

Supporting Information for Elephants as an animal model for self-domestication.

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Supplemental File 1a: List of candidate Domestication genes and their annotated terms (Benítez-Burraco et al., 2017 + Theofanopoulou et al., 2017)

Gene abbreviation	Gene name	NCBI link
ABAT	4-aminobutyrate aminotransferase	https://www.ncbi.nlm.nih.gov/gene/?term=ABAT
ABCA10	ATP binding cassette subfamily A member 10	https://www.ncbi.nlm.nih.gov/gene/?term=ABCA10
ABCA5	ATP binding cassette subfamily A member 5	https://www.ncbi.nlm.nih.gov/gene/?term=ABCA5
ABCB10	ATP binding cassette subfamily B member 10	https://www.ncbi.nlm.nih.gov/gene/?term=ABCB10
ABCG1	ATP binding cassette subfamily G member 1	https://www.ncbi.nlm.nih.gov/gene/?term=ABCG1
ABCG2	ATP binding cassette subfamily G member 2 (Junior blood group)	https://www.ncbi.nlm.nih.gov/gene/?term=ABCG2
ABHD1	abhydrolase domain containing 1	https://www.ncbi.nlm.nih.gov/gene/?term=ABHD1
ACA64	small nucleolar RNA, H/ACA box 78	https://www.ncbi.nlm.nih.gov/gene/?term=ACA64
ACAD8	acyl-CoA dehydrogenase family member 8	https://www.ncbi.nlm.nih.gov/gene/?term=ACAD8
ACMSD	aminocarboxymuconate semialdehyde decarboxylase	https://www.ncbi.nlm.nih.gov/gene/?term=ACMSD
ACOT11	acyl-CoA thioesterase 11	https://www.ncbi.nlm.nih.gov/gene/?term=ACOT11
ACOT13	acyl-CoA thioesterase 13	https://www.ncbi.nlm.nih.gov/gene/?term=ACOT13
ACOT8	acyl-CoA thioesterase 8	https://www.ncbi.nlm.nih.gov/gene/?term=ACOT8
ACOX2	acyl-CoA oxidase 2	https://www.ncbi.nlm.nih.gov/gene/?term=ACOX2
ACOX3	acyl-CoA oxidase 3, pristanoyl	https://www.ncbi.nlm.nih.gov/gene/?term=ACOX3
ACSF3	acyl-CoA synthetase family member 3	https://www.ncbi.nlm.nih.gov/gene/?term=ACSF3
ACSM5	acyl-CoA synthetase medium chain family member 5	https://www.ncbi.nlm.nih.gov/gene/?term=ACSM5
ACSS2	acyl-CoA synthetase short chain family member 2	https://www.ncbi.nlm.nih.gov/gene/?term=ACSS2
ACTA1	actin alpha 1, skeletal muscle	https://www.ncbi.nlm.nih.gov/gene/?term=ACTA1
ADAM2	ADAM metallopeptidase domain 2	https://www.ncbi.nlm.nih.gov/gene/?term=ADAM2
ADAMDEC1	ADAM like decysin 1	https://www.ncbi.nlm.nih.gov/gene/?term=ADAMDEC1
ADAMTS13	ADAM metallopeptidase with thrombospondin type 1 motif 13	https://www.ncbi.nlm.nih.gov/gene/?term=ADAMTS13
ADAMTSL3	ADAMTS like 3	https://www.ncbi.nlm.nih.gov/gene/?term=ADAMTSL3
ADRB2	adrenoceptor beta 2	https://www.ncbi.nlm.nih.gov/gene/?term=ADRB2

AHCY	adenosylhomocysteinase	https://www.ncbi.nlm.nih.gov/genome/?term=AHCY
AHCYL2	adenosylhomocysteinase like 2	https://www.ncbi.nlm.nih.gov/genome/?term=AHCYL2
AK1	adenylate kinase 1	https://www.ncbi.nlm.nih.gov/genome/?term=AK1
AKAP1	A-kinase anchoring protein 1	https://www.ncbi.nlm.nih.gov/genome/?term=AKAP1
ALDH16A1	aldehyde dehydrogenase 16 family member A1	https://www.ncbi.nlm.nih.gov/genome/?term=ALDH16A1
ALDH18A1	aldehyde dehydrogenase 18 family member A1	https://www.ncbi.nlm.nih.gov/genome/?term=ALDH18A1
ALDH1L2	aldehyde dehydrogenase 1 family member L2	https://www.ncbi.nlm.nih.gov/genome/?term=ALDH1L2
ALK	ALK receptor tyrosine kinase	https://www.ncbi.nlm.nih.gov/genome/?term=ALK
ALS2CR12	flagellum associated containing coiled-coil domains 1	https://www.ncbi.nlm.nih.gov/genome/?term=ALS2CR12
AMACR	alpha-methylacyl-CoA racemase	https://www.ncbi.nlm.nih.gov/genome/?term=AMACR
AMBRA1	autophagy and beclin 1 regulator 1	https://www.ncbi.nlm.nih.gov/genome/?term=AMBRA1
ANK1	ankyrin 1	https://www.ncbi.nlm.nih.gov/genome/?term=ANK1
ANKDD1A	ankyrin repeat and death domain containing 1A	https://www.ncbi.nlm.nih.gov/genome/?term=ANKDD1A
ANKRD2	ankyrin repeat domain 2	https://www.ncbi.nlm.nih.gov/genome/?term=ANKRD2
ANKRD49	ankyrin repeat domain 49	https://www.ncbi.nlm.nih.gov/genome/?term=ANKRD49
ANKRD50	ankyrin repeat domain 50	https://www.ncbi.nlm.nih.gov/genome/?term=ANKRD50
ANKS4B	ankyrin repeat and sterile alpha motif domain containing 4B	https://www.ncbi.nlm.nih.gov/genome/?term=ANKS4B
APEH	acylaminoacyl-peptide hydrolase	https://www.ncbi.nlm.nih.gov/genome/?term=APEH
APOBEC4	apolipoprotein B mRNA editing enzyme catalytic polypeptide like 4	https://www.ncbi.nlm.nih.gov/genome/?term=APOBEC4
APOPT1	cytochrome c oxidase assembly factor 8	https://www.ncbi.nlm.nih.gov/genome/?term=APOPT1
ARHGAP26	Rho GTPase activating protein 26	https://www.ncbi.nlm.nih.gov/genome/?term=ARHGAP26
ARID1B	AT-rich interaction domain 1B	https://www.ncbi.nlm.nih.gov/genome/?term=ARID1B
ARID3B	AT-rich interaction domain 3B	https://www.ncbi.nlm.nih.gov/genome/?term=ARID3B
ARL6IP1	ADP ribosylation factor like GTPase 6 interacting protein 1	https://www.ncbi.nlm.nih.gov/genome/?term=ARL6IP1
ARL9	ADP ribosylation factor like GTPase 9	https://www.ncbi.nlm.nih.gov/genome/?term=ARL9
ART3	ADP-ribosyltransferase 3	https://www.ncbi.nlm.nih.gov/genome/?term=ART3
ASAP1	ArfGAP with SH3 domain, ankyrin repeat and PH domain 1	https://www.ncbi.nlm.nih.gov/genome/?term=ASAP1

