantly related to to the gamma subunit family
V2MM_197078	NM_177601	Tmem60	transmembrane protein 60
V2MM_125003	NM_001085508.2	Tmem8b	transmembrane protein 8B
V2MM_19570	NM_134138	Tnfsf5ip1	Clast3 protein
V2MM_63425	NM_025482	Tpd52l2	tumor protein D52-like 2
V2MM_72167	NM_053084	Trim32	tripartite motif protein 32
V2MM_54547	NM_028604	Trmt11	RIKEN cDNA 2410075D05
V2MM_107145	NM_029264	Ttl10	tubulin tyrosine ligase-like family, member 10
V2MM_51584	NM_029064	Ttl9	tubulin tyrosine ligase like family 9
V2MM_57271	NM_011652	Ttn	titin
V2MM_76225	NM_011652	Ttn	Titin
V2MM_30357	NM_028283	Uaca	nuclear membrane binding protein NUCLING
V2MM_37708	NM_180600	Ube2q2	ubiquitin-conjugating enzyme E2Q 2
V2MM_52842	NM_022022	Ube4b	ubiquitination factor E4B
V2MM_86679	NM_173754	Usp43	ubiquitin specific protease 43
V2MM_85331	NM_133992	Usp52	ubiquitin specific protease 52
V2MM_262088	NM_134206	V1rg5	vomer nasal 1 receptor, G5
V2MM_75730	NM_173443	Vcpip1	valosin-containing protein (p97)/p47 complex-interacting protein p135
V2MM_127064	NM_001104632.1	Vmn2r19	vomer nasal 2, receptor 19
V2MM_128716	NM_001102579.1	Vmn2r67	vomer nasal 2, receptor 67
V2MM_132216	NM_001033237	Yeats2	YEATS domain containing 2
V2MM_67153	NM_178363	Ylpm1	YLP motif containing 1

V2MM_250640	NM_153398	Zbtb24	zinc finger protein 450
V2MM_101666	NM_026083	Zc3h13	RIKEN cDNA3110050K21
V2MM_16756	NM_134007	Zcd1	zinc finger, CDGSH-type domain 1
V2MM_2438	NM_172151	Zdhhc8	zinc finger, DHHC domain containing 8
V2MM_46516	NM_172586	Zfp322a	zinc finger protein 322a
V2MM_84160	NM_027007	Zfp397	zinc finger protein 397
V2MM_220730	NM_025594	Zmat2	zinc finger, matrin type 2
V2MM_62976	NM_025594	Zmat2	zinc finger, matrin type 2

Supplementary Table S1B

A list of false discovery rates for each functional category identified in the shRNA screen

annotation cluster	category	count	p-value	FDR
Annotation Cluster 1	IPR005843:Alpha-D-phosphohexomutase, C-terminal	3	0.027146493	36.9
Annotation Cluster 2	SM00324:RhoGAP	10	0.039936789	53.8
Annotation Cluster 3	IPR003104:Actin-binding FH2 and DRF autoregulatory	5	0.013959353	21.0
Annotation Cluster 4	SM00674:CENPB	4	0.020142512	23.6
Annotation Cluster 5	repeat:NHL 5	4	0.039470718	51.0
Annotation Cluster 7	IPR000337:GPCR, family 3	6	0.033004549	43.0
Annotation Cluster 8	SM00355:ZnF_C2H2	61	0.024730013	28.2
Annotation Cluster 10	metal ion-binding site:Zinc; catalytic	16	0.021799807	32.3
Annotation Cluster 13	SM00612:Kelch	10	0.039936789	41.7
Annotation Cluster 16	SM00249:zinc finger region PHD-type	13	0.022221399	25.7

Supplementary Table S2

shRNAs that deplete specifically *in vivo*. shRNAs targeting annotated genes, predicted genes, and predicted proteins that deplete an average of four-fold *in vivo* and deplete less than 25% *in vitro* are listed. The average fold change of each shRNA *in vitro* and *in vivo* was normalized to the median fold change of all shRNAs in that setting.

shRNA ID	accession number	gene symbol	gene name
V2MM_191164	NM_027855	0610007C21Rik	apoptosis related protein APR-3
V2MM_53293	NM_025319	0610009B22Rik	hypothetical protein LOC66050
V2MM_94754	NM_183249	1100001G20Rik	WDNM1-like protein
V2MM_35787	NM_019772	1110004F10Rik	small acidic protein
V2MM_55035	NM_025364	1110005A23Rik	cytokine induced protein 29 kDa
V2MM_60087	NM_145955	1110007A13Rik	hypothetical protein LOC210711
V2MM_232904	NM_025373.1	1110008L16Rik	RIKEN cDNA 1110008L16 gene
V2MM_232200	NM_026841.1	1110059M19Rik	RIKEN cDNA 1110059M19 gene
V2MM_41898	NM_027878	1200002N14Rik	damage-regulated autophagy modulator
V2MM_79348	NM_026166	1200009F10Rik	IKK interacting protein
V2MM_66225	NM_028773	1200013B08Rik	hypothetical protein LOC74131
V2MM_101678	NM_027906.1	1300010F03Rik	RIKEN cDNA 1300010F03 gene
V2MM_108242	NM_026894	1500001M20Rik	MMP37-like protein, mitochondrial
V2MM_84105	NM_026889	1500010J02Rik	hypothetical protein LOC68964
V2MM_43254	NM_177132	1520401A03Rik	hypothetical protein LOC320309
V2MM_102685	NM_028056	1600002H07Rik	hypothetical protein LOC72016
V2MM_211157	NM_001081273	1600015I10Rik	hypothetical protein LOC69761
V2MM_135220	XR_106035.1	1600025M17Rik	RIKEN cDNA 1600025M17 gene
V2MM_139	NM_027041	1700003M02Rik	hypothetical protein LOC69329
V2MM_104219	NM_027077	1700016C15Rik	hypothetical protein LOC69428
V2MM_229653	NM_198637	1700016K19Rik	hypothetical protein LOC74230
V2MM_110694	NM_028820	1700017B05Rik	hypothetical protein LOC74211
V2MM_202550	NM_028820	1700017B05Rik	hypothetical protein LOC74211
V2MM_84260	NM_027405	1700020O03Rik	hypothetical protein LOC70373
V2MM_233497	XM_988914.2	1700021P04Rik	RIKEN cDNA 1700021P04 gene
V2MM_108412	NM_027059.1	1700023A16Rik	RIKEN cDNA 1700023A16 gene
V2MM_231820	NM_027064.1	1700024P04Rik	RIKEN cDNA 1700024P04 gene
V2MM_145758	NM_001162980.1	1700024P16Rik	RIKEN cDNA 1700024P16 gene
V2MM_102192	NM_028180	1700030F18Rik	hypothetical protein LOC72277
V2MM_106497	NM_028499	1700034K16Rik	hypothetical protein LOC73314
V2MM_110591	XR_105277.1	1700036A12Rik	RIKEN cDNA 1700036A12 gene
V2MM_202159	XR_105277.1	1700036A12Rik	RIKEN cDNA 1700036A12 gene
V2MM_101604	NM_028525	1700049K14Rik	hypothetical protein LOC73382
V2MM_78584	NM_026105	1700093K21Rik	hypothetical protein LOC67358
V2MM_107186	NM_029843	1700109H08Rik	hypothetical protein LOC77036
V2MM_17970	XM_003084965.1	1700110I01Rik	RIKEN cDNA 1700110I01 gene
V2MM_101385	NM_028275.1	1700112E06Rik	RIKEN cDNA 1700112E06 gene
V2MM_15069	NM_026627	1700113O17Rik	histone variant H2aI2
V2MM_239273	NM_194348	1810013C15Rik	hypothetical protein LOC329015

V2MM_221678	NM_026327	1810048J11Rik	hypothetical protein LOC67708
V2MM_107500	XM_001473772.2	2010109A12Rik	RIKEN cDNA 2010109A12 gene
V2MM_106670	NM_001033165	2010203O07Rik	hypothetical protein LOC72429
V2MM_226090	NM_175153	2010321M09Rik	hypothetical protein LOC69882
V2MM_232195	NM_026955	2200002K05Rik	hypothetical protein LOC69137
V2MM_226319	NM_175391	2210421G13Rik	hypothetical protein LOC108956
V2MM_226270	NM_175249	2310020A21Rik	hypothetical protein LOC76943
V2MM_8839	NM_025964	2310038H17Rik	hypothetical protein LOC67099
V2MM_68643	NM_025634	2310042E22Rik	hypothetical protein LOC66561
V2MM_102459	NM_027155.1	2310061N02Rik	RIKEN cDNA 2310061N02 gene
V2MM_102463	NM_027173.1	2310079G19Rik	RIKEN cDNA 2310079G19 gene
V2MM_195917	NM_025542	2410001C21Rik	hypothetical protein LOC66404
V2MM_81340	NM_026113	2410016F19Rik	hypothetical protein LOC67371
V2MM_30274	NM_024254	2410042D21Rik	hypothetical protein LOC72425
V2MM_87779	NM_175245	2410129H14Rik	hypothetical protein LOC76789
V2MM_131086	NM_001004362	2610008E11Rik	hypothetical protein LOC72128
V2MM_110776	NM_027394	2610018I03Rik	UbcH10 binding protein with a hect-like domain
V2MM_226380	NM_173744	2610019F03Rik	hypothetical protein LOC72148
V2MM_224332	NM_029282	2610036D13Rik	hypothetical protein LOC75425
V2MM_48344	NM_001031814	2610207I05Rik	PI-3-kinase-related kinase SMG-1
V2MM_49263	NM_001031814	2610207I05Rik	PI-3-kinase-related kinase SMG-1
V2MM_37046	NM_145626	2610208M17Rik	hypothetical protein LOC108909
V2MM_84278	NM_027434	2610304G08Rik	cell-cycle related and expression-elevated protein in tumor
V2MM_84008	NM_026620	2610510H03Rik	family with sequence similarity 98, member B
V2MM_35585	NM_028131	2610510J17Rik	hypothetical protein LOC72155
V2MM_88334	NM_175381	2700081O15Rik	hypothetical protein LOC108899
V2MM_195029	NM_175179	2810002O09Rik	RIKEN cDNA 2810002O09
V2MM_29490	NM_172403	2810021J22Rik	hypothetical protein LOC69944
V2MM_25339	NM_144882	2810022L02Rik	hypothetical protein LOC67198
V2MM_33854	NM_024428	2810410M20Rik	dosage compensation-related protein DPY30
V2MM_44152	NM_021430	2900002H16Rik	hypothetical protein LOC75695
V2MM_202979	XM_003085224.1	2900055J20Rik	RIKEN cDNA 2900055J20 gene
V2MM_196626	NM_028434	2900092C05Rik	hypothetical protein LOC73090
V2MM_226548	NM_028440.1	3110003A17Rik	RIKEN cDNA 3110003A17 gene
V2MM_100964	NM_001033167	3110004L20Rik	hypothetical protein LOC73102
V2MM_206220	NM_028443	3110032G18Rik	hypothetical protein LOC73121
V2MM_70603	NM_026313	3300001P08Rik	cisplatin resistance-associated overexpressed protein
V2MM_191771	NM_001081295	4631416L12Rik	hypothetical protein LOC622434
V2MM_73064	NM_028725	4632417N05Rik	RIKEN cDNA 4632417N05 gene
V2MM_240835	NM_199009	4632419K20Rik	hypothetical protein LOC74349
V2MM_88040	NM_175307	4732473B16Rik	hypothetical protein LOC100342
V2MM_204758	NM_001081664	4833423E24Rik	hypothetical protein LOC228151
V2MM_129844	NM_001024606	4833426J09Rik	pyruvate dehydrogenase phosphatase isoenzyme 2

V2MM 89972	NM 177702	4833427G06Rik	hypothetical protein LOC235345
V2MM 104389	NM 027580	4921511C04Rik	hypothetical protein LOC70853
V2MM 83847	NM 025723	4921515J06Rik	hypothetical protein LOC66715
V2MM 66621	NM 026338	4921517D21Rik	hypothetical protein LOC67722
V2MM 105080	NM 001080709	4930402F06Rik	hypothetical protein LOC74854
V2MM 111246	XM 135594.5	4930402K13Rik	RIKEN cDNA 4930402K13 gene
V2MM 84758	NM 029115	4930455F23Rik	hypothetical protein LOC74895
V2MM 84759	NM 029115	4930455F23Rik	RIKEN cDNA 4930455F23 gene
V2MM 234766	NM 183109	4930478A21Rik	hypothetical protein LOC75002
V2MM 54228	NM 029131	4930503E14Rik	hypothetical protein LOC74954
V2MM 72563	NM 172967	4930503L19Rik	hypothetical protein LOC269033
V2MM 110539	XM 003084781.1	4930510E17Rik	RIKEN cDNA 4930510E17 gene
V2MM 231662	XR 105172.1	4930544L04Rik	RIKEN cDNA 4930544L04 gene
V2MM 206418	XR 105748.1	4930548G14Rik	RIKEN cDNA 4930548G14 gene
V2MM 202278	XM 003085136.1	4930556A20Rik	RIKEN cDNA 4930556A20 gene
V2MM 87707	NM 175228	4930578C19Rik	hypothetical protein LOC75905
V2MM 21654	NM 133732	4931406C07Rik	hypothetical protein LOC70984
V2MM 112678	NM 001033764	4931408C20Rik	hypothetical protein LOC210940
V2MM 36433	NM 027637	4931428L18Rik	hypothetical protein LOC70988
V2MM 89997	NM 177711	4932411G14Rik	hypothetical protein LOC238663
V2MM 121872	NM 001085511.1	4932429P05Rik	RIKEN cDNA 4932429P05 gene
V2MM 51151	NM 177141	4932438A13Rik	RIKEN cDNA 4932438A13 gene
V2MM 101720	NM 001081063	4933401F05Rik	hypothetical protein LOC71037
V2MM 55418	NM 153794	4933403F05Rik	hypothetical protein LOC108654
V2MM 99050	XM 003085666.1	4933406P04Rik	RIKEN cDNA 4933406P04 gene
V2MM 89701	NM 177651	4933409G03Rik	hypothetical protein LOC227998
V2MM 89702	NM 177651	4933409G03Rik	hypothetical protein LOC227998
V2MM 92101	NM 178649	4933409K07Rik	hypothetical protein LOC108816
V2MM 36634	NM 027670	4933411G06Rik	hypothetical protein LOC71090
V2MM 86798	NM 173778	4933412E14Rik	hypothetical protein LOC244885
V2MM 203467	XM 003085414.1	4933415A04Rik	RIKEN cDNA 4933415A04 gene
V2MM 104395	XR 104543.1	4933424G06Rik	RIKEN cDNA 4933424G06 gene
V2MM 104395	XR 104543.1	4933424G06Rik	RIKEN cDNA 4933424G06 gene
V2MM 197586	NM 175017	4933427D06Rik	hypothetical protein LOC232217
V2MM 84714	NM 028963	4933427D14Rik	hypothetical protein LOC74477
V2MM 89493	NM 177607	4933430I17Rik	hypothetical protein LOC214106
V2MM 102266	NM 029407.1	4933432B09Rik	RIKEN cDNA 4933432B09 gene
V2MM 102268	NM 029407.1	4933432B09Rik	RIKEN cDNA 4933432B09 gene
V2MM 76636	NM 025762	4933434E20Rik	hypothetical protein LOC99650
V2MM 74979	NM 026233	4933434I20Rik	hypothetical protein LOC67555
V2MM 74372	NM 025763	4933436I01Rik	hypothetical protein LOC66780
V2MM 50655	NM 198004	5133401N09Rik	gluconokinase-like protein
V2MM 211585	NM 027788	5530400B04Rik	hypothetical protein LOC71405
V2MM 83839	NM 025666	5730410I19Rik	hypothetical protein LOC66622
V2MM 34295	NM 027482	5730508B09Rik	hypothetical protein LOC70617
V2MM 74769	NM 026153	5730557B15Rik	hypothetical protein LOC67434
V2MM 90759	NM 177854	6030405A18Rik	hypothetical protein LOC329641
V2MM 45795	NM 177359	6030490I01Rik	zinc finger protein
V2MM 39459	NM 027519	6330406I15Rik	hypothetical protein LOC70717

V2MM 84311	NM 027518	6330416L11Rik	G protein-coupled receptor 137C
V2MM 100918	NM 029679	6330500D04Rik	hypothetical protein LOC193385
V2MM 106038	NM 001033301	6330505N24Rik	hypothetical protein LOC229474
V2MM 55425	NM 177265	6330512M04Rik	hypothetical protein LOC320802
V2MM 46196	NM 172774	6620401K05Rik	ATR interacting protein
V2MM 87810	NM 175252	6720457D02Rik	hypothetical protein LOC77117
V2MM 170614	NM 177374	6720458F09Rik	hypothetical protein LOC328162
V2MM 232987	NM 001033776	7420416P09Rik	hypothetical protein LOC432677
V2MM 226592	NM 183224	7530404M11Rik	TAFA3 protein
V2MM 194670	NM 177755	8230402K04Rik	hypothetical protein LOC268807
V2MM 54449	NM 177136	9030227G01Rik	RIKEN cDNA 9030227G01 gene
V2MM 102882	NM 027834	9130008F23Rik	hypothetical protein LOC71583
V2MM 95663	NM 198118	9130019P16Rik	RIKEN cDNA 9130019P16 gene
V2MM 27112	NM 177001	9130023H24Rik	RIKEN cDNA 9130023H24 gene
V2MM 224585	NM 178400	9130221H12Rik	hypothetical protein LOC77124
V2MM 225155	NM 178400	9130221H12Rik	hypothetical protein LOC77124
V2MM 101489	XM 127665.6	9230112D13Rik	RIKEN cDNA 9230112D13 gene
V2MM 199435	XR 104969.1	9530028C05	hypothetical protein 9530028C05
V2MM 262414	NM 175680	9530080O11Rik	RIKEN cDNA 9530080O11 gene
V2MM 52951	NM 177159	9530091C08Rik	hypothetical protein LOC320440
V2MM 58356	NM 177363	9930022N03Rik	hypothetical protein LOC245126
V2MM 43549	NM 177162	9930032O22Rik	serine protease Desc4
V2MM 76042	NM 173434	9930111J21Rik	hypothetical protein LOC245240
V2MM 226092	NM 175313	A130022J15Rik	RIKEN cDNA A130022J15
V2MM 227403	NM 175313	A130022J15Rik	RIKEN cDNA A130022J15
V2MM 194158	NM 177622	A230042K10Rik	hypothetical protein A230042K10
V2MM 195278	NM 177622	A230042K10Rik	hypothetical protein A230042K10
V2MM 211824	NM 001033348	A230067G21Rik	hypothetical protein LOC241694
V2MM 177486	XR 108142.1	A430016B06	hypothetical protein A430016B06
V2MM 89371	NM 177578	A430090E18Rik	hypothetical protein LOC195564
V2MM 92838	NM 178785	A430107D22Rik	hypothetical protein LOC320484
V2MM 203931	NM 177055.3	A630001G21Rik	RIKEN cDNA A630001G21 gene
V2MM 53483	NM 145969	A630054L15Rik	hypothetical protein LOC211922
V2MM 90725	NM 177847	A730036I17Rik	hypothetical protein LOC329513
V2MM 107602	NM 001007574.2	A830010M20Rik	RIKEN cDNA A830010M20 gene
V2MM 107604	NM 001007574.2	A830010M20Rik	RIKEN cDNA A830010M20 gene
V2MM 54943	NM 177173	A830018L16Rik	hypothetical protein LOC320492
V2MM 78503	NM 173425	A830043J08Rik	hypothetical protein LOC241128
V2MM 107320	NM 207277	A930005I04Rik	hypothetical protein LOC403174
V2MM 192745	NM 145415	AA408296	digestive-organ expansion factor homolog
V2MM 85375	NM 134087	AA409316	hypothetical protein LOC105732
V2MM 226351	NM 178894	AA792892	hypothetical protein LOC100554
V2MM 92773	NM 178772	Aadacl1	arylacetamide deacetylase-like 1
V2MM 28017	NM 144829	Aarsd1	alanyl-tRNA synthetase domain containing 1
V2MM 196120	NM 175210	Abca12	ATP-binding cassette, sub-family A (ABC1), member 12

V2MM_53248	NM_147220	Abca9	ATP-binding cassette transporter sub-family A member 9
V2MM_100310	NM_029600	Abcc3	ATP-binding cassette, sub-family C (CFTR/MRP), member 3
V2MM_162314	NM_011510	Abcc8	ATP-binding cassette, sub-family C (CFTR/MRP), member 8
V2MM_53058	NM_008991	Abcd3	ATP-binding cassette, sub-family D, member 3
V2MM_49638	NM_021304	Abhd1	abhydrolase domain containing 1
V2MM_64325	NM_025659	Abi3	ABI gene family, member 3
V2MM_92866	NM_178790	Abi3bp	ABI gene family, member 3 (NESH) binding protein
V2MM_92866	NM_178790	Abi3bp	ABI gene family, member 3 (NESH) binding protein
V2MM_27443	NM_030718	Abo	cis-AB transferase
V2MM_83423	NM_013924	Abt1	activator of basal transcription
V2MM_120214	NM_030063.2	Acbd7	acyl-Coenzyme A binding domain containing 7
V2MM_21967	NM_134247	Acot4	peroxisomal acyl-CoA thioesterase 2B
V2MM_100520	NM_172580	Acot6	acyl-CoA thioesterase 6
V2MM_25561	NM_030721	Acox3	acyl-Coenzyme A oxidase 3, pristanoyl
V2MM_34087	NM_019807	Acpp	acid phosphatase, prostate
V2MM_33619	NM_007981	Acs1	acyl-CoA synthetase long-chain family member 1
V2MM_34878	NM_023735	Actr3	ARP3 actin-related protein 3 homolog
V2MM_213534	NM_001004365	Actr3b	ARP3 actin-related protein 3 homolog B
V2MM_69559	NM_007398	Ada	adenosine deaminase
V2MM_76480	NM_007400	Adam12	a disintegrin and metalloprotease domain 12
V2MM_60419	NM_009616	Adam19	a disintegrin and metalloprotease domain 19
V2MM_33095	NM_011780	Adam23	a disintegrin and metalloprotease domain 23
V2MM_21143	NM_174885	Adam6	a disintegrin and metalloprotease domain 6
V2MM_54702	NM_009621	Adamts1	a disintegrin-like and metalloprotease (reprolysin type) with thrombospondin type 1 motif, 1
V2MM_43093	NM_172619	Adamts10	a disintegrin-like and metalloprotease (reprolysin type) with thrombospondin type 1 motif, 10