ASB11	ankyrin repeat and SOCS box containing 11	https://www.ncbi.nlm.nih.gov/genome/?term=ASB11
ASIP	agouti signaling protein	https://www.ncbi.nlm.nih.gov/genome/?term=ASIP
ASTN1	astrotactin 1	https://www.ncbi.nlm.nih.gov/genome/?term=ASTN1
ASTN2	astrotactin 2	https://www.ncbi.nlm.nih.gov/genome/?term=ASTN2
ATL1	atlastin GTPase 1	https://www.ncbi.nlm.nih.gov/genome/?term=ATL1
ATXN7L1	ataxin 7 like 1	https://www.ncbi.nlm.nih.gov/genome/?term=ATXN7L1
B3GALTL	beta 3-glucosyltransferase	https://www.ncbi.nlm.nih.gov/genome/?term=B3GALTL
B3GLCT	beta 3-glucosyltransferase	https://www.ncbi.nlm.nih.gov/genome/?term=B3GLCT
BAG5	BAG cochaperone 5	https://www.ncbi.nlm.nih.gov/genome/?term=BAG5
BARD1	BRCA1 associated RING domain 1	https://www.ncbi.nlm.nih.gov/genome/?term=BARD1
BAZ1B	bromodomain adjacent to zinc finger domain 1B	https://www.ncbi.nlm.nih.gov/genome/?term=BAZ1B
BCAP31	B cell receptor associated protein 31	https://www.ncbi.nlm.nih.gov/genome/?term=BCAP31
BMP15	bone morphogenetic protein 15	https://www.ncbi.nlm.nih.gov/genome/?term=BMP15
BMPR1B	bone morphogenetic protein receptor type 1B	https://www.ncbi.nlm.nih.gov/genome/?term=BMPR1B
BPI	bactericidal permeability increasing protein	https://www.ncbi.nlm.nih.gov/genome/?term=BPI
BRAF	B-Raf proto-oncogene, serine/threonine kinase	https://www.ncbi.nlm.nih.gov/genome/?term=BRAF
BRCA1	BRCA1 DNA repair associated	https://www.ncbi.nlm.nih.gov/genome/?term=BRCA1
BTAF1	B-TFIID TATA-box binding protein associated factor 1	https://www.ncbi.nlm.nih.gov/genome/?term=BTAF1
C11orf54	chromosome 11 open reading frame 54	https://www.ncbi.nlm.nih.gov/genome/?term=C11orf54
C11orf63	junctional cadherin complex regulator	https://www.ncbi.nlm.nih.gov/genome/?term=C11orf63
C15orf60	REC114 meiotic recombination protein	https://www.ncbi.nlm.nih.gov/genome/?term=C15orf60
C16orf71	chromosome 16 open reading frame 71	https://www.ncbi.nlm.nih.gov/genome/?term=C16orf71
C17orf67	chromosome 17 open reading frame 67	https://www.ncbi.nlm.nih.gov/genome/?term=C17orf67
C1orf109	chromosome 1 open reading frame 109	https://www.ncbi.nlm.nih.gov/genome/?term=C1orf109
C22orf31	chromosome 22 open reading frame 31	https://www.ncbi.nlm.nih.gov/genome/?term=C22orf31
C2orf40	ECRG4 augurin precursor	https://www.ncbi.nlm.nih.gov/genome/?term=C2orf40
C2orf62	ciliogenesis associated TTC17 interacting protein	https://www.ncbi.nlm.nih.gov/genome/?term=C2orf62

C3orf62	chromosome 3 open reading frame 62	https://www.ncbi.nlm.nih.gov/genome/?term=C3orf62
C4orf33	chromosome 4 open reading frame 33	https://www.ncbi.nlm.nih.gov/genome/?term=C4orf33
C5orf15	chromosome 5 open reading frame 15	https://www.ncbi.nlm.nih.gov/genome/?term=C5orf15
C7orf72	spermatogenesis associated 48	https://www.ncbi.nlm.nih.gov/genome/?term=C7orf72
C8B	complement C8 beta chain	https://www.ncbi.nlm.nih.gov/genome/?term=C8B
C9orf89	caspase recruitment domain family member 19	https://www.ncbi.nlm.nih.gov/genome/?term=C9orf89
C9orf96	serine/threonine kinase like domain containing 1	https://www.ncbi.nlm.nih.gov/genome/?term=C9orf96
CACNA1C	calcium voltage-gated channel subunit alpha1 C	https://www.ncbi.nlm.nih.gov/genome/?term=CACNA1C
CACNA1D	calcium voltage-gated channel subunit alpha1 D	https://www.ncbi.nlm.nih.gov/genome/?term=CACNA1D
CADM2	cell adhesion molecule 2	https://www.ncbi.nlm.nih.gov/genome/?term=CADM2
CAGE1	cancer antigen 1	https://www.ncbi.nlm.nih.gov/genome/?term=CAGE1
CALCB	calcitonin related polypeptide beta	https://www.ncbi.nlm.nih.gov/genome/?term=CALCB
CASP7	caspase 7	https://www.ncbi.nlm.nih.gov/genome/?term=CASP7
CAST	calpastatin	https://www.ncbi.nlm.nih.gov/genome/?term=CAST
CAV1	caveolin 1	https://www.ncbi.nlm.nih.gov/genome/?term=CAV1
CAV2	caveolin 2	https://www.ncbi.nlm.nih.gov/genome/?term=CAV2
CBD118	defensin beta 118	https://www.ncbi.nlm.nih.gov/genome/?term=CBD118
CBD121	defensin beta 121	https://www.ncbi.nlm.nih.gov/genome/?term=CBD121
CBD122	defensin beta 122	https://www.ncbi.nlm.nih.gov/genome/?term=CBD122
CBX2	chromobox 2	https://www.ncbi.nlm.nih.gov/genome/?term=CBX2
CCDC38	coiled-coil domain containing 38	https://www.ncbi.nlm.nih.gov/genome/?term=CCDC38
CCDC64B	BICD family like cargo adaptor 2	https://www.ncbi.nlm.nih.gov/genome/?term=CCDC64B
CCDC67	deuterosome assembly protein 1	https://www.ncbi.nlm.nih.gov/genome/?term=CCDC67
CCDC70	coiled-coil domain containing 70	https://www.ncbi.nlm.nih.gov/genome/?term=CCDC70
CCDC82	coiled-coil domain containing 82	https://www.ncbi.nlm.nih.gov/genome/?term=CCDC82
CCNJ	cyclin J	https://www.ncbi.nlm.nih.gov/genome/?term=CCNJ
CCNT2	cyclin T2	https://www.ncbi.nlm.nih.gov/genome/?term=CCNT2

CD27	CD27 molecule	https://www.ncbi.nlm.nih.gov/genome/?term=CD27
CD36	CD36 molecule	https://www.ncbi.nlm.nih.gov/genome/?term=CD36
CD48	CD48 molecule	https://www.ncbi.nlm.nih.gov/genome/?term=CD48
CD93	CD93 molecule	https://www.ncbi.nlm.nih.gov/genome/?term=CD93
CDH1	cadherin 1	https://www.ncbi.nlm.nih.gov/genome/?term=CDH1
CDH6	cadherin 6	https://www.ncbi.nlm.nih.gov/genome/?term=CDH6
CDK5RAP1	CDK5 regulatory subunit associated protein 1	https://www.ncbi.nlm.nih.gov/genome/?term=CDK5RAP1
CDKL3	cyclin dependent kinase like 3	https://www.ncbi.nlm.nih.gov/genome/?term=CDKL3
CDRT1	CMT1A duplicated region transcript 1	https://www.ncbi.nlm.nih.gov/genome/?term=CDRT1
CDRT4	CMT1A duplicated region transcript 4	https://www.ncbi.nlm.nih.gov/genome/?term=CDRT4
CELA1	chymotrypsin like elastase 1	https://www.ncbi.nlm.nih.gov/genome/?term=CELA1
CENPE	centromere protein E	https://www.ncbi.nlm.nih.gov/genome/?term=CENPE
CENPM	centromere protein M	https://www.ncbi.nlm.nih.gov/genome/?term=CENPM
CEP68	centrosomal protein 68	https://www.ncbi.nlm.nih.gov/genome/?term=CEP68
CEP97	centrosomal protein 97	https://www.ncbi.nlm.nih.gov/genome/?term=CEP97
CERS3	ceramide synthase 3	https://www.ncbi.nlm.nih.gov/genome/?term=CERS3
CETN3	centrin 3	https://www.ncbi.nlm.nih.gov/genome/?term=CETN3
CHD7	chromodomain helicase DNA binding protein 7	https://www.ncbi.nlm.nih.gov/genome/?term=CHD7
CHMP4B	charged multivesicular body protein 4B	https://www.ncbi.nlm.nih.gov/genome/?term=CHMP4B
CIB4	calcium and integrin binding family member 4	https://www.ncbi.nlm.nih.gov/genome/?term=CIB4
CKB	creatine kinase B	https://www.ncbi.nlm.nih.gov/genome/?term=CKB
CKM	creatine kinase, M-type	https://www.ncbi.nlm.nih.gov/genome/?term=CKM
CLCA3	chloride channel accessory 3, pseudogene	https://www.ncbi.nlm.nih.gov/genome/?term=CLCA3
CLDN17	claudin 17	https://www.ncbi.nlm.nih.gov/genome/?term=CLDN17
CLEC5A	C-type lectin domain containing 5A	https://www.ncbi.nlm.nih.gov/genome/?term=CLEC5A
CLK3	CDC like kinase 3	https://www.ncbi.nlm.nih.gov/genome/?term=CLK3
CNGA2	cyclic nucleotide gated channel subunit alpha 2	https://www.ncbi.nlm.nih.gov/genome/?term=CNGA2

CNTN6	contactin 6	https://www.ncbi.nlm.nih.gov/genome/?term=CNTN6
COA5	cytochrome c oxidase assembly factor 5	https://www.ncbi.nlm.nih.gov/genome/?term=COA5
COBL	cordon-bleu WH2 repeat protein	https://www.ncbi.nlm.nih.gov/genome/?term=COBL
COG6	component of oligomeric golgi complex 6	https://www.ncbi.nlm.nih.gov/genome/?term=COG6
COIL	coilin	https://www.ncbi.nlm.nih.gov/genome/?term=COIL
COL11A1	collagen type XI alpha 1 chain	https://www.ncbi.nlm.nih.gov/genome/?term=COL11A1
COL14A1	collagen type XIV alpha 1 chain	https://www.ncbi.nlm.nih.gov/genome/?term=COL14A1
COL22A1	collagen type XXII alpha 1 chain	https://www.ncbi.nlm.nih.gov/genome/?term=COL22A1
COL6A3	collagen type VI alpha 3 chain	https://www.ncbi.nlm.nih.gov/genome/?term=COL6A3
COL9A3	collagen type IX alpha 3 chain	https://www.ncbi.nlm.nih.gov/genome/?term=COL9A3
COMMD1	copper metabolism domain containing 1	https://www.ncbi.nlm.nih.gov/genome/?term=COMMD1
COQ10B	coenzyme Q10B	https://www.ncbi.nlm.nih.gov/genome/?term=COQ10B
COX4I1	cytochrome c oxidase subunit 4I1	https://www.ncbi.nlm.nih.gov/genome/?term=COX4I1
COX4I2	cytochrome c oxidase subunit 4I2	https://www.ncbi.nlm.nih.gov/genome/?term=COX4I2
CPEB3	cytoplasmic polyadenylation element binding protein 3	https://www.ncbi.nlm.nih.gov/genome/?term=CPEB3
CRH	corticotropin releasing hormone	https://www.ncbi.nlm.nih.gov/genome/?term=CRH
CROCC	ciliary rootlet coiled-coil, rootletin	https://www.ncbi.nlm.nih.gov/genome/?term=CROCC
CRTC3	CREB regulated transcription coactivator 3	https://www.ncbi.nlm.nih.gov/genome/?term=CRTC3
CRYM	crystallin mu	https://www.ncbi.nlm.nih.gov/genome/?term=CRYM
C-SKI	SKI proto-oncogene	https://www.ncbi.nlm.nih.gov/genome/?term=C-SKI
CSPP1	centrosome and spindle pole associated protein 1	https://www.ncbi.nlm.nih.gov/genome/?term=CSPP1
CTTN	cortactin	https://www.ncbi.nlm.nih.gov/genome/?term=CTTN
CUL1	cullin 1	https://www.ncbi.nlm.nih.gov/genome/?term=CUL1
CUX2	cut like homeobox 2	https://www.ncbi.nlm.nih.gov/genome/?term=CUX2
CXCL10	C-X-C motif chemokine ligand 10	https://www.ncbi.nlm.nih.gov/genome/?term=CXCL10
CYB5R1	cytochrome b5 reductase 1	https://www.ncbi.nlm.nih.gov/genome/?term=CYB5R1
CYFIP1	cytoplasmic FMR1 interacting protein 1	https://www.ncbi.nlm.nih.gov/genome/?term=CYFIP1