V2MM_31164	NM_172466	Adamts18	a disintegrin-like and metalloprotease (reprolysin type) with thrombospondin type 1 motif, 18
V2MM_88792	NM_001081020	Adamts6	a disintegrin-like and metalloprotease (reprolysin type) with thrombospondin type 1 motif, 6
V2MM_13318	NM_052977	Adarb2	adenosine deaminase, RNA-specific, B2
V2MM_60771	NM_009605	Adipoq	adiponectin, C1Q and collagen domain containing
V2MM_28189	NM_146102	Afap112	actin filament associated protein 1-like 2
V2MM_25980	NM_133919	Aff1	myeloid/lymphoid or mixed-lineage leukemia translocated to 2 homolog
V2MM_68883	NM_007428	Agt	angiotensinogen
V2MM_36640	NM_011784	Agtrl1	angiotensin II receptor-like 1
V2MM_50216	NM_027907	Agxt211	alanine-glyoxylate aminotransferase 2-like 1
V2MM_201281	XR_105132.1	AI314278	expressed sequence AI314278
V2MM_196817	NM_198860	AI646023	hypothetical protein LOC192734
V2MM_240009	NM_213729	AI842396	inhibitor of CDK interacting with cyclin A1
V2MM_90842	NM_177869	AI847670	hypothetical protein LOC330050
V2MM_87476	NM_175178	Aifm3	apoptosis-inducing factor like
V2MM_89120	NM_175936	AJ543404	cDNA sequence AJ543404
V2MM_89441	NM_177597	AK162044	hypothetical protein LOC211147
V2MM_89443	NM_177597	AK162044	hypothetical protein LOC211147
V2MM_35133	NM_019921	Akap10	A kinase (PRKA) anchor protein 10
V2MM_80282	NM_001033785	Akap14	A kinase (PRKA) anchor protein 14
V2MM_32931	NM_011921	Aldh1a7	aldehyde dehydrogenase family 1, subfamily A7
V2MM_196306	NM_001081264	Alg6	asparagine-linked glycosylation 6 homolog (yeast, alpha-1,3,-glucosyltransferase)
V2MM_232116	NM_001081264	Alg6	asparagine-linked glycosylation 6 homolog (yeast, alpha-1,3,-glucosyltransferase)
V2MM_87076	NM_175016	Alkbh2	alkB, alkylation repair homolog 2
V2MM_27082	NM_146228	Als2cl	Als2 C-terminal like
V2MM_87585	NM_175200	Als2cr11	amyotrophic lateral sclerosis 2 (juvenile) chromosome region, candidate 11
V2MM_87586	NM_175200	Als2cr11	amyotrophic lateral sclerosis 2 (juvenile) chromosome region, candidate 11

V2MM_150596	NM_001037725	Als2cr13	amyotrophic lateral sclerosis 2 (juvenile) chromosome region, candidate 13 (human)
V2MM_26364	NM_024213	Anapc4	anaphase-promoting complex subunit 4
V2MM_30233	NM_019805	Anapc7	anaphase-promoting complex subunit 7
V2MM_44066	NM_009640	Angpt1	angiopoietin 1
V2MM_96349	NM_001003909	Ankib1	ankyrin repeat and IBR domain containing 1
V2MM_25973	NM_027480	Ankrd24	ankyrin repeat domain 24
V2MM_101501	NM_001024604	Ankrd28	ankyrin repeat domain 28
V2MM_195814	NM_175270	Ankrd56	ankyrin repeat domain 56
V2MM_226898	NM_178402	Anks1b	ankyrin repeat and sterile alpha motif domain containing 1B
V2MM_35890	NM_028085	Anks4b	harmonin-interacting ankyrin-repeat containing
V2MM_231497	NM_001081556.1	Ano3	anoctamin 3
V2MM_136201	NM_207031.1	Ano7	anoctamin 7
V2MM_107626	NM_133738	Antxr2	anthrax toxin receptor 2
V2MM_58832	NM_013469	Anxa11	annexin A11
V2MM_61249	NM_009675	Aoc3	amine oxidase, copper containing 3
V2MM_30582	NM_026887	Ap1s2	adaptor-related protein complex 1 sigma 2 subunit
V2MM_210228	NM_175550	Ap4e1	adaptor-related protein complex AP-4, epsilon 1
V2MM_18606	NM_029943	Apex2	AP endonuclease 2
V2MM_4538	NM_026674	Aph1c	anterior pharynx defective 1c homolog
V2MM_114799	NM_009693	Apob	apolipoprotein B
V2MM_114796	NM_009693.2	Apob	apolipoprotein B
V2MM_114797	NM_009693.2	Apob	apolipoprotein B
V2MM_96120	NM_001163621.1	Apol6	apolipoprotein L 6
V2MM_18613	NM_145221	Appl1	DIP13 alpha
V2MM_82528	NM_009700	Aqp4	aquaporin 4
V2MM_82534	NM_009702	Aqr	aquarius
V2MM_82041	NM_007477	Arf2	ADP-ribosylation factor 2
V2MM_161114	NM_181416	Arhgap11a	Rho GTPase activating protein 11A
V2MM_89137	NM_176837	Arhgap18	Rho GTPase activating protein 18
V2MM_225605	NM_175535	Arhgap20	Rho GTPase activating protein 20
V2MM_88719	NM_175476	Arhgap25	Rho GTPase activating protein 25
V2MM_103151	NM_175164	Arhgap26	Rho GTPase activating protein 26
V2MM_53560	NM_138630	Arhgap4	Rho GTPase activating protein 4
V2MM_194144	NM_007486	Arhgdib	Rho, GDP dissociation inhibitor (GDI) beta
V2MM_55052	NM_001112744.1	Arhgef16	Rho guanine nucleotide exchange factor (GEF) 16 (Arhgef16), mRNA
V2MM_30723	NM_152801	Arhgef6	Rac/Cdc42 guanine nucleotide exchange factor 6

V2MM_64877	NM_001080819	Arid1a	AT rich interactive domain 1A
V2MM_102031	NM_175251.3	Arid2	AT rich interactive domain 2 (ARID, RFX-like) (Arid2), mRNA
V2MM_32302	NM_019718	Arl3	ADP-ribosylation factor-like 3
V2MM_93992	NM_182994	Arl5a	ADP-ribosylation factor-like 5
V2MM_241125	NM_207231	Arl5c	ADP-ribosylation-like factor 12 protein
V2MM_62220	NM_030066	Armcx1	armadillo repeat containing, X-linked 1
V2MM_32888	NM_172309	Arntl2	aryl hydrocarbon receptor nuclear translocator-like 2
V2MM_227618	NM_177231	Arrb1	arrestin, beta 1
V2MM_82539	NM_009712	Arsb	arylsulfatase B
V2MM_70419	NM_026287	Arxes1	dipocyte-related X-chromosome expressed sequence 1
V2MM_56514	NM_028605	Asah3l	alkaline ceramidase 2
V2MM_173376	NM_001039126	Asb1	ankyrin repeat and SOCS box-containing protein 1
V2MM_45775	NM_139152	Asb18	ankyrin repeat and SOCS box-containing 18
V2MM_51703	NM_023906	Asb3	ankyrin repeat and SOCS box-containing protein 3
V2MM_32862	NM_011791	Ash2l	ash2-like
V2MM_84285	NM_027435	Atad2	ATPase family, AAA domain containing 2
V2MM_25461	NM_174874	Atg4b	autophagin 1
V2MM_194162	NM_177683	Atg7	AGP7
V2MM_22088	NM_153389	Atp10d	ATPase, Class V, type 10D
V2MM_111529	NM_001037863	Atp11c	Atpase, class VI, type 11C
V2MM_84755	NM_029097	Atp13a2	ATPase type 13A2
V2MM_27661	NM_138314	Atp1b1	Na ⁺ /K ⁺ -ATPase beta 1 subunit
V2MM_41221	NM_016774	Atp5b	ATP synthase, H ⁺ transporting mitochondrial F1 complex, beta subunit
V2MM_26196	NM_027439	Atp6ap2	ATPase, H ⁺ transporting, lysosomal accessory protein 2
V2MM_74682	NM_025494	Atp6v1c1	ATPase, H ⁺ transporting, V1 subunit C, isoform 1
V2MM_38133	NM_133699	Atp6v1c2	vacuolar H ⁺ ATPase C2
V2MM_33472	NM_133826	Atp6v1h	ATPase, H ⁺ transporting, lysosomal, V1 subunit H
V2MM_45162	NM_009726	Atp7a	ATPase, Cu ⁺⁺ transporting, alpha polypeptide
V2MM_213050	NM_001004153	AU018091	cationic amino acid transporter 5
V2MM_143769	NM_001033211	AU022751	hypothetical protein LOC102991
V2MM_59763	NM_025338	Aurkaip1	Aurora-A kinase interacting protein
V2MM_10814	NM_134067	AW209491	hypothetical protein LOC105351
V2MM_101030	NM_207232	AW456874	protein tyrosine phosphatase domain containing 1 protein

V2MM_16328	NM_172142	AY078069	NF-kappa B inhibitor
V2MM_46660	NM_009734	Azi1	pre-acrosome localization protein 1
V2MM_15025	NM_026592	B230118H07Rik	hypothetical protein LOC68170
V2MM_160906	XR_104601.1	B230369F24Rik	RIKEN cDNA B230369F24 gene
V2MM_53844	NM_009735	B2m	beta-2-microglobulin
V2MM_88347	NM_175383	B3gnt1	beta-1,3-N-acetylglucosaminyltransferase bGnT-6
V2MM_32531	NM_019737	B4galt6	UDP-Gal
V2MM_41015	NM_019737	B4galt6	UDP-Gal
V2MM_32356	NM_080640	Baalc	brain and acute leukemia, cytoplasmic
V2MM_189582	NM_001163270.1	Baiap3	BAI1-associated protein 3
V2MM_105277	NM_001001182	Baz2b	bromodomain adjacent to zinc finger domain, 2B
V2MM_238855	NM_001081566	BB220380	p87 phosphoinositide 3-kinase gamma adapter protein
V2MM_88126	NM_175325	Bbs4	Bardet-Biedl syndrome 4 homolog
V2MM_93358	NM_181316	Bbs9	Bardet-Biedl syndrome 9
V2MM_53581	NM_145964	BC002199	hypothetical protein LOC211556
V2MM_94467	NM_183162	BC006779	hypothetical protein LOC229003
V2MM_21199	NM_145410	BC008155	hypothetical protein LOC214917
V2MM_32454	NM_145601	BC016201	hypothetical protein LOC234586
V2MM_10385	NM_133214	BC017612	hypothetical protein LOC170748
V2MM_31150	NM_144927	BC019943	hypothetical protein LOC234138
V2MM_95623	NM_198108	BC023055	hypothetical protein LOC226123
V2MM_29958	NM_146082	BC027072	hypothetical protein LOC225004
V2MM_86570	NM_173732	BC030440	hypothetical protein LOC210035
V2MM_50008	NM_153568	BC031901	hypothetical protein LOC231296
V2MM_55814	NM_153795	BC032204	UNC-112 related protein 2
V2MM_151092	NM_027498	BC033915	hypothetical protein LOC70661
V2MM_34522	NM_153407	BC035295	cDNA sequence BC035295
V2MM_107330	NM_001030306	BC037112	hypothetical protein LOC231128
V2MM_55816	NM_153803	BC038479	hypothetical protein LOC244757
V2MM_49271	NM_153784	BC038613	hypothetical protein LOC212733
V2MM_160529	NM_001111317.1	BC048609	cDNA sequence BC048609
V2MM_90132	NM_177738	BC048671	hypothetical protein LOC243535
V2MM_225243	NM_183143	BC048679	hypothetical protein LOC210321
V2MM_89309	NM_177567	BC049762	hypothetical protein LOC193286
V2MM_42647	NM_172513	BC049806	hypothetical protein LOC213056
V2MM_95734	NM_198170	BC059842	hypothetical protein LOC230676
V2MM_232988	NM_199062	BC062127	hypothetical protein LOC331188
V2MM_109865	NM_001009951	BC088983	hypothetical protein LOC382010
V2MM_95124	NM_183424	BC094274	P518
V2MM_51889	NM_025392	Bccip	BRCA2 and CDKN1A interacting protein
V2MM_108383	NM_025778	Bcl2l14	apoptosis regulator BCL-G
V2MM_69221	NM_030256	Bcl9l	B-cell CLL/lymphoma 9-like
V2MM_10086	NM_029791	Bicd2	bicaudal D homolog 2

V2MM_48748	NM_080708	Bmp2k	BMP2 inducible kinase
V2MM_41166	NM_016787	Bnip2	BCL2/adenovirus E1B 19kDa-interacting protein 1, NIP2
V2MM_112688	NM_001113367.1	Boll	bol, boule-like (Drosophila) (Boll), transcript variant 2, mRNA
V2MM_90743	NM_177850	Bpi	bactericidal/permeability-increasing protein
V2MM_91465	NM_178309	Brip1	BRCA1 interacting protein C-terminal helicase 1
V2MM_3043	NM_018819	Brp44l	brain protein 44-like
V2MM_30439	NM_001003920	Brsk1	serine/threonine kinase SADB
V2MM_197570	NM_001081038	Btbd16	BTB (POZ) domain containing 16
V2MM_36085	NM_028125	Btbd4	BTB (POZ) domain containing 4
V2MM_99484	NM_007569	Btg1	B-cell translocation gene 1, anti-proliferative
V2MM_875	NM_001037719	Btla	B and T lymphocyte associated
V2MM_97513	NM_201405	Btnl1	butyrophilin-like 1
V2MM_224462	NM_175411	C030004A17Rik	hypothetical protein LOC109229
V2MM_194548	NM_174868	C030011O14Rik	hypothetical protein LOC215708
V2MM_227363	XR_106356.1	C130046K22Rik	RIKEN cDNA C130046K22 gene
V2MM_89742	NM_177661	C130079G13Rik	hypothetical protein LOC229333
V2MM_88098	NM_175319	C330005M16Rik	hypothetical protein LOC101744
V2MM_196197	NM_177712	C330011K17Rik	hypothetical protein LOC238692
V2MM_90008	NM_177712	C330011K17Rik	hypothetical protein LOC238692
V2MM_53491	NM_172616	C330027C09Rik	hypothetical protein LOC224171
V2MM_59657	NM_145855	C330046G03Rik	RIKEN cDNA C330046G03
V2MM_234392	NM_001033314	C530028I08Rik	hypothetical protein LOC232933
V2MM_94404	NM_183148	C79267	hypothetical protein LOC212632
V2MM_191571	NM_172549	Cabin1	calcineurin binding protein 1
V2MM_193205	NM_172549	Cabin1	calcineurin binding protein 1
V2MM_31647	NM_020263	Cacna2d2	calcium channel, voltage-dependent, alpha 2/delta subunit 2
V2MM_20701	NM_146123	Cacnb4	calcium channel, voltage-dependent, beta 4 subunit
V2MM_72488	NM_178721	Cadm2	immunoglobulin superfamily, member 4D
V2MM_159470	NM_027724	Cage1	cancer antigen 1
V2MM_33845	NM_138304	Calml4	calmodulin-like 4
V2MM_99578	NM_027994.1	Cand1	cullin associated and neddylation disassociated 1
V2MM_9580	NM_007597	Canx	calnexin
V2MM_51249	NM_016739	Caprin1	cell cycle associated protein 1
V2MM_195301	NM_178396	Car12	carbonic anhydrase 12
V2MM_48299	NM_139305	Car9	carbonic anhydrase 9
V2MM_85391	NM_134148	Carns1	carnosine synthase 1
V2MM_61685	NM_009806	Cask	calcium/calmodulin-dependent serine protein kinase
V2MM_65495	NM_009809	Casp14	caspase 14
V2MM_40228	NM_011997	Casp8ap2	caspase 8 associated protein 2

V2MM_78733	NM_009813	Casq1	calsequestrin 1
V2MM_194973	NM_026201	Ccar1	cell division cycle and apoptosis regulator 1
V2MM_224699	NM_178793	Ccbe1	collagen and calcium binding EGF domains 1
V2MM_92878	NM_178793	Ccbe1	collagen and calcium binding EGF domains 1
V2MM_83854	NM_025740	Ccdc104	coiled-coil domain containing 104
V2MM_194967	NM_175369	Ccdc122	coiled-coil domain containing 122
V2MM_29560	NM_028120	Ccdc123	coiled-coil domain containing 123
V2MM_22298	NM_024201	Ccdc127	coiled-coil domain containing 127
V2MM_23380	NM_146089	Ccdc5	coiled-coil domain containing 5
V2MM_54662	NM_029061	Ccdc7	coiled-coil domain containing 7
V2MM_94755	NM_183250	Ccdc72	coiled-coil domain containing 72
V2MM_262325	NM_201372	Ccdc84	coiled-coil domain containing 84
V2MM_234285	NM_176841	Ccdc88a	Hook-related protein 1
V2MM_23631	NM_027567	Ccdc93	coiled-coil domain containing 93
V2MM_26619	NM_027567	Ccdc93	coiled-coil domain containing 93
V2MM_40154	NM_020279	Ccl28	chemokine (C-C motif) ligand 28
V2MM_70164	NM_013653	Ccl5	chemokine (C-C motif) ligand 5
V2MM_47467	NM_145700	Ccr1	chemokine (C-C motif) receptor-like 1
V2MM_34614	NM_024291	CD1	kyphoscoliosis
V2MM_67339	NM_009841	Cd14	CD14 antigen
V2MM_21148	NM_026862	Cd177	CD177 antigen
V2MM_74955	NM_018729	Cd244	CD244 natural killer cell receptor 2B4
V2MM_71093	NM_021893	Cd274	CD274 antigen
V2MM_214362	NM_009855	Cd80	CD80 antigen precursor
V2MM_202899	NM_026891	Cdan1	congenital dyserythropoietic anemia, type I
V2MM_190061	NM_183016	Cdc42bpb	Cdc42 binding protein kinase beta
V2MM_105676	NM_001004721	Cdc91i1	cell division cycle 91-like 1
V2MM_25415	NM_146040	Cdca7l	transcription factor RAM2
V2MM_38342	NM_020260	Cdgap	Cdc42 GTPase-activating protein
V2MM_205382	NM_001008420	Cdh12	cadherin 12
V2MM_33629	NM_019753	Cdh17	cadherin 17
V2MM_203187	NM_001081386	Cdh19	cadherin 19, type 2
V2MM_46414	NM_001033373.2	Cdk15	cyclin-dependent kinase 15
V2MM_68735	NM_030248	Cdk5rap3	CDK5 regulatory subunit associated protein 3
V2MM_171190	NM_009874.3	Cdk7	cyclin-dependent kinase 7
V2MM_55876	NM_016912	Cdkl2	cyclin-dependent kinase-like 2 (CDC2-related kinase)
V2MM_59449	NM_177036	Ceacam19	carcinoembryonic antigen-like 1
V2MM_25381	NM_009884	Cebpg	CCAAT/enhancer binding protein gamma
V2MM_27203	NM_144815	Cecr5	cat eye syndrome chromosome region, candidate 5 homolog