CYP1A1	cytochrome P450 family 1 subfamily A member 1	https://www.ncbi.nlm.nih.gov/genome/?term=CYP1A1
CYP1A2	cytochrome P450 family 1 subfamily A member 2	https://www.ncbi.nlm.nih.gov/genome/?term=CYP1A2
CYP26A1	cytochrome P450 family 26 subfamily A member 1	https://www.ncbi.nlm.nih.gov/genome/?term=CYP26A1
CYP26C1	cytochrome P450 family 26 subfamily C member 1	https://www.ncbi.nlm.nih.gov/genome/?term=CYP26C1
CYP27B1	cytochrome P450 family 27 subfamily B member 1	https://www.ncbi.nlm.nih.gov/genome/?term=CYP27B1
DACT1	dishevelled binding antagonist of beta catenin 1	https://www.ncbi.nlm.nih.gov/genome/?term=DACT1
DAPK1	death associated protein kinase 1	https://www.ncbi.nlm.nih.gov/genome/?term=DAPK1
DBI	diazepam binding inhibitor, acyl-CoA binding protein	https://www.ncbi.nlm.nih.gov/genome/?term=DBI
DCC	DCC netrin 1 receptor	https://www.ncbi.nlm.nih.gov/genome/?term=DCC
DCST1	DC-STAMP domain containing 1	https://www.ncbi.nlm.nih.gov/genome/?term=DCST1
DDC	dopa decarboxylase	https://www.ncbi.nlm.nih.gov/genome/?term=DDC
DEFB103B	defensin beta 103B	https://www.ncbi.nlm.nih.gov/genome/?term=DEFB103B
DEFB119	defensin beta 119	https://www.ncbi.nlm.nih.gov/genome/?term=DEFB119
DEFB122	defensin beta 122 (pseudogene)	https://www.ncbi.nlm.nih.gov/genome/?term=DEFB122
DGAT1	diacylglycerol O-acyltransferase 1	https://www.ncbi.nlm.nih.gov/genome/?term=DGAT1
DHDH	dihydrodiol dehydrogenase	https://www.ncbi.nlm.nih.gov/genome/?term=DHDH
DLGAP1	DLG associated protein 1	https://www.ncbi.nlm.nih.gov/genome/?term=DLGAP1
DLL3	delta like canonical Notch ligand 3	https://www.ncbi.nlm.nih.gov/genome/?term=DLL3
DMRT3	doublesex and mab-3 related transcription factor 3	https://www.ncbi.nlm.nih.gov/genome/?term=DMRT3
DNAH3	dynein axonemal heavy chain 3	https://www.ncbi.nlm.nih.gov/genome/?term=DNAH3
DNAH9	dynein axonemal heavy chain 9	https://www.ncbi.nlm.nih.gov/genome/?term=DNAH9
DNAJA1	DnaJ heat shock protein family (Hsp40) member A1	https://www.ncbi.nlm.nih.gov/genome/?term=DNAJA1
DNAJB9	DnaJ heat shock protein family (Hsp40) member B9	https://www.ncbi.nlm.nih.gov/genome/?term=DNAJB9
DNTTIP2	deoxynucleotidyltransferase terminal interacting protein 2	https://www.ncbi.nlm.nih.gov/genome/?term=DNTTIP2
DOCK2	dedicator of cytokinesis 2	https://www.ncbi.nlm.nih.gov/genome/?term=DOCK2
DPEP3	dipeptidase 3	https://www.ncbi.nlm.nih.gov/genome/?term=DPEP3
DSCAM	DS cell adhesion molecule	https://www.ncbi.nlm.nih.gov/genome/?term=DSCAM

DTD1	D-aminoacyl-tRNA deacylase 1	https://www.ncbi.nlm.nih.gov/genome/?term=DTD1
DUSP19	dual specificity phosphatase 19	https://www.ncbi.nlm.nih.gov/genome/?term=DUSP19
ECHDC1	ethylmalonyl-CoA decarboxylase 1	https://www.ncbi.nlm.nih.gov/genome/?term=ECHDC1
EDC3	enhancer of mRNA decapping 3	https://www.ncbi.nlm.nih.gov/genome/?term=EDC3
EDN3	endothelin 3	https://www.ncbi.nlm.nih.gov/genome/?term=EDN3
EDNRB	endothelin receptor type B	https://www.ncbi.nlm.nih.gov/genome/?term=EDNRB
EEA1	early endosome antigen 1	https://www.ncbi.nlm.nih.gov/genome/?term=EEA1
EHBP1L1	EH domain binding protein 1 like 1	https://www.ncbi.nlm.nih.gov/genome/?term=EHBP1L1
EIF2S2	eukaryotic translation initiation factor 2 subunit beta	https://www.ncbi.nlm.nih.gov/genome/?term=EIF2S2
ELF2	E74 like ETS transcription factor 2	https://www.ncbi.nlm.nih.gov/genome/?term=ELF2
EMC2	ER membrane protein complex subunit 2	https://www.ncbi.nlm.nih.gov/genome/?term=EMC2
ENKUR	enkurin, TRPC channel interacting protein	https://www.ncbi.nlm.nih.gov/genome/?term=ENKUR
ENTPD1	ectonucleoside triphosphate diphosphohydrolase 1	https://www.ncbi.nlm.nih.gov/genome/?term=ENTPD1
ENTPD7	ectonucleoside triphosphate diphosphohydrolase 7	https://www.ncbi.nlm.nih.gov/genome/?term=ENTPD7
EPHB4	EPH receptor B4	https://www.ncbi.nlm.nih.gov/genome/?term=EPHB4
EPS15	epidermal growth factor receptor pathway substrate 15	https://www.ncbi.nlm.nih.gov/genome/?term=EPS15
ERBB4	erb-b2 receptor tyrosine kinase 4	https://www.ncbi.nlm.nih.gov/genome/?term=ERBB4
ETNPPL	ethanolamine-phosphate phospho-lyase	https://www.ncbi.nlm.nih.gov/genome/?term=ETNPPL
ETV4	ETS variant transcription factor 4	https://www.ncbi.nlm.nih.gov/genome/?term=ETV4
EVC2	EvC ciliary complex subunit 2	https://www.ncbi.nlm.nih.gov/genome/?term=EVC2
EYA1	EYA transcriptional coactivator and phosphatase 1	https://www.ncbi.nlm.nih.gov/genome/?term=EYA1
F9	coagulation factor IX	https://www.ncbi.nlm.nih.gov/genome/?term=F9
FABP5	fatty acid binding protein 5	https://www.ncbi.nlm.nih.gov/genome/?term=FABP5
FAF1	Fas associated factor 1	https://www.ncbi.nlm.nih.gov/genome/?term=FAF1
FAIM3	Fc fragment of IgM receptor	https://www.ncbi.nlm.nih.gov/genome/?term=FAIM3
FAM107B	family with sequence similarity 107 member B	https://www.ncbi.nlm.nih.gov/genome/?term=FAM107B
FAM114A2	family with sequence similarity 114 member A2	https://www.ncbi.nlm.nih.gov/genome/?term=FAM114A2