V2MM_56950	NM_017392	Celsr2	cadherin EGF LAG seven-pass G-type receptor 2
V2MM_104294	NM_001081363	Cenpf	leucine, glutamic acid, lysine family 1 protein
V2MM_55156	NM_172723	Centa1	centaurin, alpha 1
V2MM_233564	NM_001039184.1	Cep350	centrosomal protein 350
V2MM_46807	NM_145825	Cetn4	centrin 4
V2MM_53598	NM_025336	Chchd3	coiled-coil-helix-coiled-coil-helix domain containing 3
V2MM_60645	NM_025336	Chchd3	coiled-coil-helix-coiled-coil-helix domain containing 3
V2MM_101581	NM_201637	Chd8	chromodomain helicase DNA binding protein 8
V2MM_38177	NM_172264	Chdh	choline dehydrogenase
V2MM_53937	NM_021350	Chml	choroideremia-like
V2MM_77900	NM_029362	Chmp4b	chromatin modifying protein 4B
V2MM_80697	NM_025519	Chmp4c	chromatin modifying protein 4C
V2MM_206093	NM_001085498.2	Chmp6	chromatin modifying protein 6
V2MM_110662	NM_176844.4	Chrna5	cholinergic receptor, nicotinic, alpha polypeptide 5
V2MM_56277	NM_021369	Chrna6	cholinergic receptor, nicotinic, alpha polypeptide 6
V2MM_54288	NM_009601	Chrbn1	cholinergic receptor, nicotinic, beta polypeptide 1 (muscle)
V2MM_25919	NM_011998	Chst4	carbohydrate (chondroitin 6/keratan) sulfotransferase 4
V2MM_261757	NM_139148	Clca4	chloride channel calcium activated 4
V2MM_21797	NM_011999	Clec4a2	C-type lectin domain family 4, member a2
V2MM_73809	NM_009907	Cln3	ceroid-lipofuscinosis, neuronal 3
V2MM_104245	NM_030131.3	Cnih4	cornichon homolog 4 (Drosophila) (Cnih4), mRNA
V2MM_80369	NM_011135	Cnot7	CCR4-NOT transcription complex, subunit 7
V2MM_57319	NM_017383	Cntn6	contactin 6
V2MM_193635	NM_001004357	Cntnap2	contactin associated protein-like 2
V2MM_36847	NM_130457	Cntnap4	contactin associated protein 4
V2MM_57737	NM_177025	Cobl1	Cobl-like 1
V2MM_83922	NM_026225	Cog6	component of oligomeric golgi complex 6
V2MM_236717	NM_028518.1	Col20a1	collagen, type XX, alpha 1
V2MM_62061	NM_009933	Col6a1	procollagen, type VI, alpha 1
V2MM_33417	NM_130449	Colec12	collectin sub-family member 12
V2MM_13146	NM_144514	Commd1	COMM domain containing 1
V2MM_4921	NM_144514	Commd1	COMM domain containing 1
V2MM_225136	NM_175095	Commd2	COMM domain containing 2
V2MM_74514	NM_033370	Copb1	coatamer protein complex, subunit beta 1

V2MM_83454	NM_015827	Copb2	coatamer protein complex, subunit beta 2 (beta prime)
V2MM_55446	NM_172687	Coq3	coenzyme Q3 homolog, methyltransferase
V2MM_59005	NM_172582	Coq6	coenzyme Q6 homolog
V2MM_61651	NM_009944	Cox7a1	cytochrome c oxidase, subunit VIIa 1
V2MM_41963	NM_175937	Cpeb2	cytoplasmic polyadenylation element binding protein 2
V2MM_75309	NM_009947	Cpne6	copine VI
V2MM_36296	NM_026896	Crsp8	transcriptional co-activator CRSP8 homolog
V2MM_16989	NM_019465	Crtam	cytotoxic and regulatory T cell molecule
V2MM_35455	NM_019922	Crtap	cartilage associated protein
V2MM_60796	NM_016669	Crym	crystallin, mu
V2MM_232314	NM_026493	Cspp1	centrosome and spindle pole associated protein 1
V2MM_30948	NM_146012	Ctdsp2	Nuclear LIM interactor-interacting factor 2
V2MM_65513	NM_025680	Ctnnb1	nuclear protein NAP
V2MM_67701	NM_009982	Ctsc	cathepsin C
V2MM_66202	NM_022326	Ctsm	cathepsin M
V2MM_51439	NM_016716	Cul3	cullin 3
V2MM_81202	NM_011339	Cxcl15	chemokine (C-X-C motif) ligand 15
V2MM_93279	NM_180962	Cyhr1	cysteine and histidine rich 1
V2MM_99590	NM_010009	Cyp27b1	cytochrome P450, family 27, subfamily b, polypeptide 1
V2MM_28098	NM_133657	Cyp2a12	cytochrome P450, family 2, subfamily a, polypeptide 12
V2MM_25812	NM_145548	Cyp2j13	cytochrome P450, family 2, subfamily j, polypeptide 13
V2MM_47839	NM_010007	Cyp2j5	cytochrome P450, family 2, subfamily j, polypeptide 5
V2MM_66647	NM_177382	Cyp2r1	cytochrome P450, family 2, subfamily r, polypeptide 1
V2MM_73892	NM_177382	Cyp2r1	cytochrome P450, family 2, subfamily r, polypeptide 1
V2MM_51804	NM_010010	Cyp46a1	cytochrome P450, family 46, subfamily a, polypeptide 1
V2MM_173152	XR_104532.1	D030040B21Rik	RIKEN cDNA D030040B21 gene
V2MM_38660	NM_145422	D10Wsu52e	hypothetical protein LOC28088
V2MM_52641	NM_145959	D15Ert621e	hypothetical protein LOC210998
V2MM_97528	NM_033477	D17H6S53E	G4 protein
V2MM_57988	NM_177140	D230037D09Rik	hypothetical protein LOC320351
V2MM_59787	NM_172727	D330028D13Rik	hypothetical protein LOC231946
V2MM_90983	NM_177899	D330038O06Rik	hypothetical protein LOC330788
V2MM_87930	NM_175275	D530005L17Rik	hypothetical protein LOC338349
V2MM_89730	NM_177657	D630003M21Rik	hypothetical protein LOC228846

V2MM_92525	NM_178727	D630039A03Rik	hypothetical protein LOC242484
V2MM_92526	NM_178727	D630039A03Rik	hypothetical protein LOC242484
V2MM_27284	NM_172433	D730001G18Rik	hypothetical protein LOC78725
V2MM_105048	NM_030021	D730039F16Rik	hypothetical protein LOC77996
V2MM_88881	NM_175518	D730040F13Rik	hypothetical protein LOC242474
V2MM_59639	NM_177335	D930020B18Rik	hypothetical protein LOC216393
V2MM_51497	NM_177259	Dab1	disabled homolog 1
V2MM_30400	NM_011932	Dapp1	dual adaptor for phosphotyrosine and 3-phosphoinositides 1
V2MM_43628	NM_010045	Darc	Duffy blood group
V2MM_251701	NM_178788	Dctd	dCMP deaminase
V2MM_59532	NM_016890	Dctn3	dynactin 3
V2MM_68084	NM_010026	Ddef1	development and differentiation enhancing
V2MM_203261	NM_001003919	Ddx11	DEAD/H (Asp-Glu-Ala-Asp/His) box polypeptide 11 (CHL1-like helicase homolog, <i>S. cerevisiae</i>)
V2MM_33220	NM_172284	Ddx19b	DDX19 homolog
V2MM_5503	NM_153065	Ddx27	DEAD (Asp-Glu-Ala-Asp) box polypeptide 27
V2MM_14437	NM_028038	Ddx28	DEAD (Asp-Glu-Ala-Asp) box polypeptide 28
V2MM_64760	NM_010028	Ddx3x	DEAD/H (Asp-Glu-Ala-Asp/His) box polypeptide 3, X-linked
V2MM_68164	NM_025748	Deadc1	deaminase domain containing 1
V2MM_7040	NM_054046	Def8	differentially expressed in FDCP 8
V2MM_94061	NM_183026	Defb14	defensin beta 14
V2MM_94110	NM_183035	Defb34	defensin beta 34
V2MM_225914	NM_183124	Defb41	defensin beta 41
V2MM_6621	NM_007844	Defcr-rs1	defensin related sequence cryptdin peptide (paneth cells)
V2MM_23420	NM_146122	Dennd1a	DENN/MADD domain containing 1A
V2MM_106181	NM_028110	Dennd2d	DENN/MADD domain containing 2D
V2MM_47654	NM_010048	Dgcr2	DiGeorge syndrome protein C
V2MM_227341	NM_001013013	Dhrs7c	dehydrogenase/reductase (SDR family) member 7C
V2MM_91559	NM_178380	Dhx38	DEAH (Asp-Glu-Ala-His) box polypeptide 38
V2MM_2205	NM_023232	Diablo	diablo
V2MM_37119	NM_019670	Diap3	diaphanous homolog 3
V2MM_22334	NM_015802	Dlc1	deleted in liver cancer 1
V2MM_87145	NM_175033	Dll3	delta-like 3
V2MM_43222	NM_010055	Dlx3	distal-less homeobox 3
V2MM_74758	NM_028772	Dmgdh	dimethylglycine dehydrogenase
V2MM_64961	NM_172899	Dmkn	dermokine
V2MM_85443	NM_145831	Dmrt2	terra
V2MM_108131	NM_001164669.1	Dnahc6	dynein, axonemal, heavy chain 6

V2MM_21113	NM_020266	Dnajb10	DnaJ (Hsp40) homolog, subfamily B, member 10
V2MM_34672	NM_011847	Dnajb6	DnaJ (Hsp40) homolog, subfamily B, member 6
V2MM_67082	NM_013760	Dnajb9	DnaJ (Hsp40) homolog, subfamily B, member 9
V2MM_201500	NM_007869.3	Dnajc1	DnaJ (Hsp40)
V2MM_23036	NM_153413	Dock3	dedicator of cyto-kinesis 3
V2MM_90347	NM_177780	Dock5	dedicator of cytokinesis 5
V2MM_59041	NM_177030	Dock6	dedicator of cytokinesis 6
V2MM_235070	NM_001033366	Dpcr1	diffuse panbronchiolitis critical region 1
V2MM_51462	NM_010073	Dpm2	dolichol-phosphate (beta-D) mannosyltransferase 2
V2MM_207901	NM_026854	Dtwd2	DTW domain containing 2
V2MM_30902	NM_024438	Dusp19	dual specificity phosphatase 19
V2MM_31744	NM_024438	Dusp19	dual specificity phosphatase 19
V2MM_34250	NM_028207	Dusp3	dual specificity phosphatase 3 (vaccinia virus phosphatase VH1-related)
V2MM_216530	NM_010091	Dvl1	dishevelled, dsh homolog 1
V2MM_134038	XR_104926.1	E130018O15Rik	RIKEN cDNA E130018O15 gene
V2MM_42679	NM_172726	E130309D02Rik	hypothetical protein LOC231868
V2MM_90772	NM_177856	E130311K13Rik	hypothetical protein LOC329659
V2MM_88930	NM_175528	E330009J07Rik	hypothetical protein LOC243780
V2MM_87065	NM_175011	E330017A01Rik	hypothetical protein LOC224247
V2MM_116476	NM_001033214	E330034G19Rik	hypothetical protein LOC105418
V2MM_224719	NM_178668	E430028B21Rik	2'-phosphodiesterase
V2MM_72568	NM_053113	Ear11	eosinophil-associated, ribonuclease A family, member 11
V2MM_57608	NM_010095	Ebf2	early B-cell factor 2
V2MM_31795	NM_026932	Ebna1bp2	EBNA1 binding protein 2
V2MM_45458	NM_139293	Ece2	endothelin converting enzyme 2
V2MM_47013	NM_153799	Edc3	enhancer of mRNA decapping 3
V2MM_65519	NM_025769	Efcab1	EF hand calcium binding domain 1
V2MM_42600	NM_010107	Efna1	ephrin A1
V2MM_43441	NM_010110	Efnb1	ephrin B1
V2MM_55345	NM_010111	Efnb2	ephrin B2
V2MM_89890	NM_177689	EG232599	hypothetical protein LOC232599
V2MM_129676	NM_001037745	EG244556	zinc finger protein 791
V2MM_90512	NM_177808	EG328231	hypothetical protein LOC328231
V2MM_261562	NM_001004158	EG380907	hypothetical protein LOC380907
V2MM_262138	NM_001013816	EG434459	hypothetical protein LOC434459
V2MM_35672	NM_019918	EG56544	calcium-sensing receptor like 1
V2MM_113091	NM_001039219	EG619597	hypothetical protein LOC619597
V2MM_33844	NM_007915	Ei24	etoposide induced 2.4
V2MM_76597	NM_025613	Eid1	CREBBP/EP300 inhibitory protein 1

V2MM_35731	NM_172265	Eif2b5	eukaryotic translation initiation factor 2B, subunit 5 epsilon
V2MM_31712	NM_153402	Eif2c3	eukaryotic translation initiation factor 2C, 3
V2MM_102279	NM_008388	Eif3s6	eukaryotic translation initiation factor 3, subunit 6
V2MM_85307	NM_133916	Eif3s9	eukaryotic translation initiation factor 3, subunit 9
V2MM_66139	NM_053255	Elac1	elaC homolog 1
V2MM_24543	NM_007922	Elk1	ELK1, member of ETS oncogene family
V2MM_26232	NM_007922	Elk1	ELK1, member of ETS oncogene family
V2MM_92580	NM_178736	Elmod2	ELMO domain containing 2
V2MM_36281	NM_007925	Eln	elastin
V2MM_56885	NM_139138	Emr4	EGF-like module containing, mucin-like, hormone receptor-like sequence 4
V2MM_44806	NM_008813	Enpp1	ectonucleotide pyrophosphatase/phosphodiesterase 1
V2MM_53976	NM_009529	ENSMUSG00000073257	Xlr-related, meiosis regulated
V2MM_57898	NM_009529	ENSMUSG00000073257	Xlr-related, meiosis regulated
V2MM_194397	NM_175009	Eny2	e(y)2 protein
V2MM_83355	NM_013511	Epb4.12	erythrocyte protein band 4.1-like 2
V2MM_20596	NM_007935	Epc1	enhancer of polycomb homolog 1
V2MM_21721	NM_007936	Epha4	Eph receptor A4
V2MM_37727	NM_007940	Ephx2	epoxide hydrolase 2, cytoplasmic
V2MM_224463	NM_177814	Erc2	CAZ-associated structural protein
V2MM_46084	NM_010155	Erf	Ets2 repressor factor
V2MM_67317	NM_026129	Erp29	endoplasmic reticulum protein ERp29
V2MM_30715	NM_133660	Es22	esterase 22
V2MM_195077	NM_198103	Exoc8	exocyst complex component 8
V2MM_35054	NM_027698	Exod1	exonuclease domain containing 1
V2MM_30713	NM_007969	Expi	extracellular proteinase inhibitor
V2MM_53522	NM_010167	Eya4	eyes absent 4 homolog
V2MM_39639	NM_007983	Faf1	Fas-associated factor 1
V2MM_116036	XM_138722.6	Fam81b	family with sequence similarity 81, member B
V2MM_232186	XM_138722.6	Fam81b	family with sequence similarity 81, member B
V2MM_90951	NM_177893	Fan1	FANCD2/FANCI-associated nuclease 1
V2MM_87125	NM_175027	Fancb	Fanconianemia, complementation group B
V2MM_26531	NM_007992	Fbln2	fibulin 2

V2MM_34692	NM_011812	Fbln5	fibulin 5
V2MM_28354	NM_133940	Fbxl14	F-box and leucine-rich repeat protein 14
V2MM_101064	NM_178674	Fbxl21	F-box and leucine-rich repeat protein 21
V2MM_99020	NM_027968	Fbxo30	F-box protein 30
V2MM_99021	NM_027968	Fbxo30	F-box protein 30
V2MM_103130	NM_199448	Fez2	fasciculation and elongation protein zeta 2 (zygin II)
V2MM_225450	NM_194057	Ffar1	G protein-coupled receptor 40
V2MM_18349	NM_030614	Fgf16	fibroblast growth factor 16
V2MM_73385	NM_008006	Fgf2	fibroblast growth factor 2
V2MM_84535	NM_028263	Fgfbp3	fibroblast growth factor binding protein 3
V2MM_33960	NM_133862	Fgg	fibrinogen, gamma polypeptide
V2MM_54488	NM_010211	Fhl1	four and a half LIM domains 1
V2MM_87936	NM_175276	Fhod3	formin-family protein FHOS2
V2MM_93014	NM_178887	Fibcd1	fibrinogen C domain containing 1
V2MM_24962	NM_024183	Fip1l1	FIP1 like 1
V2MM_31783	NM_024183	Fip1l1	FIP1 like 1
V2MM_45855	NM_153573	Fkbp14	FK506 binding protein 14
V2MM_50562	NM_153573	Fkbp14	FK506 binding protein 14
V2MM_25609	NM_019873	Fkbp1	WAF-1/CIP1 stabilizing protein 39
V2MM_57419	NM_010228	Flt1	FMS-like tyrosine kinase 1
V2MM_41674	NM_010229	Flt3	FMS-like tyrosine kinase 3
V2MM_25417	NM_145447	Flvcr2	feline leukemia virus subgroup C cellular receptor family, member 2
V2MM_56618	NM_010230	Fmn1	formin 1
V2MM_30592	NM_019679	Fmn1	formin-like 1
V2MM_56339	NM_022014	Fn3k	fructosamine 3 kinase
V2MM_78212	NM_008033	Fnta	farnesyltransferase, CAAX box, alpha
V2MM_71075	NM_008035	Folr2	folate receptor 2 (fetal)
V2MM_30793	NM_008592	Foxc1	forkhead box C1
V2MM_200870	NM_180974.4	Foxn2	forkhead box N2
V2MM_95171	NM_194060	Foxo6	forkhead box O6
V2MM_80044	NM_172862	Frem2	Fras1 related extracellular matrix protein 2
V2MM_67798	NM_011356	Frzb	frizzled-related protein
V2MM_54996	NM_177059	Fstl4	follistatin-like 4
V2MM_59518	NM_139149	Fus	pigpen
V2MM_54196	NM_022004	Fxyd6	FXYD domain-containing ion transport regulator 6
V2MM_49005	NM_020510	Fzd2	frizzled 2
V2MM_916	NM_153073	Gab3	growth factor receptor bound protein 2-associated protein 3
V2MM_71205	NM_008065	Gabpa	GA repeat binding protein, alpha
V2MM_71012	NM_008066	Gabra2	gamma-aminobutyric acid (GABA-A) receptor, subunit alpha 2

V2MM_65176	NM_008071	Gabrb3	gamma-aminobutyric acid (GABA) A receptor, beta 3
V2MM_236555	NM_008084	Gapdh	glyceraldehyde-3-phosphate dehydrogenase
V2MM_51690	NM_172692	Gba2	bile acid beta-glucosidase
V2MM_99273	NM_027375	Gcc2	GRIP and coiled-coil domain-containing 2
V2MM_227046	NM_010272	Gdf11	growth differentiation factor 11
V2MM_41165	NM_010275	Gdnf	glial cell line derived neurotrophic factor
V2MM_42643	NM_010275	Gdnf	glial cell line derived neurotrophic factor
V2MM_57513	NM_010278	Gfi1	growth factor independent 1
V2MM_53656	NM_027819	Ggt6	gamma-glutamyltransferase 6
V2MM_54277	NM_010285	Ghrh	growth hormone releasing hormone
V2MM_70807	NM_025466	Gkn1	gastrokine 1
V2MM_104636	NM_029010.1	Glb1l	galactosidase, beta 1-like
V2MM_111857	NM_001081125	Gli2	GLI-Kruppel family member GLI2
V2MM_58663	NM_010298	Glrb	glycine receptor, beta subunit
V2MM_104977	NM_001039095	Glt6d1	galactosyltransferase family 6 domain containing 1
V2MM_47820	NM_153601	Glud1	glutamate-ammonia ligase (glutamine synthase) domain containing 1
V2MM_162350	XM_003084703.1	Gm10295	predicted gene 10295
V2MM_232577	XM_003085421.1	Gm10931	predicted gene 10931
V2MM_114508	XR_106221.1	Gm12248	predicted gene 12248
V2MM_114509	XR_106221.1	Gm12248	predicted gene 12248
V2MM_133800	NM_001085549.1	Gm12824	predicted gene 12824
V2MM_106587	NM_001033255	Gm136	hypothetical protein LOC214568
V2MM_108370	NM_001014997	Gm156	killer cell lectin-like receptor subfamily H, member 1
V2MM_231593	NM_001166601.1	Gm16430	predicted gene 16430
V2MM_113929	XM_001475544.2	Gm3055	predicted gene 3055
V2MM_120131	XM_003085242.1	Gm340	predicted gene 340
V2MM_125597	NM_001085504.1	Gm436	predicted gene 436
V2MM_118360	NM_177596.3	Gm4769	predicted gene 4769
V2MM_114220	XM_137324.3	Gm4801	predicted gene 4801
V2MM_205058	XM_136255.4	Gm4845	predicted gene 4845
V2MM_239119	XR_106171.1	Gm4890	predicted gene 4890
V2MM_239750	XM_003085289.1	Gm4916	predicted gene 4916
V2MM_37238	NM_177706.4	Gm4922	predicted gene 4922
V2MM_209014	XM_001477831.2	Gm5165	predicted gene 5165
V2MM_172032	XM_488772.3	Gm5482	predicted gene 5482
V2MM_233684	NM_001013820.3	Gm5631	predicted gene 5631
V2MM_108391	NM_001185040.1	Gm5885	predicted gene 5885
V2MM_209467	NM_001195674.1	Gm600	predicted gene 600
V2MM_213015	XM_003084661.1	Gm6590	predicted gene 6590