FAM131B	family with sequence similarity 131 member B	https://www.ncbi.nlm.nih.gov/genome/?term=FAM131B
FAM172A	family with sequence similarity 172 member A	https://www.ncbi.nlm.nih.gov/genome/?term=FAM172A
FAM179A	TOG array regulator of axonemal microtubules 2	https://www.ncbi.nlm.nih.gov/genome/?term=FAM179A
FAM40B	striatin interacting protein 2	https://www.ncbi.nlm.nih.gov/genome/?term=FAM40B
FAM69A	divergent protein kinase domain 1A	https://www.ncbi.nlm.nih.gov/genome/?term=FAM69A
FANCA	FA complementation group A	https://www.ncbi.nlm.nih.gov/genome/?term=FANCA
FANCB	FA complementation group B	https://www.ncbi.nlm.nih.gov/genome/?term=FANCB
FAT4	FAT atypical cadherin 4	https://www.ncbi.nlm.nih.gov/genome/?term=FAT4
FBN3	fibrillin 3	https://www.ncbi.nlm.nih.gov/genome/?term=FBN3
FBXL22	F-box and leucine rich repeat protein 22	https://www.ncbi.nlm.nih.gov/genome/?term=FBXL22
FBXO10	F-box protein 10	https://www.ncbi.nlm.nih.gov/genome/?term=FBXO10
FBXO28	F-box protein 28	https://www.ncbi.nlm.nih.gov/genome/?term=FBXO28
FBXO31	F-box protein 31	https://www.ncbi.nlm.nih.gov/genome/?term=FBXO31
FBXW10	F-box and WD repeat domain containing 10	https://www.ncbi.nlm.nih.gov/genome/?term=FBXW10
FBXW11	F-box and WD repeat domain containing 11	https://www.ncbi.nlm.nih.gov/genome/?term=FBXW11
FCHSD2	FCH and double SH3 domains 2	https://www.ncbi.nlm.nih.gov/genome/?term=FCHSD2
FCRL4	Fc receptor like 4	https://www.ncbi.nlm.nih.gov/genome/?term=FCRL4
FER	FER tyrosine kinase	https://www.ncbi.nlm.nih.gov/genome/?term=FER
FGA	fibrinogen alpha chain	https://www.ncbi.nlm.nih.gov/genome/?term=FGA
FGD6	FYVE, RhoGEF and PH domain containing 6	https://www.ncbi.nlm.nih.gov/genome/?term=FGD6
FGF13	fibroblast growth factor 13	https://www.ncbi.nlm.nih.gov/genome/?term=FGF13
FGF18	fibroblast growth factor 18	https://www.ncbi.nlm.nih.gov/genome/?term=FGF18
FGF4	fibroblast growth factor 4	https://www.ncbi.nlm.nih.gov/genome/?term=FGF4
FGF5	fibroblast growth factor 5	https://www.ncbi.nlm.nih.gov/genome/?term=FGF5
FGF8	fibroblast growth factor 8	https://www.ncbi.nlm.nih.gov/genome/?term=FGF8
FGFBP3	fibroblast growth factor binding protein 3	https://www.ncbi.nlm.nih.gov/genome/?term=FGFBP3
FHL1	four and a half LIM domains 1	https://www.ncbi.nlm.nih.gov/genome/?term=FHL1

FMO3	flavin containing dimethylaniline monooxygenase 3	https://www.ncbi.nlm.nih.gov/genome/?term=FMO3
FN3K	fructosamine 3 kinase	https://www.ncbi.nlm.nih.gov/genome/?term=FN3K
FOXD3	forkhead box D3	https://www.ncbi.nlm.nih.gov/genome/?term=FOXD3
FOXI1	forkhead box I1	https://www.ncbi.nlm.nih.gov/genome/?term=FOXI1
FOXJ3	forkhead box J3	https://www.ncbi.nlm.nih.gov/genome/?term=FOXJ3
FRMD6	FERM domain containing 6	https://www.ncbi.nlm.nih.gov/genome/?term=FRMD6
FRMD7	FERM domain containing 7	https://www.ncbi.nlm.nih.gov/genome/?term=FRMD7
FRMPD1	FERM and PDZ domain containing 1	https://www.ncbi.nlm.nih.gov/genome/?term=FRMPD1
FSTL4	folliculin like 4	https://www.ncbi.nlm.nih.gov/genome/?term=FSTL4
GABRA5	gamma-aminobutyric acid type A receptor subunit alpha5	https://www.ncbi.nlm.nih.gov/genome/?term=GABRA5
GAK	cyclin G associated kinase	https://www.ncbi.nlm.nih.gov/genome/?term=GAK
GALR1	galanin receptor 1	https://www.ncbi.nlm.nih.gov/genome/?term=GALR1
GAPDHS	glyceraldehyde-3-phosphate dehydrogenase, spermatogenic	https://www.ncbi.nlm.nih.gov/genome/?term=GAPDHS
GCNT7	glucosaminyl (N-acetyl) transferase family member 7	https://www.ncbi.nlm.nih.gov/genome/?term=GCNT7
GDNF	glial cell derived neurotrophic factor	https://www.ncbi.nlm.nih.gov/genome/?term=GDNF
GEMIN7	gem nuclear organelle associated protein 7	https://www.ncbi.nlm.nih.gov/genome/?term=GEMIN7
GGT6	gamma-glutamyltransferase 6	https://www.ncbi.nlm.nih.gov/genome/?term=GGT6
GGT7	gamma-glutamyltransferase 7	https://www.ncbi.nlm.nih.gov/genome/?term=GGT7
GLRA1	glycine receptor alpha 1	https://www.ncbi.nlm.nih.gov/genome/?term=GLRA1
GNAT3	G protein subunit alpha transducin 3	https://www.ncbi.nlm.nih.gov/genome/?term=GNAT3
GNG10	G protein subunit gamma 10	https://www.ncbi.nlm.nih.gov/genome/?term=GNG10
GNG4	G protein subunit gamma 4	https://www.ncbi.nlm.nih.gov/genome/?term=GNG4
GNPTAB	N-acetylglucosamine-1-phosphate transferase subunits alpha and beta	https://www.ncbi.nlm.nih.gov/genome/?term=GNPTAB
GOLGA1	golgin A1	https://www.ncbi.nlm.nih.gov/genome/?term=GOLGA1
GP2	glycoprotein 2	https://www.ncbi.nlm.nih.gov/genome/?term=GP2
GPATCH8	G-patch domain containing 8	https://www.ncbi.nlm.nih.gov/genome/?term=GPATCH8
GPR133	adhesion G protein-coupled receptor D1	https://www.ncbi.nlm.nih.gov/genome/?term=GPR133

GPR139	G protein-coupled receptor 139	https://www.ncbi.nlm.nih.gov/genome/?term=GPR139
GPR15	G protein-coupled receptor 15	https://www.ncbi.nlm.nih.gov/genome/?term=GPR15
GPR174	G protein-coupled receptor 174	https://www.ncbi.nlm.nih.gov/genome/?term=GPR174
GPRASP2	G protein-coupled receptor associated sorting protein 2	https://www.ncbi.nlm.nih.gov/genome/?term=GPRASP2
GPRC5A	G protein-coupled receptor class C group 5 member A	https://www.ncbi.nlm.nih.gov/genome/?term=GPRC5A
GPRC5B	G protein-coupled receptor class C group 5 member B	https://www.ncbi.nlm.nih.gov/genome/?term=GPRC5B
GPRIN2	G protein regulated inducer of neurite outgrowth 2	https://www.ncbi.nlm.nih.gov/genome/?term=GPRIN2
GRHL3	grainyhead like transcription factor 3	https://www.ncbi.nlm.nih.gov/genome/?term=GRHL3
GRIA1	glutamate ionotropic receptor AMPA type subunit 1	https://www.ncbi.nlm.nih.gov/genome/?term=GRIA1
GRIA2	glutamate ionotropic receptor AMPA type subunit 2	https://www.ncbi.nlm.nih.gov/genome/?term=GRIA2
GRID1	glutamate ionotropic receptor delta type subunit 1	https://www.ncbi.nlm.nih.gov/genome/?term=GRID1
GRIK2	glutamate ionotropic receptor kainate type subunit 2	https://www.ncbi.nlm.nih.gov/genome/?term=GRIK2
GRIK3	glutamate ionotropic receptor kainate type subunit 3	https://www.ncbi.nlm.nih.gov/genome/?term=GRIK3
HADH	hydroxyacyl-CoA dehydrogenase	https://www.ncbi.nlm.nih.gov/genome/?term=HADH
HAS2	hyaluronan synthase 2	https://www.ncbi.nlm.nih.gov/genome/?term=HAS2
HEATR5B	HEAT repeat containing 5B	https://www.ncbi.nlm.nih.gov/genome/?term=HEATR5B
HECA	hdc homolog, cell cycle regulator	https://www.ncbi.nlm.nih.gov/genome/?term=HECA
HEPACAM2	HEPACAM family member 2	https://www.ncbi.nlm.nih.gov/genome/?term=HEPACAM2
HEPH	hephaestin	https://www.ncbi.nlm.nih.gov/genome/?term=HEPH
HERC2	HECT and RLD domain containing E3 ubiquitin protein ligase 2	https://www.ncbi.nlm.nih.gov/genome/?term=HERC2
HIPK2	homeodomain interacting protein kinase 2	https://www.ncbi.nlm.nih.gov/genome/?term=HIPK2
HMGA2	high mobility group AT-hook 2	https://www.ncbi.nlm.nih.gov/genome/?term=HMGA2
HMMR	hyaluronan mediated motility receptor	https://www.ncbi.nlm.nih.gov/genome/?term=HMMR
HOPX	HOP homeobox	https://www.ncbi.nlm.nih.gov/genome/?term=HOPX
HPS5	HPS5 biogenesis of lysosomal organelles complex 2 subunit 2	https://www.ncbi.nlm.nih.gov/genome/?term=HPS5
HS3ST4	heparan sulfate-glucosamine 3-sulfotransferase 4	https://www.ncbi.nlm.nih.gov/genome/?term=HS3ST4
HS6ST2	heparan sulfate 6-O-sulfotransferase 2	https://www.ncbi.nlm.nih.gov/genome/?term=HS6ST2

HSD3B7	hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase 7	https://www.ncbi.nlm.nih.gov/genome/?term=HSD3B7
HSPA13	heat shock protein family A (Hsp70) member 13	https://www.ncbi.nlm.nih.gov/genome/?term=HSPA13
HSPD1	heat shock protein family D (Hsp60) member 1	https://www.ncbi.nlm.nih.gov/genome/?term=HSPD1
HSPE1	heat shock protein family E (Hsp10) member 1	https://www.ncbi.nlm.nih.gov/genome/?term=HSPE1
HTR4	5-hydroxytryptamine receptor 4	https://www.ncbi.nlm.nih.gov/genome/?term=HTR4
IFT80	intraflagellar transport 80	https://www.ncbi.nlm.nih.gov/genome/?term=IFT80
IFT81	intraflagellar transport 81	https://www.ncbi.nlm.nih.gov/genome/?term=IFT81
IGF1	insulin like growth factor 1	https://www.ncbi.nlm.nih.gov/genome/?term=IGF1
IGF2	insulin like growth factor 2	https://www.ncbi.nlm.nih.gov/genome/?term=IGF2
IGHMBP2	immunoglobulin mu DNA binding protein 2	https://www.ncbi.nlm.nih.gov/genome/?term=IGHMBP2
IGSF1	immunoglobulin superfamily member 1	https://www.ncbi.nlm.nih.gov/genome/?term=IGSF1
IGSF3	immunoglobulin superfamily member 3	https://www.ncbi.nlm.nih.gov/genome/?term=IGSF3
IGSF9B	immunoglobulin superfamily member 9B	https://www.ncbi.nlm.nih.gov/genome/?term=IGSF9B
IKZF1	IKAROS family zinc finger 1	https://www.ncbi.nlm.nih.gov/genome/?term=IKZF1
IMMP2L	inner mitochondrial membrane peptidase subunit 2	https://www.ncbi.nlm.nih.gov/genome/?term=IMMP2L
INHBC	inhibin subunit beta C	https://www.ncbi.nlm.nih.gov/genome/?term=INHBC
INPP4B	inositol polyphosphate-4-phosphatase type II B	https://www.ncbi.nlm.nih.gov/genome/?term=INPP4B
INPP5J	inositol polyphosphate-5-phosphatase J	https://www.ncbi.nlm.nih.gov/genome/?term=INPP5J
IPO4	importin 4	https://www.ncbi.nlm.nih.gov/genome/?term=IPO4
IQCB1	IQ motif containing B1	https://www.ncbi.nlm.nih.gov/genome/?term=IQCB1
ISG15	ISG15 ubiquitin like modifier	https://www.ncbi.nlm.nih.gov/genome/?term=ISG15
ITGA2B	integrin subunit alpha 2b	https://www.ncbi.nlm.nih.gov/genome/?term=ITGA2B
ITGA9	integrin subunit alpha 9	https://www.ncbi.nlm.nih.gov/genome/?term=ITGA9
ITGBL1	integrin subunit beta like 1	https://www.ncbi.nlm.nih.gov/genome/?term=ITGBL1
ITPR3	inositol 1,4,5-trisphosphate receptor type 3	https://www.ncbi.nlm.nih.gov/genome/?term=ITPR3
JAM3	junctional adhesion molecule 3	https://www.ncbi.nlm.nih.gov/genome/?term=JAM3
JMJD1C	jumonji domain containing 1C	https://www.ncbi.nlm.nih.gov/genome/?term=JMJD1C