V2MM_108378	XM_132900.6	Gm6619	predicted gene 6619
V2MM_241072	XM_003084615.1	Gm6647	predicted gene 6647
V2MM_140130	XM_001472529.1	Gm7489	predicted gene 7489
V2MM_148033	XR_105120.1	Gm7710	predicted gene 7710
V2MM_232374	XR_105401.1	Gm8117	predicted gene 8117
V2MM_103267	NM_001004061	Gm93	hypothetical protein LOC225497
V2MM_108717	XR_033994.2	Gm9519	predicted gene 9519
V2MM_177870	XM_001474362.2	Gm9524	predicted gene 9524
V2MM_162382	XM_003084711.1	Gm9990	predicted gene 9990
V2MM_55733	NM_020567	Gmnn	geminin
V2MM_16374	NM_177992	Gmpr2	guanosine monophosphate reductase 2
V2MM_82760	NM_010306	Gnai3	guanine nucleotide binding protein, alpha inhibiting 3
V2MM_58698	NM_025331	Gng11	guanine nucleotide binding protein gamma 11
V2MM_74344	NM_010316	Gng3	guanine nucleotide binding protein (G protein), gamma 3 subunit
V2MM_56273	NM_172529	Gnptg	M6PR domain-containing protein 1
V2MM_84599	NM_028487	Gbp1	G+C-rich promoter-binding protein
V2MM_31597	NM_175500	Gpc5	glypican 5
V2MM_21014	NM_130453	Gpha2	glycoprotein hormone alpha 2
V2MM_37783	NM_175644	Gphb5	glycoprotein hormone beta 5
V2MM_92710	NM_178760	Gpr107	expressed sequence AI790205
V2MM_102833	NM_001081178	Gpr116	G protein-coupled receptor 116
V2MM_93747	NM_181751	Gpr119	G-protein coupled receptor 119
V2MM_99098	NM_001002268	Gpr126	G protein-coupled receptor 126
V2MM_88785	NM_175495	Gpr150	G protein-coupled receptor 150
V2MM_111612	NM_029536	Gpr165	G protein-coupled receptor 165
V2MM_19732	NM_026582	Gpr177	G protein-coupled receptor 177
V2MM_77719	NM_177383	Gpr21	G protein-coupled receptor 21
V2MM_29470	NM_175668	Gpr4	G protein-coupled receptor 4
V2MM_232544	NM_001033290	Gpr55	G protein-coupled receptor 55
V2MM_26151	NM_030720	Gpr84	G protein-coupled receptor 84
V2MM_5678	NM_145066	Gpr85	G protein-coupled receptor 85
V2MM_79534	NM_029460	Gprc2a-rs5	G protein-coupled receptor, family C, group 2, member A, related sequence 5
V2MM_18378	NM_153071	Gprc6a	G protein-coupled receptor, family C, group 6, member A
V2MM_116553	NM_183209.2	Gprin2	G protein regulated inducer of neurite outgrowth 2
V2MM_4286	NM_030677	Gpx2	glutathione peroxidase 2
V2MM_202761	NM_001033498	Gramd2	GRAM domain containing 2
V2MM_211460	NM_001013756	Grhl3	transcription factor CP2-like 4
V2MM_239513	NM_001013756	Grhl3	transcription factor CP2-like 4
V2MM_195601	NM_175481	Grik4	glutamate receptor KA1
V2MM_60526	NM_173372	Grm6	glutamate receptor, metabotropic 6
V2MM_33613	NM_146066	Gspt1	G1 to S phase transition 1

V2MM_66965	NM_010363	Gstz1	glutathione transferase zeta 1 (maleylacetoacetate isomerase)
V2MM_45544	NM_025294	Gtlf3b	transcript expressed during hematopoiesis 2
V2MM_93554	NM_181424	Gtpbp5	GTP binding protein 5
V2MM_27749	NM_145067	Gucy2c	guanylate cyclase 2c
V2MM_56377	NM_029000	Gvin1	very large inducible GTPase 1
V2MM_66195	NM_013755	Gyg	glycogenin 1
V2MM_59464	NM_010293	Gykl1	glycerol kinase-like 1
V2MM_118555	NM_177923.1	H2-M10.2	histocompatibility 2, M region locus 10.2
V2MM_68607	NM_010395	H2-T10	histocompatibility 2, T region locus 10
V2MM_89886	NM_177688	H2afj	H2A histone family, member J
V2MM_29407	NM_146101	Habp2	hyaluronic acid binding protein 2
V2MM_225488	NM_175000	Hbq1	hemoglobin, theta 1
V2MM_87014	NM_175000	Hbq1	hemoglobin, theta 1
V2MM_226854	NM_181821	Hcfc1r1	host cell factor C1 regulator 1
V2MM_77685	NM_010408	Hcn1	hyperpolarization-activated, cyclic nucleotide-gated K+ 1
V2MM_262551	NM_198962	Hcrtr2	hypocretin (orexin) receptor 2
V2MM_173310	NM_001001883.3	Hecw2	HECT, C2 and WW domain containing E3 ubiquitin protein ligase 2
V2MM_107641	NM_001081107	Hel308	helicase, mus308-like
V2MM_86856	NM_173789	Helt	Hey-like transcription factor
V2MM_100123	NM_198298	Helz	helicase with zinc finger domain
V2MM_78571	NM_028705	Herc3	hect domain and RLD 3
V2MM_50904	NM_033041	Hes7	hairy and enhancer of split 7
V2MM_193858	NM_175663	Hist1h2ba	histone 1, H2ba
V2MM_192162	NM_144959	Hltf	SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily a, member 3
V2MM_86568	NM_173731	Hmgcll1	3-hydroxymethyl-3-methylglutaryl-Coenzyme A lyase-like 1
V2MM_24354	NM_027521	Hmha1	minor histocompatibility antigen HA-1
V2MM_193957	NM_133834	Hnrpf	heterogeneous nuclear ribonucleoprotein F
V2MM_25705	NM_144802	Hnrpll	heterogeneous nuclear ribonucleoprotein L-like
V2MM_23637	NM_175606	Hod	homeobox only domain
V2MM_224489	NM_001005247	Hps5	Hermansky-Pudlak syndrome 5
V2MM_82796	NM_010472	Hrb	HIV-1 Rev binding protein
V2MM_49394	NM_013559	Hsp110	heat shock protein 105
V2MM_96159	NM_010478	Hspa1b	heat shock 70kDa protein 1B
V2MM_51929	NM_013558	Hspa1l	heat shock 70kDa protein 1-like
V2MM_87228	NM_175111	Hspbap1	Hspb associated protein 1

V2MM_53977	NM_016865	Htati2	HIV-1 tat interactive protein 2, homolog
V2MM_91122	NM_178020	Hyal3	hyaluronidase 3
V2MM_21264	NM_146042	Ibrdc2	IBR domain containing 2
V2MM_44895	NM_177197	Idi2	isopentenyl diphosphate delta-isomerase type 2
V2MM_261891	NM_172648	Ifi205	interferon activated gene 205
V2MM_226962	NM_011879	Ik	IK cytokine
V2MM_81660	NM_010551	Il16	interleukin 16
V2MM_60090	NM_153511	Il1f9	interleukin 1 family, member 9
V2MM_91422	NM_178258	Il22ra2	interleukin 22 receptor, alpha 2
V2MM_206443	NM_029594.1	Il31	interleukin 31
V2MM_171535	NM_009909	Il8rb	interleukin 8 receptor, beta
V2MM_66480	NM_029673	Immt	inner membrane protein, mitochondrial
V2MM_196613	NM_177730	Impad1	inositol monophosphatase domain containing 1
V2MM_21316	NM_174876	Impg2	interphotoreceptor matrix proteoglycan 2
V2MM_27296	NM_145540	Ints3	integrator complex subunit 3
V2MM_91257	NM_178112	Ints8	integrator complex subunit 8
V2MM_95538	NM_198026	Iqcc	IQ motif containing C
V2MM_110736	NM_030068.1	Iqch	IQ motif containing H
V2MM_110740	NM_030068.1	Iqch	IQ motif containing H
V2MM_41444	NM_172535	Iqub	IQ motif and ubiquitin domain containing
V2MM_33107	NM_022986	Irak1bp1	interleukin-1 receptor-associated kinase 1 binding protein 1
V2MM_92694	NM_178757	Irf2bp1	interferon regulatory factor 2 binding protein 1
V2MM_71354	NM_010572	Irs4	insulin receptor substrate 4
V2MM_191930	NM_001081053	Itga10	integrin, alpha 10
V2MM_133278	NM_010576	Itga4	integrin alpha 4
V2MM_21191	NM_010578.2	Itgb1	integrin beta 1 (fibronectin receptor beta) (Itgb1), mRNA
V2MM_200115	NM_177290	Itgb8	integrin beta 8
V2MM_5397	NM_008410	Itm2b	integral membrane protein 2B
V2MM_55386	NM_001081175	Itpkb	inositol 1,4,5-trisphosphate 3-kinase B
V2MM_66426	NM_011365	Itn2	intersectin 2
V2MM_21446	NM_152895	Jarid1b	PLU1
V2MM_72017	NM_173433	Jmjd2d	jumonji domain containing 2D
V2MM_51021	NM_145958	Kbtbd2	kelch repeat and BTB (POZ) domain containing 2
V2MM_116929	NM_001024135	Kbtbd7	kelch repeat and BTB (POZ) domain containing 7-like protein
V2MM_85201	NM_133207	Kcnh7	potassium voltage-gated channel, subfamily H (eag-related), member 7

V2MM_31929	NM_030716	Kcnp2	Kv channel-interacting protein 2
V2MM_20642	NM_019659	Kcnj1	potassium inwardly-rectifying channel, subfamily J, member 1
V2MM_30221	NM_080465	Kcnn2	small conductance calcium-activated potassium channel protein 2
V2MM_94919	NM_183285	Kctd2	potassium channel tetramerisation domain containing 2
V2MM_197039	NM_175519	Kctd8	potassium channel tetramerisation domain containing 8
V2MM_200678	NM_145997.2	Kdm5a	lysine (K
V2MM_173589	NM_001033039	Klhc9	kelch domain containing 9
V2MM_133950	NM_198305.2	Klhl17	kelch-like 17 (Drosophila) (Klhl17), mRNA
V2MM_193323	NM_178771	Klhl26	kelch-like 26
V2MM_43722	NM_172925	Klhl31	kelch repeat and BTB (POZ) domain containing 1
V2MM_60930	NM_172925	Klhl31	kelch repeat and BTB (POZ) domain containing 1
V2MM_87462	NM_175174	Klhl5	kelch-like 5 (Drosophila)
V2MM_227139	NM_183390	Klhl6	kelch-like 6
V2MM_49893	NM_153590	Klre1	killer cell lectin-like receptor family E member 1
V2MM_59719	NM_033078	Klrk1	NKG2-D
V2MM_32988	NM_133809	Kmo	kynurenine 3-monooxygenase
V2MM_262137	NM_027983	Krt33a	RIKEN cDNA 2310015J09
V2MM_6785	NM_008476	Krt6a	keratin complex 2, basic, gene 6a
V2MM_81148	NM_212485.2	Krt73	keratin 73
V2MM_188096	NM_008474	Krt84	keratin complex 2, basic, gene 16
V2MM_63597	NM_010676	Krtap8-2	keratin associated protein 8-2
V2MM_62695	NM_029571	Kti12	KTI12 homolog, chromatin associated
V2MM_61067	NM_145993	L3mbtl2	l(3)mbt-like 2
V2MM_61464	NM_172787	L3mbtl3	l(3)mbt-like 3
V2MM_71241	NM_026235	Larp6	La ribonucleoprotein domain family, member 6
V2MM_128403	NM_001164201.1	Lass3	LAG1 homolog, ceramide synthase 3
V2MM_22435	NM_015771	Lats2	large tumor suppressor 2
V2MM_133588	NM_001018079	Lce3f	late cornified envelope protein
V2MM_238980	NM_177846.3	Lcmt2	leucine carboxyl methyltransferase 2
V2MM_226991	NM_178142	Lcorl	Mblk1-related protein-1
V2MM_91295	NM_178142	Lcorl	Mblk1-related protein-1
V2MM_125510	NM_001033979	Ldlrad2	low density lipoprotein receptor A domain containing 2
V2MM_32728	NM_019782	Lepre1	leprecan 1
V2MM_82862	NM_010709	Lgtn	ligatin
V2MM_88357	NM_175386	Lhfp	lipoma HMGIC fusion partner

V2MM_56503	NM_172589	Lhfp12	lipoma HMGIC fusion partner-like 2
V2MM_196203	NM_177763	Lhfp14	lipoma HMGIC fusion partner-like 4
V2MM_195610	NM_010713	Lhx8	LIM homeobox protein 8
V2MM_33350	NM_008501	Lif	leukemia inhibitory factor
V2MM_62706	NM_176953	Lig4	DNA ligase IV
V2MM_21583	NM_008505	Lmo2	LIM domain only 2
V2MM_66740	NM_172827	Lnpep	leucyl/cystinyl aminopeptidase
V2MM_53008	NM_080795	Lnx2	PDZ domain containing ring finger 1
V2MM_171980	XM_003085101.1	LOC100502943	hypothetical protein LOC100502943
V2MM_232809	XM_003085405.1	LOC100502966	zinc finger protein 717-like
V2MM_101808	XR_105638.1	LOC100502987	hypothetical LOC100502987
V2MM_227263	XR_105430.1	LOC100503029	hypothetical LOC100503029
V2MM_199654	XR_105064.1	LOC100503149	hypothetical LOC100503149
V2MM_207836	XM_003084935.1	LOC100503368	zinc finger protein 120-like
V2MM_237984	XM_003084865.1	LOC100503388	hypothetical protein LOC100503388
V2MM_213462	XR_105977.1	LOC100503392	hypothetical LOC100503392, transcript variant 1
V2MM_96817	XM_003085408.1	LOC100503535	uncharacterized protein C17orf47 homolog
V2MM_170912	XR_105541.1	LOC100503592	hypothetical LOC100503592
V2MM_173593	XR_104609.1	LOC100503962	hypothetical LOC100503962, transcript variant 1
V2MM_199540	XR_105588.1	LOC100504675	hypothetical LOC100504675
V2MM_223224	XM_003086824.1	LOC100505216	hypothetical protein LOC100505216
V2MM_45829	XM_003085053.1	LOC100505348	hypothetical protein LOC100505348
V2MM_162397	XM_001477076.2	LOC675594	hypothetical LOC675594
V2MM_25849	NM_080420	Lpo	lactoperoxidase
V2MM_33332	NM_001025067	Lrig2	leucine-rich repeats and immunoglobulin-like domains 2
V2MM_61366	NM_177152	Lrig3	leucine-rich and immunoglobulin- like domains 3
V2MM_20816	NM_022993	Lrp10	low-density lipoprotein receptor- related protein 10
V2MM_75173	NM_026278	Lrp2bp	LRP2 binding protein
V2MM_38908	NM_146242	Lrrc10	leucine rich repeat containing 10
V2MM_224614	NM_175413	Lrrc39	leucine rich repeat containing 39
V2MM_226906	NM_175413	Lrrc39	leucine rich repeat containing 39
V2MM_84988	NM_029985	Lrrc42	leucine rich repeat containing 42
V2MM_83824	NM_025657	Lrrc57	leucine rich repeat containing 57
V2MM_160031	NM_177093	Lrrc58	leucine rich repeat containing 58
V2MM_55961	NM_177093	Lrrc58	leucine rich repeat containing 58
V2MM_113976	NM_001163559.1	Lrrig1	leucine-rich repeats and IQ motif containing 1

V2MM_82875	NM_010733	Lrrn3	leucine rich repeat protein 3, neuronal
V2MM_28420	NM_172492	Lrtm2	leucine-rich repeats and transmembrane domains 2
V2MM_46805	NM_138721	Lsm10	U7 snRNP-specific Sm-like protein LSM10
V2MM_86536	NM_172947	Lsm12	LSM12 homolog
V2MM_31700	NM_008519	Ltb4r1	leukotriene B4 receptor 1
V2MM_29006	NM_008520	Ltbp3	latent transforming growth factor beta binding protein 3
V2MM_190009	NM_201358	Lym4	cDNA sequence BC034664
V2MM_54668	NM_013590	Lyz	P lysozyme structural
V2MM_150584	NM_175296	Mael	maelstrom homolog
V2MM_197099	NM_173783	Mageb18	melanoma antigen family B, 18
V2MM_34177	NM_133853	Magi3	membrane-associated guanylate kinase-related (MAGI-3)
V2MM_25789	NM_008549	Man2a1	mannosidase 2, alpha 1
V2MM_71202	NM_173740	Maoa	monoamine oxidase A
V2MM_32740	NM_024275	Map4k5	mitogen-activated protein kinase kinase kinase 5
V2MM_175624	NM_009158	Mapk10	mitogen activated protein kinase 10
V2MM_206388	NM_177345	Mapkap1	mitogen-activated protein kinase associated protein 1
V2MM_188698	NM_133350	Mapre3	APC-binding protein EB2
V2MM_188867	NM_133350	Mapre3	APC-binding protein EB2
V2MM_48961	NM_172606	March6	membrane-associated ring finger (C3HC4) 6
V2MM_33052	NM_145569	Mat2a	methionine adenosyltransferase II, alpha
V2MM_42558	NM_153546	Mboat1	O-acyltransferase (membrane bound) domain containing 1
V2MM_6614	NM_145130	Mboat5	O-acyltransferase (membrane bound) domain containing 5
V2MM_10742	NM_010777	Mbp	myelin basic protein
V2MM_195522	NM_027290	Mcm10	minichromosome maintenance complex component 10
V2MM_21840	NM_008566	Mcm5	minichromosome maintenance deficient 5, cell division cycle 46
V2MM_40210	NM_026902	Mcts1	malignant T cell amplified sequence 1
V2MM_51671	NM_021442	Mds1	myelodysplasia syndrome 1 protein homolog
V2MM_225213	NM_178881	Med12l	mediator of RNA polymerase II transcription, subunit 12 homolog (yeast)-like
V2MM_10552	NM_025895	Med28	endothelial-derived gene 1
V2MM_26861	NM_008585	Mep1a	meprin 1 alpha
V2MM_21091	NM_030705	Mesdc1	mesoderm development candidate 1

V2MM_82377	NM_008588	Mesp1	mesoderm posterior 1
V2MM_82379	NM_008588	Mesp1	mesoderm posterior 1
V2MM_32025	NM_008590	Mest	mesoderm specific transcript
V2MM_14656	NM_175224	Metap1	methionyl aminopeptidase 1
V2MM_32883	NM_019721	Mettl3	methyltransferase-like 3
V2MM_81228	NM_176917	Mettl4	methyltransferase like 4
V2MM_34957	NM_028140	Mfsd8	major facilitator superfamily domain containing 8
V2MM_86903	NM_173870	Mgat4a	mannoside acetylglucosaminyltransferase 4, isoenzyme A
V2MM_60610	NM_153598	MGC37823	UDP glucuronosyltransferase 2 family, polypeptide B34
V2MM_36191	NM_146034	Mgea6	CTAGE family, member 5
V2MM_42381	NM_019946	Mgst1	microsomal glutathione S-transferase 1
V2MM_73602	NM_025569	Mgst3	microsomal glutathione S-transferase 3
V2MM_67358	NM_013791	Mkln1	muskelin 1, intracellular mediator containing kelch motifs
V2MM_89430	NM_177595	Mkx	mohawk
V2MM_73840	NM_053015	Mlph	melanophilin
V2MM_92899	NM_178797	Mlstd1	male sterility domain containing 1
V2MM_30068	NM_133823	Mmaa	methylmalonic aciduria type A
V2MM_52437	NM_013599	Mmp9	matrix metalloproteinase 9
V2MM_16702	NM_153127	Mmrn2	elastin microfibril interfacier 3
V2MM_197791	NM_029797	Mnd1	GAJ protein
V2MM_25392	NM_008613	Mns1	meiosis-specific nuclear structural protein 1
V2MM_103138	NM_026779	Mocos	molybdenum cofactor sulfurase
V2MM_95693	NM_198162	Morc2a	microrchidia 2A
V2MM_102441	NM_001045529	Morc3	microrchidia 3
V2MM_107830	NM_029112	Morn3	MORN repeat containing 3
V2MM_63266	NM_021509	Moxd1	monooxygenase, DBH-like 1
V2MM_18383	NM_010824	Mpo	myeloperoxidase
V2MM_29303	NM_019939	Mpp6	membrane protein, palmitoylated 3 (MAGUK p55 subfamily member 6)
V2MM_77696	NM_176993	Mpzl3	yelin protein zero-like 3 (Mpzl3)
V2MM_33687	NM_008627	Mrg2	myeloid ecotropic viral integration site-related gene 2
V2MM_22914	NM_030726	Mrgprh	MAS-related GPR, member H
V2MM_83777	NM_025300	Mrpl15	mitochondrial ribosomal protein L15
V2MM_84089	NM_026851	Mrpl52	mitochondrial ribosomal protein L52
V2MM_11408	NM_026768	Mrps18a	mitochondrial ribosomal protein S18A
V2MM_3025	NM_026768	Mrps18a	mitochondrial ribosomal protein S18A

V2MM_35760	NM_024174	Mrps23	mitochondrial ribosomal protein S23
V2MM_55964	NM_013516	Ms4a2	membrane-spanning 4-domains, subfamily A, member 2
V2MM_50626	NM_028595	Ms4a6c	membrane-spanning 4-domains, subfamily A, member 6C
V2MM_2021	NM_054082	Mta3	metastasis associated 3
V2MM_34547	NM_008633	Mtap4	microtubule-associated protein 4
V2MM_42122	NM_177293	Mtap7d3	MAP7 domain containing 3
V2MM_19076	NM_172135	Mterf	mitochondrial transcription termination factor
V2MM_49749	NM_172761	Mthfsd	methenyltetrahydrofolate synthetase domain containing
V2MM_196343	NM_001005863	Mtus1	mitochondrial tumor suppressor 1
V2MM_86544	NM_172979	Muc15	mucin 15
V2MM_93715	NM_181729	Muc6	mucin 6, gastric
V2MM_152310	NM_001012323.1	Mup20	major urinary protein 20
V2MM_36673	NM_008648	Mup4	major urinary protein 4
V2MM_224665	NM_181390	Mustn1	musculoskeletal, embryonic nuclear protein 1
V2MM_30876	NM_008506	Mycl1	lung carcinoma myc related oncogene 1
V2MM_23343	NM_008709	Mycn	neuroblastoma myc-related oncogene 1
V2MM_227613	NM_022410	Myh9	myosin, heavy polypeptide 9, non-muscle
V2MM_76260	NM_022410	Myh9	myosin, heavy polypeptide 9, non-muscle
V2MM_196295	NM_001081219	Myo1a	myosin IA
V2MM_89553	NM_177619	Myst2	MYST histone acetyltransferase 2
V2MM_43599	NM_017479	Myst4	MYST histone acetyltransferase monocytic leukemia 4
V2MM_108014	NM_201369.3	N4bp2l2	NEDD4 binding protein 2-like 2
V2MM_33276	NM_008667	Nab1	Ngfi-A binding protein 1
V2MM_30008	NM_008668	Nab2	Ngfi-A binding protein 2
V2MM_18485	NM_026425	Nat5	N-acetyltransferase 5 (ARD1 homolog, <i>S. cerevisiae</i>)
V2MM_109029	NM_001111016.1	Nav2	neuron navigator 2
V2MM_81818	NM_026245	Nbeal1	neurobeachin like 1
V2MM_29283	NM_146171	Ncapd2	chromosome condensation-related SMC-associated protein 1
V2MM_17609	NM_010878	Nck1	non-catalytic region of tyrosine kinase adaptor protein 1
V2MM_44347	NM_153505	Nckap1l	hematopoietic protein 1
V2MM_85334	NM_134009	Ncln	nicalin homolog
V2MM_6921	NM_027175	Ndufaf1	NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, assembly factor 1

V2MM_24397	NM_145518	Ndufs1	NADH dehydrogenase (ubiquinone) Fe-S protein 1
V2MM_36953	NM_144946	Neto1	neuropilin- and tolloid-like protein 1
V2MM_110252	NM_001081324	Neto2	neuropilin- and tolloid-like protein 2
V2MM_86766	NM_173772	Neu4	sialidase 4
V2MM_61491	NM_009718	Neurog2	neurogenin 2
V2MM_28202	NM_008686	Nfe2l1	nuclear factor, erythroid derived 2,-like 1
V2MM_33336	NM_008686	Nfe2l1	nuclear factor, erythroid derived 2,-like 1
V2MM_90079	NM_008687	Nfib	nuclear factor I/B
V2MM_37226	NM_008689	Nfkb1	nuclear factor kappa-B, subunit 1
V2MM_49586	NM_172766	Nfrkb	nuclear factor related to kappa B binding protein
V2MM_57447	NM_009750	Ngfrap1	nerve growth factor receptor (TNFRSF16) associated protein 1
V2MM_197730	NM_175340	Nhlrc1	malin
V2MM_58066	NM_025391	Nip7	Saccharomyces cerevisiae Nip7p homolog
V2MM_50768	NM_153578	Nipa1	non-imprinted in Prader-Willi/Angelman syndrome 1
V2MM_203002	NM_027116.1	Nkpd1	NTPase, KAP family P-loop domain containing 1
V2MM_204349	NM_008699	Nkx2-3	NK2 transcription factor related, locus 3
V2MM_34842	NM_133702	Nol11	nucleolar protein 11
V2MM_30440	NM_008720	Npc1	Niemann Pick type C1
V2MM_72546	NM_033525	Npnt	nephronectin
V2MM_21619	NM_008730	Nptx1	neuronal pentraxin 1
V2MM_3368	NM_145354	Nsun2	NOL1/NOP2/Sun domain family 2
V2MM_41068	NM_011851	Nt5e	5'nucleotidase, ecto
V2MM_50207	NM_025399	Nudt14	nudix (nucleoside diphosphate linked moiety X)-type motif 14
V2MM_42706	NM_172527	Nudt15	MTH2 protein
V2MM_227090	NM_001024205	Nufip2	82-kD FMRP Interacting Protein
V2MM_96631	NM_001024205	Nufip2	82-kD FMRP Interacting Protein
V2MM_96633	NM_001024205	Nufip2	82-kD FMRP Interacting Protein
V2MM_195614	NM_029937.1	Nup210l	nucleoporin 210-like
V2MM_98110	NM_029937.1	Nup210l	nucleoporin 210-like
V2MM_5270	NM_027191	Nup37	nucleoporin 37
V2MM_104046	NM_183392	Nup54	nucleoporin 54
V2MM_60844	NM_172521	Nut	nuclear protein in testis
V2MM_46816	NM_016813	Nxf1	nuclear RNA export factor 1
V2MM_196608	NM_130888	Nxf7	nuclear RNA export factor 7
V2MM_94965	NM_183297	Nxph4	neurexophilin 4
V2MM_165757	NM_001113213.1	Odf2	outer dense fiber of sperm tails 2
V2MM_27764	NM_011857	Odz3	odd Oz/ten-m homolog 3
V2MM_34226	NM_011858	Odz4	odd Oz/ten-m homolog 4
V2MM_34075	NM_031373	Ogfr	opioid growth factor receptor

V2MM 25490	NM 008760	Ogn	osteoglycin
V2MM 39080	NM 133859	Olfml3	olfactomedin-like 3
V2MM 120640	NM 001011758	Olfr1016	olfactory receptor 1016
V2MM 52351	NM 146586	Olfr1018	olfactory receptor 1018
V2MM 57505	NM 146586	Olfr1018	olfactory receptor 1018
V2MM 57680	NM 146580	Olfr1020	olfactory receptor 1020
V2MM 51148	NM 147010	Olfr1052	olfactory receptor 1052
V2MM 53019	NM 147018	Olfr1056	olfactory receptor 1056
V2MM 49356	NM 147020	Olfr1061	olfactory receptor 1061
V2MM 225978	NM 146511	Olfr107	olfactory receptor 107
V2MM 85775	NM 146465	Olfr108	olfactory receptor 108
V2MM 74443	NM 146846	Olfr1087	olfactory receptor 1087
V2MM 72595	NM 146768	Olfr1099	olfactory receptor 1099
V2MM 49854	NM 146591	Olfr1101	olfactory receptor 1101
V2MM 51341	NM 146591	Olfr1101	olfactory receptor 1101
V2MM 61752	NM 146769	Olfr1110	olfactory receptor 1110
V2MM 51156	NM 147028	Olfr1125	olfactory receptor 1125
V2MM 227039	NM 146642	Olfr1140	olfactory receptor 1140
V2MM 76698	NM 146848	Olfr1161	olfactory receptor 1161
V2MM 23571	NM 146294	Olfr1167	olfactory receptor 1167
V2MM 212924	XM 621554.5	Olfr1174-ps	olfactory receptor 1174, pseudogene
V2MM 57840	NM 146323	Olfr1232	olfactory receptor 1232
V2MM 59378	NM 147090	Olfr1253	olfactory receptor 1253
V2MM 43676	NM 146342	Olfr1269	olfactory receptor 1269
V2MM 53834	NM 146377	Olfr127	olfactory receptor 127
V2MM 74166	NM 146908	Olfr1280	olfactory receptor 1280
V2MM 76080	NM 146889	Olfr1302	olfactory receptor 1302
V2MM 85720	NM 146450	Olfr1314	olfactory receptor 1314
V2MM 121608	NM 207631	Olfr1321	olfactory receptor 1321
V2MM 30260	NM 146292	Olfr1324	olfactory receptor 1324
V2MM 86015	NM 146541	Olfr1361	olfactory receptor 1361
V2MM 86017	NM 146541	Olfr1361	olfactory receptor 1361
V2MM 57710	NM 146337	Olfr1396	olfactory receptor 1396
V2MM 56451	NM 146505	Olfr148	olfactory receptor 148
V2MM 225002	NM 146635	Olfr1489	olfactory receptor 1489
V2MM 86162	NM 146635	Olfr1489	olfactory receptor 1489
V2MM 79991	NM 146796	Olfr1499	olfactory receptor 1499
V2MM 86220	NM 146646	Olfr152	olfactory receptor 152
V2MM 97735	NM 019475	Olfr155	olfactory receptor 155
V2MM 86389	NM 146860	Olfr161	olfactory receptor 161
V2MM 197319	NM 146466	Olfr165	olfactory receptor 165
V2MM 85778	NM 146466	Olfr165	olfactory receptor 165
V2MM 49978	NM 146357	Olfr168	olfactory receptor 168
V2MM 42539	NM 020598	Olfr17	olfactory receptor 17
V2MM 50809	NM 146486	Olfr203	olfactory receptor 203
V2MM 52086	NM 146384	Olfr208	olfactory receptor 208
V2MM 85639	NM 146429	Olfr223	olfactory receptor 223
V2MM 114255	XM 001474443.2	Olfr227	olfactory receptor 227

V2MM 85538	NM 146405	Olfr228	olfactory receptor 228
V2MM 239522	NM 001011866	Olfr309	olfactory receptor 309
V2MM 70104	NM 146939	Olfr354	olfactory receptor 354
V2MM 69569	NM 146825	Olfr39	olfactory receptor 39
V2MM 58884	NM 147005	Olfr395	olfactory receptor 395
V2MM 68542	NM 146715	Olfr419	olfactory receptor 419
V2MM 47090	NM 146305	Olfr420	olfactory receptor 420
V2MM 75020	NM 146819	Olfr466	olfactory receptor 466
V2MM 123518	XM 001487801.2	Olfr471	olfactory receptor 471
V2MM 57330	NM 146307	Olfr498	olfactory receptor 498
V2MM 53651	NM 146311	Olfr510	olfactory receptor 510
V2MM 61119	NM 146325	Olfr554	olfactory receptor 554
V2MM 56362	NM 147092	Olfr561	olfactory receptor 561
V2MM 56413	NM 147085	Olfr571	olfactory receptor 571
V2MM 57075	NM 147053	Olfr582	olfactory receptor 582
V2MM 55469	NM 147111	Olfr586	olfactory receptor 586
V2MM 128590	NM 207556	Olfr592	olfactory receptor 592
V2MM 59714	NM 147046	Olfr600	olfactory receptor 600
V2MM 56865	NM 147070	Olfr604	olfactory receptor 604
V2MM 66239	NM 146756	Olfr608	olfactory receptor 608
V2MM 50075	NM 147047	Olfr618	olfactory receptor 618
V2MM 41587	NM 146315	Olfr62	olfactory receptor 62
V2MM 51700	NM 147083	Olfr622	olfactory receptor 622
V2MM 239088	NM 147098	Olfr630	olfactory receptor 630
V2MM 53876	NM 147077	Olfr643	olfactory receptor 643
V2MM 27628	NM 146760	Olfr672	olfactory receptor 672
V2MM 44179	NM 147069	Olfr686	olfactory receptor 686
V2MM 47444	NM 147032	Olfr705	olfactory receptor 705
V2MM 12330	NM 054091	Olfr74	olfactory receptor 74
V2MM 36167	NM 146298	Olfr746	olfactory receptor 746
V2MM 54546	NM 146422	Olfr765	olfactory receptor 765
V2MM 227551	NM 146551	Olfr788	olfactory receptor 788
V2MM 46759	NM 146548	Olfr800	olfactory receptor 800
V2MM 86293	NM 146675	Olfr820	olfactory receptor 820
V2MM 214283	NM 001012266	Olfr835	olfactory receptor 835
V2MM 241917	NM 001012266	Olfr835	olfactory receptor 835
V2MM 41149	NM 146567	Olfr843	olfactory receptor 843
V2MM 65862	NM 146903	Olfr871	olfactory receptor 871
V2MM 195057	NM 146419	Olfr883	olfactory receptor 883
V2MM 85607	NM 146423	Olfr887	olfactory receptor 887
V2MM 85809	NM 146478	Olfr891	olfactory receptor 891
V2MM 71746	NM 146786	Olfr914	olfactory receptor 914
V2MM 77737	NM 146784	Olfr916	olfactory receptor 916
V2MM 85669	NM 146438	Olfr938	olfactory receptor 938
V2MM 197603	NM 146615	Olfr986	olfactory receptor 986
V2MM 75654	NM 146865	Olfr992	olfactory receptor 992
V2MM 226998	NM 146437	Olfr996	olfactory receptor 996
V2MM 53412	NM 138648	Olr1	oxidized low density lipoprotein (lectin-like) receptor 1

V2MM_234490	NM_201258	Oog3	oogenesis 3
V2MM_95607	NM_198105	ORF34	hypothetical protein LOC207375
V2MM_33973	NM_145525	Osbpl6	OSBP-related protein 6
V2MM_38185	NM_133885	Osbpl9	oxysterol binding protein-like 9
V2MM_20686	NM_028091	Osgpl1	O-sialoglycoprotein endopeptidase-like 1
V2MM_54667	NM_145950	Osgin2	oxidative stress induced growth inhibitor family member 2
V2MM_114412	NM_001013365	Osm	oncostatin M
V2MM_23616	NM_011859	Osr	odd-skipped related 1
V2MM_37461	NM_172416	Ostm1	osteopetrosis associated transmembrane protein 1
V2MM_66697	NM_027695	Oxsm	3-oxoacyl-ACP synthase, mitochondrial
V2MM_59687	NM_020621	P2ry4	purinergic receptor P2Y, G-protein coupled, 4
V2MM_36905	NM_008776	Pafah1b3	platelet-activating factor acetylhydrolase, isoform 1b, alpha1 subunit
V2MM_54896	NM_013626	Pam	peptidylglycine alpha-amidating monooxygenase
V2MM_35991	NM_023792	Pank1	pantothenate kinase 1 beta
V2MM_23880	NM_011960	Parg	poly (ADP-ribose) glycohydrolase
V2MM_110605	NM_029922	Parp6	poly (ADP-ribose) polymerase family, member 6
V2MM_23696	NM_008780	Pax1	paired box gene 1
V2MM_45528	NM_013627	Pax6	paired box gene 6
V2MM_92304	NM_178685	Pcdh20	protocadherin 20
V2MM_28352	NM_033595	Pcdhga12	protocadherin gamma subfamily A, 12
V2MM_29764	NM_027654	Pcgf6	polycomb group ring finger 6
V2MM_66442	NM_146239	Pctk2	PCTAIRE-motif protein kinase 2
V2MM_84084	NM_026850	Pdcl3	phosducin-like 3
V2MM_120552	NM_001081033	Pde11a	phosphodiesterase 11A
V2MM_54442	NM_016744	Pde1a	phosphodiesterase 1A, calmodulin-dependent
V2MM_109239	NM_011055	Pde3b	phosphodiesterase 3B, cGMP-inhibited
V2MM_22185	NM_001039376	Pde4dip	phosphodiesterase 4D interacting protein
V2MM_53814	NM_177145	Pde4dip	phosphodiesterase 4D interacting protein
V2MM_47580	NM_019971	Pdgfc	platelet-derived growth factor, C polypeptide
V2MM_30910	NM_007952	Pdia3	protein disulfide isomerase associated 3
V2MM_93255	NM_178939	Pdrg1	p53 and DNA damage-regulated protein
V2MM_171587	NM_001081064	Pdzd2	PDZ domain containing 2

V2MM_89482	NM_177605	Pdzd7	PDZ domain containing 7
V2MM_21511	NM_001033222	Pdzd8	PDZ domain containing 8
V2MM_27954	NM_011868	Peci	peroxisomal delta3, delta2-enoyl-Coenzyme A isomerase
V2MM_74910	NM_011067	Per3	period homolog 3
V2MM_203003	NM_027777	Pex1	peroxin1
V2MM_213095	NM_171824	Pgbd5	piggyBac transposable element derived 5
V2MM_44079	NM_028634	Pgea1	PKD2 interactor, golgi and endoplasmic reticulum associated 1
V2MM_53544	NM_021319	Pglyrp2	peptidoglycan recognition protein 2
V2MM_83844	NM_025700	Pgm1	phosphoglucomutase 1
V2MM_31998	NM_028352	Pgm3	phosphoglucomutase 3
V2MM_33749	NM_028352	Pgm3	phosphoglucomutase 3
V2MM_87073	NM_175013	Pgm5	phosphoglucomutase 5
V2MM_233632	NM_030101.1	Pgpep1l	pyroglutamyl-peptidase I-like
V2MM_60911	NM_016783	Pgrmc1	progesterone receptor membrane component
V2MM_99074	NM_001033257	Phactr2	phosphatase and actin regulator 2
V2MM_105738	NM_001007154	Phactr3	phosphatase and actin regulator 3
V2MM_101762	NM_172603	Phf11	PHD finger protein 11
V2MM_86933	NM_174852	Phf12	PHD zinc finger transcription factor
V2MM_25387	NM_172303	Phf17	PHD zinc finger protein Jade1
V2MM_197509	NM_001081409	Phf20l1	PHD finger protein 20-like 1
V2MM_84338	NM_027642	Phf6	PHD finger protein 6
V2MM_52399	NM_008832	Phka1	phosphorylase kinase alpha 1
V2MM_41591	NM_008838	Pigf	phosphatidylinositol glycan, class F
V2MM_91302	NM_178149	Pik3ip1	calcineurin-regulated kringle domain protein
V2MM_21716	NM_181585	Pik3r3	phosphatidylinositol 3 kinase, regulatory subunit, polypeptide 3 (p55)
V2MM_56551	NM_021311	Piwil1	piwi like homolog 1
V2MM_22918	NM_144859	Pja2	ring finger protein 131
V2MM_53536	NM_008863	Pkib	cAMP-dependent protein kinase inhibitor beta
V2MM_41206	NM_139198	Plac8	placenta-specific 8
V2MM_22798	NM_148937	Plcd4	phospholipase C, delta 4
V2MM_197691	NM_183191	Plch1	phospholipase C-like 3
V2MM_197066	NM_175556	Plch2	phospholipase C, eta 2
V2MM_41433	NM_177355	Plcx3	phosphatidylinositol-specific phospholipase C, X domain containing 3
V2MM_150590	NM_176916	Pld5	phospholipase D family, member 5
V2MM_25136	NM_144920	Plekha5	phosphoinositol 3-phosphate-binding protein-2

V2MM_88104	NM_001081333	Plekhg4	pleckstrin homology domain containing, family G (with RhoGef domain) member 4
V2MM_204092	NM_001008233.3	Plekhn1	pleckstrin homology domain containing, family N member 1
V2MM_21715	NM_019755	Plp2	proteolipid protein 2
V2MM_22891	NM_019755	Plp2	proteolipid protein 2
V2MM_175996	NM_175750.3	Plxna4	plexin A4
V2MM_2965	NM_025928	Pmf1	polyamine-modulated factor 1
V2MM_93625	NM_181579	Pof1b	premature ovarian failure 1B
V2MM_87451	NM_175170	Pogk	pogo transposable element with KRAB domain
V2MM_52093	NM_172683	Pogz	pogo transposable element with ZNF domain
V2MM_58367	NM_008892	Pola1	polymerase (DNA directed), alpha 1
V2MM_195705	NM_011133	Pole2	DNA polymerase epsilon subunit 2
V2MM_24417	NM_011972	Poli	polymerase (DNA directed), iota
V2MM_14300	NM_022811	Polr1e	RNA polymerase I associated factor 53
V2MM_94440	NM_001081247	Polr3a	polymerase (RNA) III (DNA directed) polypeptide A, 155kDa
V2MM_45273	NM_025298	Polr3e	sex-lethal interactor homolog
V2MM_55694	NM_183308	Pon2	paraoxonase 2
V2MM_153511	NM_010127	Pou6f1	POU domain, class 6, transcription factor 1
V2MM_59666	NM_008903	Ppap2a	phosphatidic acid phosphatase 2a
V2MM_232637	NM_001144855.1	Ppfia4	protein tyrosine phosphatase, receptor type, f polypeptide (PTPRF), interacting protein (liprin), alpha 4 (Ppfia4), mRNA
V2MM_52991	NM_028677	Ppih	peptidylprolyl isomerase H
V2MM_226144	NM_144954	Ppil2	peptidylprolyl isomerase-like 2
V2MM_85430	NM_144954	Ppil2	peptidylprolyl isomerase-like 2
V2MM_99129	NM_028430.1	Ppil6	peptidylprolyl isomerase (cyclophilin)-like 6 (Ppil6), mRNA
V2MM_227508	NM_028292	Ppme1	protein phosphatase methylesterase 1
V2MM_58148	NM_172707	Ppp1cb	protein phosphatase 1, catalytic subunit, beta isoform
V2MM_29286	NM_146081	Ppp4r1	protein phosphatase 4, regulatory subunit 1
V2MM_51882	NM_008918	Ppy	pancreatic polypeptide
V2MM_33406	NM_031390	Pramel3	preferentially expressed antigen in melanoma-like 3
V2MM_226978	NM_178250	Pramel7	preferentially expressed antigen in melanoma like 7
V2MM_2595	NM_145150	Prc1	protein regulator of cytokinesis 1
V2MM_84306	NM_027504	Prdm16	transcription factor MEL1