JPH3	junctophilin 3	https://www.ncbi.nlm.nih.gov/genome/?term=JPH3
JRKL	JRK like	https://www.ncbi.nlm.nih.gov/genome/?term=JRKL
KCNK10	potassium two pore domain channel subfamily K member 10	https://www.ncbi.nlm.nih.gov/genome/?term=KCNK10
KDM3A	lysine demethylase 3A	https://www.ncbi.nlm.nih.gov/genome/?term=KDM3A
KDM6B	lysine demethylase 6B	https://www.ncbi.nlm.nih.gov/genome/?term=KDM6B
KDR	kinase insert domain receptor	https://www.ncbi.nlm.nih.gov/genome/?term=KDR
KIAA0226	rubicon autophagy regulator	https://www.ncbi.nlm.nih.gov/genome/?term=KIAA0226
KIAA0556	KIAA0556	https://www.ncbi.nlm.nih.gov/genome/?term=KIAA0556
KIAA1549	KIAA1549	https://www.ncbi.nlm.nih.gov/genome/?term=KIAA1549
KIF1C	kinesin family member 1C	https://www.ncbi.nlm.nih.gov/genome/?term=KIF1C
KIF22	kinesin family member 22	https://www.ncbi.nlm.nih.gov/genome/?term=KIF22
KIF27	kinesin family member 27	https://www.ncbi.nlm.nih.gov/genome/?term=KIF27
KIRREL2	kirre like nephrin family adhesion molecule 2	https://www.ncbi.nlm.nih.gov/genome/?term=KIRREL2
KIT	KIT proto-oncogene, receptor tyrosine kinase	https://www.ncbi.nlm.nih.gov/genome/?term=KIT
KITLG	KIT ligand	https://www.ncbi.nlm.nih.gov/genome/?term=KITLG
KLF4	Kruppel like factor 4	https://www.ncbi.nlm.nih.gov/genome/?term=KLF4
KLHDC4	kelch domain containing 4	https://www.ncbi.nlm.nih.gov/genome/?term=KLHDC4
KRIT1	KRIT1 ankyrin repeat containing	https://www.ncbi.nlm.nih.gov/genome/?term=KRIT1
KRT71	keratin 71	https://www.ncbi.nlm.nih.gov/genome/?term=KRT71
KYNU	kynureninase	https://www.ncbi.nlm.nih.gov/genome/?term=KYNU
LAMC2	laminin subunit gamma 2	https://www.ncbi.nlm.nih.gov/genome/?term=LAMC2
LAMC3	laminin subunit gamma 3	https://www.ncbi.nlm.nih.gov/genome/?term=LAMC3
LAP3	leucine aminopeptidase 3	https://www.ncbi.nlm.nih.gov/genome/?term=LAP3
LATS2	large tumor suppressor kinase 2	https://www.ncbi.nlm.nih.gov/genome/?term=LATS2
LCAT	lecithin-cholesterol acyltransferase	https://www.ncbi.nlm.nih.gov/genome/?term=LCAT
LCLAT1	lysocardiolipin acyltransferase 1	https://www.ncbi.nlm.nih.gov/genome/?term=LCLAT1
LEPREL1	prolyl 3-hydroxylase 2	https://www.ncbi.nlm.nih.gov/genome/?term=LEPREL1

LHFPL3	LHFPL tetraspan subfamily member 3	https://www.ncbi.nlm.nih.gov/genome/?term=LHFPL3
LIAS	lipoic acid synthetase	https://www.ncbi.nlm.nih.gov/genome/?term=LIAS
LILRA6	leukocyte immunoglobulin like receptor A6	https://www.ncbi.nlm.nih.gov/genome/?term=LILRA6
LIMD1	LIM domains containing 1	https://www.ncbi.nlm.nih.gov/genome/?term=LIMD1
LIN28B	lin-28 homolog B	https://www.ncbi.nlm.nih.gov/genome/?term=LIN28B
LINC01927	long intergenic non-protein coding RNA 1927	https://www.ncbi.nlm.nih.gov/genome/?term=LINC01927
LINGO2	leucine rich repeat and Ig domain containing 2	https://www.ncbi.nlm.nih.gov/genome/?term=LINGO2
LMF1	lipase maturation factor 1	https://www.ncbi.nlm.nih.gov/genome/?term=LMF1
LRIG3	leucine rich repeats and immunoglobulin like domains 3	https://www.ncbi.nlm.nih.gov/genome/?term=LRIG3
LRP1B	LDL receptor related protein 1B	https://www.ncbi.nlm.nih.gov/genome/?term=LRP1B
LRRC32	leucine rich repeat containing 32	https://www.ncbi.nlm.nih.gov/genome/?term=LRRC32
LRRC36	leucine rich repeat containing 36	https://www.ncbi.nlm.nih.gov/genome/?term=LRRC36
LRRN3	leucine rich repeat neuronal 3	https://www.ncbi.nlm.nih.gov/genome/?term=LRRN3
LSM3	LSM3 homolog, U6 small nuclear RNA and mRNA degradation associated	https://www.ncbi.nlm.nih.gov/genome/?term=LSM3
LTF	lactotransferrin	https://www.ncbi.nlm.nih.gov/genome/?term=LTF
LYST	lysosomal trafficking regulator	https://www.ncbi.nlm.nih.gov/genome/?term=LYST
MAFK	MAF bZIP transcription factor K	https://www.ncbi.nlm.nih.gov/genome/?term=MAFK
MAGOH	mago homolog, exon junction complex subunit	https://www.ncbi.nlm.nih.gov/genome/?term=MAGOH
MAOA	monoamine oxidase A	https://www.ncbi.nlm.nih.gov/genome/?term=MAOA
MAOB	monoamine oxidase B	https://www.ncbi.nlm.nih.gov/genome/?term=MAOB
MAP3K1	mitogen-activated protein kinase kinase kinase 1	https://www.ncbi.nlm.nih.gov/genome/?term=MAP3K1
MAP3K4	mitogen-activated protein kinase kinase kinase 4	https://www.ncbi.nlm.nih.gov/genome/?term=MAP3K4
MAP7D2	MAP7 domain containing 2	https://www.ncbi.nlm.nih.gov/genome/?term=MAP7D2
MAP7D3	MAP7 domain containing 3	https://www.ncbi.nlm.nih.gov/genome/?term=MAP7D3
MAPK10	mitogen-activated protein kinase 10	https://www.ncbi.nlm.nih.gov/genome/?term=MAPK10
MARCH10	membrane associated ring-CH-type finger 10	https://www.ncbi.nlm.nih.gov/genome/?term=MARCH10
MARCH7	membrane associated ring-CH-type finger 7	https://www.ncbi.nlm.nih.gov/genome/?term=MARCH7