V2MM_12848	NM_001042671	Prei4	preimplantation protein 4
V2MM_10271	NM_054077	Prelp	proline arginine-rich end leucine-rich repeat
V2MM_55800	NM_021400	Prg4	proteoglycan 4
V2MM_59052	NM_021400	Prg4	proteoglycan 4
V2MM_65055	NM_178143	Prkaa2	AMP-activated protein kinase alpha 2 catalytic subunit
V2MM_73087	NM_011158	Prkar2b	protein kinase, cAMP dependent regulatory, type II beta
V2MM_85236	NM_133740	Prmt3	protein arginine N-methyltransferase 3
V2MM_106231	NM_178891	Prmt6	HMT1 hnRNP methyltransferase-like 6
V2MM_124468	NM_001044382	Prok1	prokineticin 1
V2MM_227337	NM_175198	Prox2	prospero homeobox 2
V2MM_83866	NM_025845	Prpf38b	PRP38 pre-mRNA processing factor 38 (yeast) domain containing B
V2MM_29597	NM_019628	Prpmp5	proline-rich protein MP5
V2MM_103193	NM_001081224	Prr16	proline rich 16
V2MM_232072	NM_022999	Prrg2	proline-rich Gla (G-carboxyglutamic acid) polypeptide 2
V2MM_92365	NM_178695	Prrg4	transmembrane gamma-carboxyglutamic acid protein 4
V2MM_2307	NM_027220	Prss32	trypsin 5
V2MM_93391	NM_181348	Prune2	prune homolog 2
V2MM_73941	NM_011181	Pscd2	pleckstrin homology, Sec7 and coiled-coil domains 2
V2MM_227420	NM_011965	Psma1	proteasome (prosome, macropain) subunit, alpha type 1
V2MM_39879	NM_080554	Psm5	proteasome 26S non-ATPase subunit 5
V2MM_65356	NM_025550	Psm6	proteasome, 26S, non-ATPase regulatory subunit 6
V2MM_50776	NM_008956	Ptbp1	polypyrimidine tract binding protein 1
V2MM_197506	NM_139270	Pthr2	parathyroid hormone receptor 2
V2MM_220895	NM_025760	Ptplad2	protein tyrosine phosphatase-like A domain containing 2
V2MM_78122	NM_025760	Ptplad2	protein tyrosine phosphatase-like A domain containing 2
V2MM_30303	NM_019933	Ptpn4	protein tyrosine phosphatase, non-receptor type 4
V2MM_43817	NM_177081	Ptpn7	protein tyrosine phosphatase, non-receptor type 7
V2MM_56210	NM_008982	Ptprj	protein tyrosine phosphatase, receptor type, J
V2MM_66385	NM_011218	Ptprs	protein tyrosine phosphatase, receptor type, S

V2MM_233330	NM_001081306	Ptprz1	protein tyrosine phosphatase, receptor type Z, polypeptide 1
V2MM_87039	NM_175004	Pthr2	Bcl-2 inhibitor of transcription
V2MM_55698	NM_145925	Pttg1ip	pituitary tumor-transforming gene 1 protein-interacting protein
V2MM_60007	NM_145925	Pttg1ip	pituitary tumor-transforming gene 1 protein-interacting protein
V2MM_36620	NM_145458	Pxk	PX domain containing serine/threonine kinase
V2MM_231600	NM_026869	Pygo2	pygopus 2
V2MM_70182	NM_007376	Pzp	pregnancy zone protein
V2MM_150497	NM_001159517.1	Qk	quaking
V2MM_190600	NM_029128	Qtrtd1	queuine tRNA-ribosyltransferase domain containing 1
V2MM_22598	NM_023635	Rab27a	RAB27A protein
V2MM_86482	NM_172601	Rab2b	RAB2B protein
V2MM_89079	NM_175562	Rab39	RAB39, member RAS oncogene family
V2MM_87274	NM_175122	Rab39b	RAB39B, member RAS oncogene family
V2MM_61507	NM_023852	Rab3c	RAB3C, member RAS oncogene family
V2MM_7052	NM_144538	Rab3il1	RAB3A interacting protein (rabin3)-like 1
V2MM_37227	NM_024287	Rab6	RAB6A, member RAS oncogene family
V2MM_74436	NM_176971	Rab9b	RAB9B, member RAS oncogene family
V2MM_196524	NM_001103367.1	Rai2	retinoic acid induced 2
V2MM_208064	NM_001080925	Rapgef1	Rap guanine nucleotide exchange factor (GEF)-like 1
V2MM_72419	NM_011244	Rarg	retinoic acid receptor, gamma
V2MM_196995	NM_181406	Rars2	arginyl-tRNA synthetase-like
V2MM_93471	NM_181406	Rars2	arginyl-tRNA synthetase-like
V2MM_110621	NM_001033158	Rasl12	RAS-like, family 12
V2MM_11575	NM_018750	Rassf5	Ras association (RalGDS/AF-6) domain family 5
V2MM_74101	NM_009826	Rb1cc1	RB1-inducible coiled-coil 1
V2MM_227548	NM_134077	Rbm26	RNA binding motif protein 26
V2MM_42429	NM_173376	Rbmx2	RNA binding motif protein, X-linked 2
V2MM_22815	NM_144814	Rcor3	REST corepressor 3
V2MM_220764	NM_021557	Rdh11	short-chain dehydrogenase/reductase 1
V2MM_226378	NM_175372	Rdh13	retinol dehydrogenase 13 (all-trans and 9-cis)
V2MM_66591	NM_025654	Rdm1	RAD52 motif 1
V2MM_37526	NM_144865	Reep2	receptor expression enhancing protein 2

V2MM_224981	NM_178606	Reep3	receptor expression enhancing protein 3
V2MM_93261	NM_180588	Reep4	receptor expression enhancing protein 4
V2MM_227516	NM_181988	Rerg	RAS-like, estrogen-regulated, growth-inhibitor
V2MM_227554	NM_177815	Rft1	RFT1 homolog
V2MM_104529	NM_028713	Rftn2	raftlin family member 2
V2MM_239155	NM_001145660.1	Rfx8	regulatory factor X 8
V2MM_122448	NM_001040434.1	Rgag1	retrotransposon gag domain containing 1
V2MM_224345	NM_183318	Rgag4	retrotransposon gag domain containing 4
V2MM_57054	NM_019958	Rgs17	regulator of G-protein signaling 17
V2MM_74124	NM_175092	Rhof	ras homolog gene family, member f
V2MM_47847	NM_145999	Rhot2	ras homolog gene family, member T2
V2MM_227557	NM_001025083	Rhox12	reproductive homeobox on X chromosome, 12
V2MM_41753	NM_021300	Rhox4b	reproductive homeobox 4B
V2MM_64832	NM_025660	Ribc1	RIB43A domain with coiled-coils 1
V2MM_92816	NM_178780	Ric3	resistance to inhibitors of cholinesterase 3 homolog
V2MM_197006	NM_177620	Rin3	Ras and Rab interactor 3
V2MM_224674	NM_177620	Rin3	Ras and Rab interactor 3
V2MM_94668	NM_183204	Rnf182	ring finger protein 182
V2MM_213235	NM_001039242	Rnf190	ring finger protein 190
V2MM_94008	NM_182999	Rnf20	ring finger protein 20
V2MM_224423	NM_175549	Robo2	roundabout homolog 2
V2MM_65206	NM_011248	Robo3	roundabout homolog 3
V2MM_33873	NM_011282	Ros1	Ros1 proto-oncogene
V2MM_63196	NM_025589	Rpl36al	ribosomal protein L36a-like
V2MM_224732	NM_024212	Rpl4	ribosomal protein L4
V2MM_197792	NM_175109	Rps19bp1	S19 binding protein
V2MM_79608	NM_026147	Rps20	ribosomal protein S20
V2MM_33082	NM_178775	Rps6kc1	ribosomal protein S6 kinase, 52kDa, polypeptide 1
V2MM_72426	NM_173450	Rpusd2	RNA pseudouridylate synthase domain containing 2
V2MM_54493	NM_017475	Rragc	small GTPase homolog
V2MM_74533	NM_026041	Rrp15	ribosomal RNA processing 15 homolog
V2MM_107807	NM_025438	Rsrc2	arginine/serine-rich coiled-coil 2
V2MM_49468	NM_130892	Rtn4ip1	reticulon 4 interacting protein 1
V2MM_1231	NM_153100	Rtp3	transmembrane protein 7
V2MM_36536	NM_175542	Rttn	rotatin
V2MM_70199	NM_009821	Runx1	runt related transcription factor 1
V2MM_50971	NM_172718	Rutbc2	RUN and TBC1 domain containing 2

V2MM_51886	NM_172718	Rutbc2	RUN and TBC1 domain containing 2
V2MM_70555	NM_025637	Rwdd3	RWD domain containing 3
V2MM_262310	NM_203507	Rwdd4a	RWD domain containing 4A
V2MM_215563	NM_011305	Rxra	retinoid X receptor alpha
V2MM_225666	NM_194357	Rya3	antimicrobial peptide RYA3
V2MM_95277	NM_194357	Rya3	antimicrobial peptide RYA3
V2MM_58315	NM_020568	S3-12	plasma membrane associated protein, S3-12
V2MM_38783	NM_173029	Sacy	soluble adenylyl cyclase
V2MM_60899	NM_016682	Sae2	ubiquitin-like 1 (sentrin) activating enzyme E1B
V2MM_234453	NM_001029979	Safb2	scaffold attachment factor B2
V2MM_106257	NM_028349	Sass6	spindle assembly 6
V2MM_111661	NM_028655.1	Satl1	spermidine/spermine N1-acetyl transferase-like 1
V2MM_54574	NM_172769	Sc5d	sterol-C5-desaturase (fungal ERG3, delta-5-desaturase) homolog
V2MM_231931	NM_027013.2	Scnm1	sodium channel modifier 1
V2MM_105182	NM_029022	Scrn3	secernin 3
V2MM_105184	NM_029022	Scrn3	secernin 3
V2MM_73192	NM_028776	Scyl3	SCY1-like 3 (<i>S. cerevisiae</i>)
V2MM_54719	NM_172713	Sdad1	SDA1 domain containing 1
V2MM_4483	NM_027301	Sdro	retinol dehydrogenase similar protein
V2MM_58225	NM_019951	Sec11a	Sec11-like 1
V2MM_43462	NM_016906	Sec61a1	Sec61 alpha subunit homolog
V2MM_70515	NM_013657	Sema3c	semaphorin 3C
V2MM_65493	NM_013660	Sema4d	semaphorin 4D
V2MM_25105	NM_144851	Senp1	SUMO1/sentrin specific protease 1
V2MM_73337	NM_029457	Senp2	SUMO/sentrin specific peptidase 2
V2MM_25478	NM_027669	Sept12	septin 12
V2MM_74487	NM_011353	Serf1	small EDRK-rich factor 1
V2MM_70287	NM_172852	Serpinb13	serine (or cysteine) proteinase inhibitor, clade B (ovalbumin), member 13
V2MM_68315	NM_030261	Sesn3	sestrin 3
V2MM_196544	NM_175465	Sestd1	SEC14 and spectrin domains 1
V2MM_197866	NM_175465	Sestd1	SEC14 and spectrin domains 1
V2MM_119596	NM_053099	Setbp1	SET binding protein 1
V2MM_91627	NM_178391	Setmar	SET domain and mariner transposase fusion gene
V2MM_39589	NM_133953	Sf3b3	splicing factor 3b, subunit 3
V2MM_32390	NM_009186	Sfrs10	splicing factor, arginine/serine-rich 10
V2MM_64447	NM_028148	Sfrs2ip	splicing factor, arginine/serine-rich 2, interacting protein

V2MM_49990	NM_020587	Sfrs4	splicing factor, arginine/serine-rich 4 (SRp75)
V2MM_25395	NM_145512	Sft2d2	SFT2 domain containing 2
V2MM_28074	NM_009160	Sftpd	surfactant associated protein D
V2MM_262429	NM_199007	Sgol2	tripin
V2MM_101499	NM_177816	Sh2d4b	SH2 domain containing 4B
V2MM_56778	NM_019989	Sh3bgrl	SH3-binding domain glutamic acid-rich protein like
V2MM_49838	NM_021389	Sh3kbp1	SH3-domain kinase binding protein 1
V2MM_129167	NM_001081370	Shank2	SH3/ankyrin domain gene 2
V2MM_51176	NM_172530	She	Src homology 2 domain containing E
V2MM_53438	NM_172530	She	Src homology 2 domain containing E
V2MM_27048	NM_009169	Shfm1	split hand/foot deleted gene 1
V2MM_194544	NM_172937	Shprh	SNF2 histone linker PHD RING helicase
V2MM_195636	NM_181590	Shq1	SHQ1 homolog
V2MM_27836	NM_145581	Siglecf	sialic acid binding Ig-like lectin 5
V2MM_92427	NM_178706	Siglech	SIGLEC-like protein
V2MM_151093	NM_027498	Sik3	SIK family kinase 3 (Sik3)
V2MM_79280	NM_011378	Sin3a	transcriptional regulator, SIN3A
V2MM_17665	NM_007547	Sirpa	signal-regulatory protein alpha
V2MM_107842	NM_001167691.1	Sirt4	sirtuin 4 (silent mating type information regulation 2 homolog
V2MM_197465	NM_178848	Sirt5	sirtuin 5 (silent mating type information regulation 2 homolog) 5
V2MM_82419	NM_009189	Six1	sine oculis homeobox homolog 1
V2MM_66700	NM_029444	Six6os1	Six6 opposite strand transcript 1
V2MM_30817	NM_030710	Slamf6	SLAM family member 6
V2MM_25715	NM_134251	Slc12a8	solute carrier family 12, member 8
V2MM_226164	NM_028247	Slc16a10	solute carrier family 16 (monocarboxylic acid transporters), member 10
V2MM_197325	NM_182959	Slc17a8	vesicular glutamate transporter-3
V2MM_67012	NM_021712	Slc18a3	vesicular acetylcholine transporter
V2MM_31159	NM_148938	Slc1a3	solute carrier family 1 (glial high affinity glutamate transporter), member 3
V2MM_97617	NM_001159275.1	Slc25a2	solute carrier family 25 (mitochondrial carrier, ornithine transporter) member 2 (Slc25a2), nuclear gene encoding mitochondrial protein, mRNA
V2MM_56144	NM_138756	Slc25a36	solute carrier family 25, member 36
V2MM_103310	NM_001081072	Slc27a6	solute carrier family 27 (fatty acid transporter), member 6
V2MM_27077	NM_130451	Slc2a10	solute carrier family 2 member 10

V2MM_39554	NM_144798	Slc30a6	solute carrier family 30 (zinc transporter), member 6
V2MM_64969	NM_028756	Slc35a5	solute carrier family 35, member A5
V2MM_28382	NM_144893	Slc35c2	solute carrier family 35, member C2
V2MM_88565	NM_175434	Slc35f3	solute carrier family 35, member F3
V2MM_697	NM_134086	Slc38a1	solute carrier family 38, member 1
V2MM_190235	NM_013901	Slc39a1	solute carrier family 39 (zinc transporter), member 1
V2MM_16233	NM_145394	Slc44a3	solute carrier family 44, member 3
V2MM_22038	NM_021053	Slc46a2	solute carrier family 46, member 2
V2MM_47617	NM_027872	Slc46a3	solute carrier family 46, member 3
V2MM_150642	NM_001081162	Slc4a11	solute carrier family 4, sodium bicarbonate transporter-like, member 11
V2MM_92414	NM_178703	Slc6a1	solute carrier family 6 (neurotransmitter transporter, GABA), member 1
V2MM_101230	NM_028878	Slc6a19	solute carrier family 6, member 19
V2MM_90477	NM_177802	Slc7a15	aromatic-preferring amino acid transporter
V2MM_92906	NM_178798	Slc7a6	solute carrier family 7 (cationic amino acid transporter, y+ system), member 6
V2MM_110215	NM_001007567.2	Slc7a6os	solute carrier family 7, member 6 opposite strand
V2MM_134822	NM_001081332	Slc9a5	solute carrier family 9 (sodium/hydrogen exchanger), member 5
V2MM_91041	NM_177909	Slc9a9	solute carrier family 9 (sodium/hydrogen exchanger), member 9
V2MM_50757	NM_172658	Slco4c1	solute carrier organic anion transporter family, member 4C1
V2MM_58057	NM_172658	Slco4c1	solute carrier organic anion transporter family, member 4C1
V2MM_52595	NM_172796	Slfn9	schlafen 9
V2MM_89324	NM_177570	Slfnl1	schlafen like 1
V2MM_88810	NM_175499	Slitrk6	neuronal transmembrane protein Slitrk6
V2MM_65332	NM_028887	Smchd1	SMC hinge domain containing 1
V2MM_115574	NM_009214	Sms	spermine synthase
V2MM_227	NM_027188	Smyd3	SET and MYND domain containing 3
V2MM_57460	NM_177009	Smyd4	SET and MYND domain containing 4
V2MM_84964	NM_029949	Snpc3	small nuclear RNA activating complex, polypeptide 3
V2MM_190940	NM_198214	Snph	syntaphilin

V2MM_43419	NM_016667	Sntb1	syntrophin, basic 1
V2MM_52361	NM_016667	Sntb1	syntrophin, basic 1
V2MM_50459	NM_029068	Snx16	sorting nexin 16
V2MM_205000	NM_028874	Snx19	sorting nexin 19
V2MM_224726	NM_175407	Sobp	sine oculis-binding protein homolog
V2MM_64214	NM_013671	Sod2	superoxide dismutase 2, mitochondrial
V2MM_31907	NM_009166	Sorbs1	sorbin and SH3 domain containing 1
V2MM_72051	NM_011366	Sorbs3	sorbin and SH3 domain containing 3
V2MM_27080	NM_009234	Sox11	SRY-box 11
V2MM_174034	NM_001005343.2	Sp9	trans-acting transcription factor 9
V2MM_41142	NM_029160	Spag16	sperm associated antigen 16
V2MM_84840	NM_029599	Spag4l	spermatogenesis-related gene 4
V2MM_57692	NM_172561	Spag7	sperm associated antigen 7
V2MM_43487	NM_010097	Sparcl1	SPARC-like 1 (mast9, hevin)
V2MM_53590	NM_010097	Sparcl1	SPARC-like 1 (mast9, hevin)
V2MM_203574	NM_016962	Spast	spastic paraplegia 4 homolog
V2MM_60973	NM_021343	Spata5	spermatogenesis associated 5
V2MM_205982	NM_029701	Spcs3	signal peptidase complex subunit 3
V2MM_60414	NM_028561	Speer4b	spermatogenesis associated glutamate (E)-rich protein 4b
V2MM_34138	NM_145531	Spg11	spastic paraplegia 11
V2MM_94347	NM_183136	Spink8	serine protease inhibitor Kazal type 8
V2MM_152084	NM_194355	Spire1	Spir-1 protein
V2MM_192576	NM_175836	Spnb2	spectrin beta 2
V2MM_188880	NM_032610	Spnb4	spectrin beta 4
V2MM_50652	NM_029269	Spp2	secreted phosphoprotein 24
V2MM_77180	NM_033524	Spred1	sprouty-related protein 1 with EVH-1 domain
V2MM_11001	NM_011468	Sprr2a	small proline-rich protein 2A
V2MM_2906	NM_011468	Sprr2a	small proline-rich protein 2A
V2MM_37453	NM_011896	Spry1	sprouty homolog 1
V2MM_29483	NM_011898	Spry4	sprouty homolog 4
V2MM_99620	NM_025716	Spryd4	SPRY domain containing 4
V2MM_226830	NM_175318	Spty2d1	SPT2, Suppressor of Ty, domain containing 1
V2MM_28883	NM_009270	Sqle	squalene epoxidase
V2MM_60892	NM_020611	Srd5a2l	steroid 5 alpha-reductase 2-like
V2MM_26624	NM_020493	Srf	serum response factor
V2MM_107524	NM_025691	Srp72	signal recognition particle72
V2MM_108552	NM_028358	Ssbp1	single-stranded DNA binding protein 1
V2MM_36556	NM_024186	Ssbp2	single-stranded DNA binding protein 2
V2MM_81801	NM_025448	Ssr2	signal sequence receptor, beta

V2MM_30896	NM_023546	Ssty2	spermiogenesis specific transcript on the Y 2
V2MM_86894	NM_173868	St18	suppression of tumorigenicity 18
V2MM_190109	NM_153124	St8sia5	sialyltransferase 8E
V2MM_54073	NM_021465	Stag2	stromal antigen 2
V2MM_32020	NM_024270	Stard3nl	MLN64 N-terminal homolog
V2MM_13428	NM_054098	Steap4	Tnfa-induced adipose-related protein
V2MM_104453	NM_175031	Stk36	serine/threonine kinase36
V2MM_87418	NM_175162	Stox2	storkhead box 2
V2MM_29477	NM_133789	Strn4	zinedin
V2MM_32276	NM_019879	Suclg1	succinate-CoA ligase, GDP-forming, alpha subunit
V2MM_42461	NM_153532	Suhw3	suppressor of hairy wing homolog 3
V2MM_98061	NM_001184981.1	Sult2a7	sulfotransferase family 2A, dehydroepiandrosterone (DHEA
V2MM_25467	NM_009296	Supt4h1	suppressor of Ty 4 homolog 1
V2MM_193482	NM_175683	Suv39h2	suppressor of variegation 3-9 homologue 2
V2MM_225170	NM_199196	Suz12	suppressor of zeste 12 homolog
V2MM_39591	NM_009299	Sva	seminal vesicle antigen
V2MM_195103	NM_178046	Svil	supervillin
V2MM_91165	NM_178046	Svil	supervillin
V2MM_71849	NM_013680	Syn1	synapsin I
V2MM_37715	NM_019666	Syncrip	NS1-associated protein 1
V2MM_47097	NM_021482	Syngr4	synaptogyrin 4
V2MM_37736	NM_080451	Synpo2	synaptopodin 2
V2MM_145010	NM_080451.2	Synpo2	synaptopodin 2
V2MM_25881	NM_030725	Syt13	synaptotagmin XIII
V2MM_38032	NM_009308	Syt4	synaptotagmin 4
V2MM_30841	NM_031393	Syt11	synaptotagmin-like 1
V2MM_23856	NM_031394	Syt12	synaptotagmin-like 2
V2MM_113484	NM_001007266	Taar2	trace amine-associated receptor 2
V2MM_113515	NM_001010830	Taar8a	trace amine-associated receptor 8A
V2MM_22695	NM_009311	Tac1	tachykinin 1
V2MM_60026	NM_001081288	Taf2	TBP-associated factor 2
V2MM_51322	NM_145968	Tagap	T-cell activation Rho GTPase-activating protein
V2MM_86731	NM_173764	Tapt1	transmembrane anterior posterior transformation 1
V2MM_110341	NM_001159907.1	Tarbp1	TAR (HIV-1) RNA binding protein 1 (Tarbp1), mRNA
V2MM_55741	NM_020501	Tas2r105	taste receptor, type 2, member 105
V2MM_87374	NM_175151	Tatdn1	TatD DNase domain containing 1
V2MM_14548	NM_134023	Tbc1d10a	TBC1 domain family, member 10a
V2MM_38513	NM_133910	Tbc1d14	TBC1 domain family, member 14
V2MM_114214	NM_029057.1	Tbc1d30	TBC1 domain family, member 30

V2MM_202223	NM_028162	Tbc1d5	TBC1 domain family, member 5
V2MM_30258	NM_030732	Tbl1xr1	IRA1 protein
V2MM_27759	NM_027762	Tchhl1	trichohyalin-like 1
V2MM_36952	NM_027762	Tchhl1	trichohyalin-like 1
V2MM_18108	NM_018756	Tcstv1	2-cell-stage, variable group, member 1
V2MM_132544	NM_022311	Tcte2	t-complex-associated testis expressed 2
V2MM_26680	NM_019911	Tdo2	tryptophan 2,3-dioxygenase
V2MM_37456	NM_031384	Tex11	testis expressed gene 11
V2MM_20964	NM_031386	Tex14	testis expressed gene 14
V2MM_33515	NM_009361	Tfdp1	transcription factor Dp 1
V2MM_83196	NM_011576	Tfpi	tissue factor pathway inhibitor
V2MM_32442	NM_009373	Tgm2	transglutaminase 2, C polypeptide
V2MM_29339	NM_009378	Thbd	thrombomodulin
V2MM_124292	NM_207278	Tigd4	tigger transposable element derived 4
V2MM_225683	NM_178646	Tigd5	tigger transposable element derived 5
V2MM_72707	NM_013899	Timm10	translocase of inner mitochondrial membrane 13 homolog a
V2MM_204309	NM_001037744	Timm8a2	translocase of inner mitochondrial membrane 8 homolog a2
V2MM_80336	NM_029360	Tm4sf5	transmembrane 4 superfamily member 5
V2MM_232147	NM_026281	Tm7sf3	transmembrane 7 superfamily member 3
V2MM_33961	NM_133847	Tm9sf4	transmembrane 9 superfamily protein member 4
V2MM_225020	NM_177695	Tmc3	transmembrane channel-like gene family 3
V2MM_196065	NM_178874	Tmcc2	transmembrane and coiled-coil domains 2
V2MM_32338	NM_001039483	Tmco1	putative membrane protein
V2MM_65695	NM_172998	Tmem118	transmembrane protein 118
V2MM_39269	NM_028343	Tmem135	hypothetical protein LOC72759
V2MM_194272	NM_175350	Tmem146	transmembrane protein 146
V2MM_49928	NM_177260	Tmem154	hypothetical protein LOC320782
V2MM_92776	NM_178773	Tmem16d	transmembrane protein 16D
V2MM_57268	NM_025326	Tmem176a	hepatocellular carcinoma-associated antigen 112
V2MM_52847	NM_020588	Tmem183a	hypothetical protein LOC57439
V2MM_81912	NM_025708	Tmem186	hypothetical protein LOC66690
V2MM_166659	NM_001164683.1	Tmem29	transmembrane protein 29
V2MM_39660	NM_133718	Tmem30a	transmembrane protein 30A
V2MM_29642	NM_019631	Tmem45a	transmembrane protein 45a
V2MM_93253	NM_178936	Tmem56	transmembrane protein 56
V2MM_93253	NM_178936	Tmem56	transmembrane protein 56
V2MM_206290	NM_175259	Tmem58	transmembrane protein 58

V2MM_23081	NM_019801	Tmem59	thymic dendritic cell-derived factor 1
V2MM_89462	NM_177601	Tmem60	transmembrane protein 60
V2MM_225630	NM_175285	Tmem62	transmembrane protein 62
V2MM_95717	NM_198167	Tmem63b	transmembrane protein 63b
V2MM_26919	NM_024246	Tmem79	hypothetical protein LOC71913
V2MM_27429	NM_027797	Tmem80	hypothetical protein LOC71448
V2MM_96462	NM_001033233	Tmprss11a	transmembrane protease, serine 11a
V2MM_134929	NM_001013373	Tmprss13	transmembrane protease, serine 13
V2MM_239118	NM_001033535	Tnfaip8l3	tumor necrosis factor, alpha-induced protein 8-like 3
V2MM_38323	NM_020275	Tnfrsf10b	tumor necrosis factor receptor superfamily, member 10b
V2MM_103765	NM_001163635.1	Tnks2	tankyrase, TRF1-interacting ankyrin-related ADP-ribose polymerase 2
V2MM_49719	NM_009407	Tnp1	transition protein 1
V2MM_83612	NM_022312	Tnr	tenascin R
V2MM_134196	NM_001122730.1	Tnrc18	trinucleotide repeat containing 18
V2MM_100114	NM_198022	Tnrc6c	trinucleotide repeat containing 6C
V2MM_57620	NM_172609	Tomm22	translocase of outer mitochondrial membrane 22 homolog
V2MM_47658	NM_138599	Tomm70a	translocase of outer mitochondrial membrane 70 homolog A
V2MM_2912	NM_031187	Tpsab1	mast cell protease 7
V2MM_225687	NM_199257	Tpte	transmembrane phosphatase with tensin homology
V2MM_54487	NM_009186	Tra2b	transformer 2 beta homolog (Drosophila)
V2MM_84875	NM_029726	Trdn	triadin
V2MM_44075	NM_009426	Trh	thyrotropin releasing hormone
V2MM_29862	NM_146241	Trhde	thyrotropin-releasing hormone degrading ectoenzyme
V2MM_191963	NM_145076	Trim24	tripartite motif protein 24
V2MM_189185	NM_053170	Trim33	tripartite motif protein 33
V2MM_97550	NM_001033235	Trim40	tripartite motif-containing 40
V2MM_97554	NM_001033235	Trim40	tripartite motif-containing 40
V2MM_111323	NM_001034906.2	Trim43a	tripartite motif-containing 43A
V2MM_51874	NM_021447	Trim54	tripartite motif-containing 54
V2MM_59288	NM_173378	Trp53bp2	tumor protein p53 binding protein, 2
V2MM_226290	NM_178111	Trp53inp2	tumor protein p53 inducible nuclear protein 2
V2MM_27178	NM_032000	Trps1	zinc finger transcription factor TRPS1
V2MM_60544	NM_010286	Tsc22d3	glucocorticoid-induced leucine zipper

V2MM_22304	NM_146010	Tspan8	tetraspanin 8
V2MM_202710	NM_175414	Tspan9	tetraspan NET-5
V2MM_194214	NM_183096	Ttc29	tetratricopeptide repeat domain 29
V2MM_100334	NM_029321	Ttc32	tetratricopeptide repeat domain 32
V2MM_100788	NM_001033213.1	Ttc7b	tetratricopeptide repeat domain 7B
V2MM_103581	NM_027412	Ttc9c	tetratricopeptide repeat domain 9C
V2MM_27239	NM_146190	Tubgcp5	tubulin, gamma complex associated protein 5
V2MM_80212	NM_013698	Txk	TXK tyrosine kinase
V2MM_11751	NM_145367	Txndc5	thioredoxin domain containing 5
V2MM_60797	NM_016792	Txnl1	thioredoxin-like 1
V2MM_35966	NM_145598	Txnl6	thioredoxin-like 6
V2MM_197079	NM_172474	Tyw3	tRNA-yW synthesizing protein 3 homolog
V2MM_46218	NM_009457	Ube1x	ubiquitin-activating enzyme E1, Chr X
V2MM_56178	NM_009459	Ube2h	ubiquitin-conjugating enzyme E2H
V2MM_58951	NM_019949	Ube2l6	E2 ubiquitin conjugating enzyme
V2MM_226909	NM_173755	Ube2o	ubiquitin-conjugating enzyme E2O
V2MM_96010	NM_173755	Ube2o	ubiquitin-conjugating enzyme E2O
V2MM_28534	NM_172300	Ube2z	ubiquitin-conjugating enzyme E2Z
V2MM_40176	NM_026842	Ubqln1	ubiquilin 1
V2MM_91652	NM_178397	Ubx8	protein expressed in T-cells and eosinophils in atopic dermatitis
V2MM_261839	NM_033607	Uchl4	ubiquitin carboxyl-terminal esterase L4
V2MM_104592	NM_198899	Ugcgl1	UDP-glucose ceramide glucosyltransferase-like 1
V2MM_220943	NM_053184	Ugt2a1	UDP glucuronosyltransferase 2 family, polypeptide A1
V2MM_60150	NM_009467	Ugt2b5	UDP glucuronosyltransferase 2 family, polypeptide B5
V2MM_204151	NM_011307	Uimc1	retinoid X receptor interacting protein 110
V2MM_92273	NM_178680	Unc45b	cardiomyopathy associated 4
V2MM_4880	NM_029770	Unc5b	unc-5 homolog B
V2MM_55597	NM_009472	Unc5c	unc-5 homolog C
V2MM_45471	NM_172569	Unk	zinc finger CCCH type containing 5
V2MM_226542	NM_028789	Unkl	unkempt-like
V2MM_42739	NM_133995	Upb1	ureidopropionase, beta
V2MM_63769	NM_025710	Uqcifs1	ubiquinol-cytochrome c reductase, Rieske iron-sulfur polypeptide 1
V2MM_189412	NM_153677	Ush1c	harmonin
V2MM_225211	NM_011669	Usp12	ubiquitin specific protease 12
V2MM_105836	NM_001013024	Usp13	ubiquitin specific protease 13 (isopeptidase T-3)
V2MM_105836	NM_001013024	Usp13	ubiquitin specific protease 13 (isopeptidase T-3)
V2MM_46677	NM_016808	Usp2	ubiquitin-specific protease 2

V2MM_94739	NM_183225	Usp24	ubiquitin specific peptidase 24
V2MM_24548	NM_031388	Usp26	ubiquitin specific protease 26
V2MM_39649	NM_144937	Usp3	ubiquitin specific protease 3
V2MM_206002	NM_001033291	Usp40	ubiquitin specific peptidase 40
V2MM_86678	NM_173754	Usp43	ubiquitin specific protease 43
V2MM_85328	NM_133992	Usp52	ubiquitin specific protease 52
V2MM_93431	NM_181399	Usp6nl	USP6 N-terminal like
V2MM_99535	NM_175158.3	Utp20	UTP20, small subunit (SSU
V2MM_15548	NM_053228	V1rb7	vomeronasal 1 receptor, B7
V2MM_31561	NM_134436	V1rc33	vomeronasal 1 receptor, C33
V2MM_40036	NM_030735	V1rd9	vomeronasal 1 receptor, D9
V2MM_49433	NM_145848	V1re13	vomeronasal 1 receptor, E13
V2MM_10147	NM_134195	V1re6	vomeronasal 1 receptor, E6
V2MM_59963	NM_145842	V1re9	vomeronasal 1 receptor, E9
V2MM_39556	NM_134203	V1rg2	vomeronasal 1 receptor, G2
V2MM_262047	NM_134206	V1rg5	vomeronasal 1 receptor, G5
V2MM_23109	NM_134210	V1rg9	vomeronasal 1 receptor, G9
V2MM_39380	NM_134210	V1rg9	vomeronasal 1 receptor, G9
V2MM_35579	NM_134212	V1rh3	vomeronasal 1 receptor, H3
V2MM_31028	NM_134218	V1rh9	vomeronasal 1 receptor, H9
V2MM_28175	NM_019917	V2r1b	vomeronasal2, receptor, 1b
V2MM_49736	NM_016796	Vamp4	vesicle-associated membrane protein 4
V2MM_49877	NM_016872	Vamp5	vesicle-associated membrane protein 5
V2MM_76601	NM_177393	Vgcnl1	voltage gated channel like 1
V2MM_196750	NM_175237	Vmn2r29	vomeronasal 2, receptor 29
V2MM_241287	NM_001105059.1	Vmn2r62	vomeronasal 2, receptor 62
V2MM_90874	NM_177876	Vps37b	vacuolar protein sorting 37B
V2MM_107797	NM_001033311.3	Vsig10	V-set and immunoglobulin domain containing 10
V2MM_46669	NM_016862	Vti1a	vesicle transport through interaction with t-SNAREs homolog 1A
V2MM_44272	NM_031877	Wasf1	WASP family 1
V2MM_224329	NM_011712	Wbp5	WW domain binding protein 5
V2MM_43801	NM_025362	Wbscr18	Williams-Beuren syndrome critical region 18
V2MM_44099	NM_025362	Wbscr18	Williams-Beuren syndrome critical region 18
V2MM_84855	NM_029681	Wbscr28	hypothetical protein LOC76629
V2MM_50430	NM_027963	Wdr16	WD40-repeat protein upregulated in HCC
V2MM_33013	NM_028220	Wdr17	WD repeat domain 17
V2MM_86617	NM_173741	Wdr24	WD repeat domain 24
V2MM_35453	NM_145514	Wdr26	WD repeat domain 26
V2MM_39155	NM_026893	Wdr40a	WD repeat domain 40A
V2MM_48735	NM_153555	Wdr42a	H326
V2MM_93435	NM_181400	Wdr47	WD repeat domain 47

V2MM_83935	NM_026236	Wdr48	WD repeat domain 48
V2MM_84718	NM_028976	Wdr48	WD repeat domain 48
V2MM_81711	NM_172864	Wdr63	WD repeat domain 63
V2MM_203995	NM_001081396	Wdr67	WD repeat domain 67
V2MM_27311	NM_027432	Wdr77	WD repeat domain 77
V2MM_24830	NM_146254	Wdr78	WD repeat domain 78
V2MM_53302	NM_009519	Wnt11	wingless-related MMTV integration site 11
V2MM_74174	NM_030215	Wrnip1	Werner helicase interacting protein 1
V2MM_195102	NM_175394	Wtap	Wilms'tumour 1-associating protein
V2MM_22143	NM_023500	Xk	Kell blood group precursor (McLeod phenotype) homolog
V2MM_87673	NM_023045	Xpo7	exportin 7
V2MM_53798	NM_009534	Yap1	yes-associated protein 1
V2MM_28522	NM_145550	Yipf1	Yip1 domain family, member 1
V2MM_34723	NM_023784	Yipf7	Yip1 domain family, member 7
V2MM_74045	NM_013771	Yme111	YME1-like 1
V2MM_99980	NM_001005341	Ypel2	yippee-like 2
V2MM_15297	NM_145393	Ythdf2	high glucose-regulated protein 8
V2MM_48116	NM_021397	Zbtb32	repressor of GATA
V2MM_88985	NM_175537	Zbtb38	zinc finger and BTB domain containing 38
V2MM_99821	NM_029348.2	Zbtb4	zinc finger and BTB domain containing 4
V2MM_30875	NM_133879	Zbtb48	GLI-Kruppel family member HKR3
V2MM_48703	NM_173399	Zbtb5	zinc finger and BTB domain containing 5
V2MM_29314	NM_146253	Zbtb6	zinc finger protein 482
V2MM_130488	NM_001162921.1	Zc3h12c	zinc finger CCCH type containing 12C
V2MM_101667	NM_026083	Zc3h13	RIKEN cDNA3110050K21
V2MM_42790	NM_020594	Zc3h8	zinc finger CCCH type containing 8
V2MM_240458	NM_001101433.1	Zcchc24	zinc finger, CCHC domain containing 24
V2MM_112776	NM_028673.1	Zdbf2	zinc finger, DBF-type containing 2
V2MM_233254	NM_027306	Zdhhc25	zinc finger, DHHC domain containing 25
V2MM_32596	NM_172465	Zdhhc9	zinc finger, DHHC domain containing 9
V2MM_59561	NM_009540	Zfa	zinc finger autosomal protein
V2MM_58353	NM_021307	Zfp112	zinc finger protein 112
V2MM_61065	NM_009547	Zfp161	zinc finger protein 161
V2MM_140942	NM_001081217	Zfp174	zinc finger protein 174
V2MM_59103	NM_139141	Zfp192	zinc finger protein 192
V2MM_58962	NM_001044697	Zfp2	zinc finger protein 2
V2MM_37841	NM_148924	Zfp263	zinc finger protein 263
V2MM_83253	NM_011754	Zfp27	zinc finger protein 27
V2MM_87793	NM_175247	Zfp28	zinc finger protein 28

V2MM_89663	NM_177643	Zfp281	zinc finger protein 281
V2MM_23789	NM_146175	Zfp282	zinc finger protein 282
V2MM_40042	NM_030743	Zfp313	zinc finger protein 313
V2MM_108838	NM_001081007	Zfp382	zinc finger protein 382
V2MM_84161	NM_027007	Zfp397	zinc finger protein 397
V2MM_161036	NM_001033451	Zfp408	zinc finger protein 408
V2MM_30858	NM_146179	Zfp418	zinc finger protein 418
V2MM_35402	NM_146179	Zfp418	zinc finger protein 418
V2MM_77979	NM_172867	Zfp462	zinc finger protein 462
V2MM_2704	NM_153063	Zfp472	zinc finger protein 472
V2MM_92567	NM_178734	Zfp473	zinc finger protein 473
V2MM_92569	NM_178734	Zfp473	zinc finger protein 473
V2MM_63386	NM_025749	Zfp474	zinc finger protein 474
V2MM_134204	NM_001081431.1	Zfp498	zinc finger protein 498
V2MM_94102	NM_183033	Zfp516	zinc finger protein 516
V2MM_94411	NM_183149	Zfp598	zinc finger protein 598
V2MM_48627	NM_009561	Zfp61	zinc finger protein 61
V2MM_189471	NM_026856	Zfp644	zinc finger motif enhancer binding protein 2
V2MM_90363	NM_177783	Zfp650	zinc finger protein 650
V2MM_227487	NM_175163	Zfp689	zinc finger protein HIT-39
V2MM_92729	NM_178763	Zfp750	zinc finger protein 750
V2MM_108601	NM_001081382	Zfp777	zinc finger protein 777
V2MM_197664	NM_177882	Zfp786	zinc finger protein 786
V2MM_33867	NM_145612	Zfp810	zinc finger protein ZFP
V2MM_197293	NM_023750	Zfp84	zinc finger protein 84
V2MM_55020	NM_016684	Zfp96	zinc finger protein 96
V2MM_39126	NM_024231	Zfpl1	zinc finger like protein 1
V2MM_100683	NM_001008550	Zfyve26	zinc finger, FYVE domain containing 26
V2MM_48177	NM_177319	Zfyve27	zinc finger, FYVE domain containing 27
V2MM_106890	NM_183300	Zfyve9	zinc finger, FYVE domain containing 9
V2MM_23739	NM_144894	Zgpat	zinc finger, CCCH-type with G patch domain
V2MM_32312	NM_023547	Znhit4	PAP-1 binding protein
V2MM_93017	NM_178889	Zscan29	zinc finger SCAN domains 29
V2MM_16543	NM_026507	Zwilch	Zwilch
V2MM_94214	NM_001081473	Zxdb	zinc finger, X-linked, duplicated B
V2MM_219719	NM_030260	Zxdc	ZXD family zinc finger C

Supplementary Table S3

Overlapping set of genes from transcriptional data and screening data. Genes that were significantly transcriptionally upregulated in leukemia cells harvested from the blood of mice relative to leukemia cells maintained in culture, and genes that were targeted by hairpins that depleted at least four-fold *in vivo* and less than 25% *in vitro*.

Adam19	a disintegrin and metallopeptidase domain 19
Abhd1	abhydrolase domain containing 1
Acox3	acyl-Coenzyme A oxidase 3, pristanoyl
Arf2	ADP-ribosylation factor 2
Aff1	AF4/FMR2 family, member 1
Arrb1	arrestin, beta 1
Atg2a	ATG2 autophagy related 2 homolog A (<i>S. cerevisiae</i>)
Atp13a2	ATPase type 13A2
Atp7a	ATPase, Cu ⁺⁺ transporting, alpha polypeptide
Btg1	B-cell translocation gene 1, anti-proliferative
Bbs4	Bardet-Biedl syndrome 4 (human)
Baz2b	bromodomain adjacent to zinc finger domain, 2B
Cabin1	calcineurin binding protein 1
Cabin1	calcineurin binding protein 1
Cask	calcium/calmodulin-dependent serine protein kinase (MAGUK family)
Ctsc	cathepsin C
Cd177	CD177 antigen
BC006779	cDNA sequence BC006779
Ccr1	chemokine (C-C motif) receptor-like 1
Chrnbl	cholinergic receptor, nicotinic, beta polypeptide 1 (muscle)
Chd8	chromodomain helicase DNA binding protein 8
Cobll1	Cobl-like 1
Ccdc84	coiled-coil domain containing 84
Ctdsp2	CTD (carboxy-terminal domain, RNA polymerase II, polypeptide A) small phosphatase 2
BC035295	cysteine-serine-rich nuclear protein 2
Cyth2	cytohesin 2
Dcaf8	DDB1 and CUL4 associated factor 8
Diablo	diablo homolog (<i>Drosophila</i>)
Dvl1	dishevelled, dsh homolog 1 (<i>Drosophila</i>)
Dnajb9	DnaJ (Hsp40) homolog, subfamily B, member 9
Emr4	EGF-like module containing, mucin-like, hormone receptor-like sequence 4
Efna1	ephrin A1
Fam160a2	family with sequence similarity 160, member A2
Fam193a	family with sequence similarity 193, member A
Glb1l	galactosidase, beta 1-like
Gpcpd1	glycerophosphocholine phosphodiesterase GDE1 homolog (<i>S. cerevisiae</i>)
Gvin1	GTPase, very large interferon inducible 1
H2afj	H2A histone family, member J
Hspa1b	heat shock protein 1B
Herc3	hect domain and RLD 3
Hps5	Hermansky-Pudlak syndrome 5 homolog (human)

Hmha1	histocompatibility (minor) HA-1
Ikbip	IKBKB interacting protein
Itpkb	inositol 1,4,5-trisphosphate 3-kinase B
Itm2b	integral membrane protein 2B
Klhl17	kelch-like 17 (Drosophila)
Klhl6	kelch-like 6 (Drosophila)
L3mbtl3	l(3)mbt-like 3 (Drosophila)
Lrrn3	leucine rich repeat protein 3, neuronal
Lif	leukemia inhibitory factor
Lnx2	ligand of numb-protein X 2
Lmo2	LIM domain only 2
Mmp9	matrix metalloproteinase 9
Ms4a6c	membrane-spanning 4-domains, subfamily A, member 6C
Morc3	microrchidia 3
Mgst1	microsomal glutathione S-transferase 1
Myh9	myosin, heavy polypeptide 9, non-muscle
Myh9	myosin, heavy polypeptide 9, non-muscle
Nfe2l1	nuclear factor, erythroid derived 2,-like 1
Nfe2l1	nuclear factor, erythroid derived 2,-like 1
Ostm1	osteopetrosis associated transmembrane protein 1
Pdrg1	p53 and DNA damage regulated 1
Pon2	paraoxonase 2
Pdzd2	PDZ domain containing 2
Pex1	peroxisomal biogenesis factor 1
Phacr2	phosphatase and actin regulator 2
Ppap2a	phosphatidic acid phosphatase type 2A
Pik3r3	phosphatidylinositol 3 kinase, regulatory subunit, polypeptide 3 (p55)
Plac8	placenta-specific 8
Pafah1b3	platelet-activating factor acetylhydrolase, isoform 1b, subunit 3
Plekhn1	pleckstrin homology domain containing, family N member 1
Pogz	pogo transposable element with ZNF domain
Parp6	poly (ADP-ribose) polymerase family, member 6
Pan2	polyA specific ribonuclease subunit homolog (S. cerevisiae)
Prkar2b	protein kinase, cAMP dependent regulatory, type II beta
Ptprs	protein tyrosine phosphatase, receptor type, S
Plp2	proteolipid protein 2
Rab2b	RAB2B, member RAS oncogene family
Trp53inp2	transformation related protein 53 inducible nuclear protein 2
Rin3	Ras and Rab interactor 3
Rassf5	Ras association (RalGDS/AF-6) domain family member 5
Rasal3	RAS protein activator like 3
Rragc	Ras-related GTP binding C
Reep2	receptor accessory protein 2
Arhgap25	Rho GTPase activating protein 25
Arhgap26	Rho GTPase activating protein 26
1100001G20R	RIKEN cDNA 1100001G20 gene
1700020O03R	RIKEN cDNA 1700020O03 gene
1700109H08R	RIKEN cDNA 1700109H08 gene
2610008E11Ri	RIKEN cDNA 2610008E11 gene

2700081O15R	RIKEN cDNA 2700081O15 gene
4930470P17R	RIKEN cDNA 4930470P17 gene
4931406C07R	RIKEN cDNA 4931406C07 gene
4933437N03R	RIKEN cDNA 4933437N03 gene
5133401N09R	RIKEN cDNA 5133401N09 gene
5730508B09R	RIKEN cDNA 5730508B09 gene
9130008F23R	RIKEN cDNA 9130008F23 gene
A630001G21R	RIKEN cDNA A630001G21 gene
E130309D02R	RIKEN cDNA E130309D02 gene
Rnf114	ring finger protein 114
Robo3	roundabout homolog 3 (Drosophila)
Runx1	runt related transcription factor 1
Sesn3	sestrin 3
Sik3	SIK family kinase 3
Ssbp2	single-stranded DNA binding protein 2
Sirt5	sirtuin 5
Smg1	SMG1 homolog, phosphatidylinositol 3-kinase-related kinase (C. elegans)
Slc39a1	solute carrier family 39 (zinc transporter), member 1
Slc9a9	solute carrier family 9 (sodium/hydrogen exchanger), member 9
Spnb2	spectrin beta 2
Tagap	T-cell activation Rho GTPase-activating protein
Tnks2	tankyrase, TRF1-interacting ankyrin-related ADP-ribose polymerase 2
Sin3a	transcriptional regulator, SIN3A (yeast)
Tgm2	transglutaminase 2, C polypeptide
Timm8a2	translocase of inner mitochondrial membrane 8 homolog a2 (yeast)
Tmcc2	transmembrane and coiled-coil domains 2
Tsc22d3	TSC22 domain family, member 3
Ube2h	ubiquitin-conjugating enzyme E2H
Unkl	unkempt-like (Drosophila)
Usp6nl	USP6 N-terminal like
Mycn	v-myc myelocytomatosis viral related oncogene, neuroblastoma derived (avian)
Vamp5	vesicle-associated membrane protein 5
Wdr24	WD repeat domain 24
Wdr26	WD repeat domain 26
Ythdf2	YTH domain family 2
Zbtb4	zinc finger and BTB domain containing 4
Zbtb48	zinc finger and BTB domain containing 48
Zfp161	zinc finger protein 161
Zfp28	zinc finger protein 2
Zfp263	zinc finger protein 263
Zfp408	zinc finger protein 408
Zfp598	zinc finger protein 598
Zfyve9	zinc finger, FYVE domain containing 9

Supplementary Table S4

Genes from the microarray overlap validation screen that were targeted by two or more depleting shRNAs. The average fold change for each shRNA *in vivo* (relative to the input cell population) was divided by the average fold change of that shRNA *in vitro* to identify hairpins that specifically depleted *in vivo*. shRNAs were rank ordered based on this value, and the bottom 30% of shRNAs were considered depleting shRNAs

Number of independent shRNAs	Gene symbol	Gene name
4	Chd8	chromodomain helicase DNA binding protein 8
4	Klhl17	kelch-like 17 (Drosophila)
4	Lmo2	LIM domain only 2
3	1700020O03Rik	RIKEN cDNA 1700020O03 gene
3	1700109H08Rik	RIKEN cDNA 1700109H08 gene
3	2700081O15Rik	RIKEN cDNA 2700081O15 gene
3	4931406C07Rik	RIKEN cDNA 4931406C07 gene
3	Acox3	acyl-Coenzyme A oxidase 3, pristanoyl
3	Adam19	a disintegrin and metallopeptidase domain 19
3	Arf2	ADP-ribosylation factor 2
3	Baz2b	bromodomain adjacent to zinc finger domain, 2B
3	Ctsc	cathepsin C
3	Dcaf8	DDB1 and CUL4 associated factor 8
3	Dvl1	dishevelled, dsh homolog 1 (Drosophila)
3	E130309D02Rik	RIKEN cDNA E130309D02 gene
3	Herc3	hect domain and RLD 3
3	Hmha1	histocompatibility (minor) HA-1
3	L3mbtl3	l(3)mbt-like 3 (Drosophila)
3	Ln timer	ligand of numb-protein X 2
3	Lrrn3	leucine rich repeat protein 3, neuronal
3	Ms4a6c	membrane-spanning 4-domains, subfamily A, member 6C
3	Myh9	myosin, heavy polypeptide 9, non-muscle
3	Pdzd2	PDZ domain containing 2
3	Plekhn1	pleckstrin homology domain containing, family N member 1
3	Reep2	receptor accessory protein 2
3	Rragc	Ras-related GTP binding C
3	Smg1	SMG1 homolog, phosphatidylinositol 3-kinase-related kinase (C. elegans)
3	Tagap	T-cell activation Rho GTPase-activating protein
3	Tmcc2	transmembrane and coiled-coil domains 2
3	Tnks2	tankyrase, TRF1-interacting ankyrin-related ADP-ribose polymerase 2
3	Ube2h	ubiquitin-conjugating enzyme E2H
3	Zbtb48	zinc finger and BTB domain containing 48
3	Zfp161	zinc finger protein 161
3	Zfp408	zinc finger protein 408

2	4930470P17Rik	RIKEN cDNA 4930470P17 gene
2	Atp7a	ATPase, Cu ⁺⁺ transporting, alpha polypeptide
2	BC006779	cDNA sequence BC006779
2	Cabin1	calcineurin binding protein 1
2	Ccdc84	coiled-coil domain containing 84
2	Ccr1	chemokine (C-C motif) receptor-like 1
2	Cd177	CD177 antigen
2	BC035295	cysteine-serine-rich nuclear protein 2
2	Ctdsp2	CTD (carboxy-terminal domain, RNA polymerase II, polypeptide A) small phosphatase 2
2	Diablo	diablo homolog (Drosophila)
2	Dnajb9	DnaJ (Hsp40) homolog, subfamily B, member 9
2	H2afj	H2A histone family, member J
2	Hps5	Hermansky-Pudlak syndrome 5 homolog (human)
2	Ikbip	IKBKB interacting protein
2	Itpkb	inositol 1,4,5-trisphosphate 3-kinase B
2	Klhl6	kelch-like 6 (Drosophila)
2	Morc3	microrchidia 3
2	Mycn	v-myc myelocytomatosis viral related oncogene, neuroblastoma derived (avian)
2	Nfe2l1	nuclear factor, erythroid derived 2,-like 1
2	Ostm1	osteopetrosis associated transmembrane protein 1
2	Pafah1b3	platelet-activating factor acetylhydrolase, isoform 1b, subunit 3
2	Pdrg1	p53 and DNA damage regulated 1
2	Phactr2	phosphatase and actin regulator 2
2	Pik3r3	phosphatidylinositol 3 kinase, regulatory subunit, polypeptide 3 (p55)
2	Pogz	pogo transposable element with ZNF domain
2	Pon2	paraoxonase 2
2	A430107D22Rik	RAS protein activator like 3
2	Rassf5	Ras association (RalGDS/AF-6) domain family member 5
2	Rin3	Ras and Rab interactor 3
2	Runx1	runt related transcription factor 1
2	Sik3	SIK family kinase 3
2	Sirt5	sirtuin 5
2	Slc39a1	solute carrier family 39 (zinc transporter), member 1
2	Slc9a9	solute carrier family 9 (sodium/hydrogen exchanger), member 9
2	Spnb2	spectrin beta 2
2	Timm8a2	translocase of inner mitochondrial membrane 8 homolog a2 (yeast)
2	Trp53inp2	transformation related protein 53 inducible nuclear protein 2
2	Tsc22d3	TSC22 domain family, member 3
2	Unkl	unkempt-like (Drosophila)
2	Vamp5	vesicle-associated membrane protein 5
2	Wdr26	WD repeat domain 26
2	Ythdf2	YTH domain family 2
2	Zfp28	zinc finger protein 2

Supplementary Table S5

The frequency of inactivating Phf6 mutations in hematopoietic cancers.

Disease		Number of cases examined	Number of Phf6 LOF mutations identified	% w/ Phf6 LOF mutations	Reference
T-cell leukemia					
	adult T-ALL	42	16	38%	Nature Genetics 2010; PMID: 20228800
	pediatric T-ALL	89	14	16%	Nature Genetics 2010; PMID: 20228800
	T-ALL	23	8	35%	Acta Oncologica 2012; PMID: 21736506
	childhood T-ALL; early T-cell precursor	64	16	25%	Nature 2012; PMID: 22237106
	childhood T-ALL; non-early T-cell precursor	42	9	21%	Nature 2012; PMID: 22237106
AML					
	AML	398	NA	3%	NEJM 2012; PMID: 22417203
	adult AML	353	10	3%	Leukemia 2011; PMID: 21030981
	adult AML	105	2	2%	Acta Oncologica 2012; PMID: 21736506
B-cell leukemia					
	B-ALL	62	0	0%	Nature Genetics 2010; PMID: 20228800
	pre-B ALL	66	0	0%	Acta Oncologica 2012; PMID: 21736506

Supplementary Table S6

The target genes bound by PHF6 were classified using Ingenuity Pathway analysis for the top five results in these categories: top networks, diseases and disorders, canonical pathways, and cellular and molecular function. P-values and number of molecules for each category are shown.

Top networks**ID Associated Network Functions**

- 1 Cell Cycle, Cell Death and Survival, Cell-To-Cell Signaling and Interaction
- 2 Cell Morphology, Cellular Assembly and Organization, Cellular Development
- 3 Cancer, Endocrine System Disorders, Hematological Disease
- 4 Cell-To-Cell Signaling and Interaction, Nervous System Development and Function, Cell Signaling
- 5 Cellular Growth and Proliferation, Hematological System Development and Function, Hematopoiesis

Diseases and disorders

Name	p-value	#Molecules
Cancer	$3.81E^{-22}$ - $3.12E^{-05}$	1577
Developmental Disorder	$4.75E^{-19}$ - $2.45E^{-05}$	626
Connective Tissue Disorders	$9.35E^{-18}$ - $1.13E^{-06}$	150
Skeletal and Muscular Disorders	$9.35E^{-18}$ - $1.13E^{-06}$	493
Infectious Disease	$5.20E^{-15}$ - $1.12E^{-05}$	615

Canonical pathways

Name	p-value	Ratio
Molecular Mechanisms of Cancer	$4.56E^{-24}$	161/378 (0.426)
Axonal Guidance Signaling	$2.46E^{-15}$	169/468 (0.361)
WnV~catenin Signaling	$2.50E^{-11}$	78/174 (0.448)
Ephrin Receptor Signaling	$2.04E^{-10}$	77/201 (0.383)
Factors Promoting Cardiogenesis in Vertebrates	$2.65E^{-10}$	47/94 (0.5)

Molecular and cellular function

Name	p-value	#Molecules
Gene Expression	$1.68E^{-60}$ - $1.78E^{-09}$	1008
Cellular Growth and Proliferation	$1.11E^{-36}$ - $2.97E^{-05}$	1299
Cellular Development	$1.06E^{-32}$ - $2.97E^{-05}$	1278
Cell Death and Survival	$4.47E^{-30}$ - $2.74E^{-05}$	1268
Cell Cycle	$4.63E^{-25}$ - $2.67E^{-05}$	632

Supplemental Table S7
Primers used to amplify half-hairpins and index samples for high throughput sequencing
Primer sequences for genome-scale screen
5' unmutated primer
TAGTGAAGCCACAGATGTA
5' primers with 1 basepair mutation (used to mark individual samples)
TAGTGACGCCACAGATGTA
TAGTGAAGCCACCGATGTA
TAGTGAGGCCACAGATGTA
TAGTGAAGCCACGGATGTA
TAGTGAAGCCCCAGATGTA
TAGTGAAGCCGCAGATGTA
TAGTGAAGCCACAGCTGTA
TAGTGAAGCCACAGGTGTA
TAGGGAAGCCACAGATGTA
3' primer
GTGATTTAATTTATACCATT
Primer sequences for validation screen
5' unmutated primer
NNNNNTAGTGAAGCCACAGATGTA
5' primers with 1 basepair mutation (used to mark individual samples)
NNNNNTAGTGACGCCACAGATGTA
NNNNNTAGTGAAGCCACCGATGTA
NNNNNTAGTGAGGCCACAGATGTA
NNNNNTAGTGAAGCCACGGATGTA
NNNNNTAGTGAAGCCCCAGATGTA
NNNNNTAGTGAAGCCGCAGATGTA
NNNNNTAGTGAAGCCACAGCTGTA
NNNNNTAGTGAAGCCACAGGTGTA
NNNNNTAGGGAAGCCACAGATGTA
NNNNNTAGCGAAGCCACAGATGTA
NNNNNTAGTGAAGACACAGATGTA
3' unmutated primer

NNNNTTGAATTCCGAGGCAGTAGG
3' primers with 1 basepair mutation (used to mark individual samples)
NNNNTTGCATTCCGAGGCAGTAGG
NNNNTTGGATTCCGAGGCAGTAGG
NNNNTTGACTTCCGAGGCAGTAGG
NNNNTTGAGTTCCGAGGCAGTAGG
NNNNTTGAATTCCGAGGCCGTAGG
NNNNTTGAATTCCGAGGCCGTAGG
NNNNTTGAATTCCGCGGCAGTAGG
NNNNTTGAACTCCGAGGCAGTAGG
NNNNTTGAAGTCCGAGGCAGTAGG
NNNNTTGAATCCCGAGGCAGTAGG
NNNNTTGAATGCCGAGGCAGTAGG

Supplementary Table S8**qPCR primer sequences**

shRNA ID	5' qPCR primer	3' qPCR primer
sh2700081O15Rik	AGCTCCCTAGGGCTCAGTG	GAGGTCATCGTCTGGTGAGG
shChd8	TATGGTTCCCAGTGGTGGAT	CCATGCTTAAAAACGCCAAT
shDgcr2	TACCGGGTCTACCTCAGTGG	AGCTCCTGGTCAGTGGAGAA
shDpy30	TACAGGGACTTGCTGTGCTT	ATCTTCAAACCTGCGCCTTGT
shItpkb	ACTGGAGCGCTTTGGAACATA	CTCCATGAGGGCAGAATCAT
shItn2	GCAGCTGGAGTTGGAGAAAC	TTTTGCTGCCTCTCGTCTTT
shKlhl26	CGAGGACTTCCTGAAAGCTG	ACTCACGCAGTGATGTCAGG
shLmo2	GGCGCCTCTACTACAAGCTG	GCTTGTACAGGATGCACAG
shMorc3	TCAGACAACCGGAAATCCTC	CACAGGGGAGAAGCTCTGAC
shMpzi3	CGAGGCTATGTGGGAGAGAA	AGGGCGGTATGTCCAGTCTA
shOsr1	TTCGTTTGCAAGTTCTGTGG	CACAGGTGTAAGGTCGCTCA
shPhf6	GGGGAGGAAGAAAATGAAGC	GTGAGCTGAACAGTGCCAGA
shPogz	CCTGTGGCCTCACAACTAT	GTTCAGCACAAATCCCAACCT
shRassf5	CAGACAAGCGGACTTCCTTC	CCCCTGGATGACCTCACTAA
shRunx1	CCAGCCTCTCTGCAGAACTT	GACGGCAGAGTAGGGAACCTG
shSik3	GCTCAAGCACACTGACCAAA	CTGACTCACAGTTCCCAGCA
shSox11	CATGTTCCGACCTGAGCTTG	GTCCTTATCCACCAGCGACA
shWdr26	AGGTCAGCGTGGTCAGTTCT	CACAGTCTTCCCGTCACTCA
shZfp28	GGGACTTTGTGCTTCTCAGC	TGCTGGCCTTTTCTCATCTT
shZfp516	CATGCCGTCTGTGTCCATAC	GCTGGCATCTTTAGGTGAG
shZfp84	CACCCATTGCTCTGAGTGAA	GGAATTCGCACCTGTTGAGT

Supplementary Table S9	
shRNA-mediated gene knockdown (measured by RT-qPCR)	
hairpin ID	fraction mRNA remaining (relative to vector control infected cells)
sh2700081O15Rik	0.33
shCcr1	N.C.
shChd8	0.67
shDgcr2	0.49
shDgcr2_B	0.17
shDgcr2_C	0.35
shDpy30	0.16
shItpkb	0.42
shItn2	0.13
shKlhdc9	N.C.
shKlhl26	0.36
shKlhl26_B	N.C.
shKlhl26_C	0.59
shLmo2_A	0.22
shLmo2_B	0.28
shLmo2_C	0.24
shLmo2_D	0.27
shMorc3	0.72
shMpzl3	0.62
shMpzl3_B	0.66
shMpzl3_C	0.24
shOsr1	0.46
shPhf6_A	0.13
shPhf6_B	0.2
shPhf6_C	0.46
shPogZ	0.64
shRassf5	0.12
shRunx1_A	0.66
shRunx1_B	0.57
shRunx1_C	0.52
shRunx1_D	0.76
shSik3	0.71
shSik3_B	0.32
shSik3_C	0.45
shSik3_C	0.15
shSlitrk4	N.C.
shSlitrk4_B	N.C.
shSlitrk4_C	N.C.
shSox11	0.74
shVamp5	N.C.
shWdr26	0.28
shZfp161	N.C.
shZfp28	0.58

shZfp28_B	N.C.
shZfp516	0.53
shZfp84	0.45
shZfp84_B	0.17

N.C. = knockdown not confirmed