MARK2	microtubule affinity regulating kinase 2	https://www.ncbi.nlm.nih.gov/genome/?term=MARK2
MARK3	microtubule affinity regulating kinase 3	https://www.ncbi.nlm.nih.gov/genome/?term=MARK3
MARVELD3	MARVEL domain containing 3	https://www.ncbi.nlm.nih.gov/genome/?term=MARVELD3
MATN2	matrilin 2	https://www.ncbi.nlm.nih.gov/genome/?term=MATN2
MBD2	methyl-CpG binding domain protein 2	https://www.ncbi.nlm.nih.gov/genome/?term=MBD2
MBP	myelin basic protein	https://www.ncbi.nlm.nih.gov/genome/?term=MBP
MC1R	melanocortin 1 receptor	https://www.ncbi.nlm.nih.gov/genome/?term=MC1R
MC2R	melanocortin 2 receptor	https://www.ncbi.nlm.nih.gov/genome/?term=MC2R
MC4R	melanocortin 4 receptor	https://www.ncbi.nlm.nih.gov/genome/?term=MC4R
MCF2	MCF.2 cell line derived transforming sequence	https://www.ncbi.nlm.nih.gov/genome/?term=MCF2
MCHR2	melanin concentrating hormone receptor 2	https://www.ncbi.nlm.nih.gov/genome/?term=MCHR2
MED23	mediator complex subunit 23	https://www.ncbi.nlm.nih.gov/genome/?term=MED23
MERTK	MER proto-oncogene, tyrosine kinase	https://www.ncbi.nlm.nih.gov/genome/?term=MERTK
METAP2	methionyl aminopeptidase 2	https://www.ncbi.nlm.nih.gov/genome/?term=METAP2
METTL22	methyltransferase like 22	https://www.ncbi.nlm.nih.gov/genome/?term=METTL22
METTL8	methyltransferase like 8	https://www.ncbi.nlm.nih.gov/genome/?term=METTL8
MFAP3	microfibril associated protein 3	https://www.ncbi.nlm.nih.gov/genome/?term=MFAP3
MGAM	maltase-glucoamylase	https://www.ncbi.nlm.nih.gov/genome/?term=MGAM
MGC12345	MGC12345	https://www.ncbi.nlm.nih.gov/genome/?term=MGC12345
MIER3	MIER family member 3	https://www.ncbi.nlm.nih.gov/genome/?term=MIER3
MIF4GD	MIF4G domain containing	https://www.ncbi.nlm.nih.gov/genome/?term=MIF4GD
MIIP	migration and invasion inhibitory protein	https://www.ncbi.nlm.nih.gov/genome/?term=MIIP
MINOS1	mitochondrial contact site and cristae organizing system subunit 10	https://www.ncbi.nlm.nih.gov/genome/?term=MINOS1
MITF	melanocyte inducing transcription factor	https://www.ncbi.nlm.nih.gov/genome/?term=MITF
MKKS	McKusick-Kaufman syndrome	https://www.ncbi.nlm.nih.gov/genome/?term=MKKS
MMP16	matrix metalloproteinase 16	https://www.ncbi.nlm.nih.gov/genome/?term=MMP16
MOB4	MOB family member 4, phocein	https://www.ncbi.nlm.nih.gov/genome/?term=MOB4

MORC1	MORC family CW-type zinc finger 1	https://www.ncbi.nlm.nih.gov/genome/?term=MORC1
MPV17L	MPV17 mitochondrial inner membrane protein like	https://www.ncbi.nlm.nih.gov/genome/?term=MPV17L
MRPL11	mitochondrial ribosomal protein L11	https://www.ncbi.nlm.nih.gov/genome/?term=MRPL11
MRPL52	mitochondrial ribosomal protein L52	https://www.ncbi.nlm.nih.gov/genome/?term=MRPL52
MSI2	musashi RNA binding protein 2	https://www.ncbi.nlm.nih.gov/genome/?term=MSI2
MSRB3	methionine sulfoxide reductase B3	https://www.ncbi.nlm.nih.gov/genome/?term=MSRB3
MSTN	myostatin	https://www.ncbi.nlm.nih.gov/genome/?term=MSTN
MT1F	metallothionein 1F	https://www.ncbi.nlm.nih.gov/genome/?term=MT1F
MT1L	metallothionein 1L, pseudogene	https://www.ncbi.nlm.nih.gov/genome/?term=MT1L
MT2A	metallothionein 2A	https://www.ncbi.nlm.nih.gov/genome/?term=MT2A
MTIF2	mitochondrial translational initiation factor 2	https://www.ncbi.nlm.nih.gov/genome/?term=MTIF2
MTRF1	mitochondrial translation release factor 1	https://www.ncbi.nlm.nih.gov/genome/?term=MTRF1
MURC	caveolae associated protein 4	https://www.ncbi.nlm.nih.gov/genome/?term=MURC
MVK	mevalonate kinase	https://www.ncbi.nlm.nih.gov/genome/?term=MVK
MYBPC1	myosin binding protein C1	https://www.ncbi.nlm.nih.gov/genome/?term=MYBPC1
MYLK3	myosin light chain kinase 3	https://www.ncbi.nlm.nih.gov/genome/?term=MYLK3
MYO15A	myosin XVA	https://www.ncbi.nlm.nih.gov/genome/?term=MYO15A
MYO9A	myosin IXA	https://www.ncbi.nlm.nih.gov/genome/?term=MYO9A
MYOF	myoferlin	https://www.ncbi.nlm.nih.gov/genome/?term=MYOF
NAPRT1	nicotinate phosphoribosyltransferase	https://www.ncbi.nlm.nih.gov/genome/?term=NAPRT1
NCAPD3	non-SMC condensin II complex subunit D3	https://www.ncbi.nlm.nih.gov/genome/?term=NCAPD3
NCAPG	non-SMC condensin I complex subunit G	https://www.ncbi.nlm.nih.gov/genome/?term=NCAPG
NCOA6	nuclear receptor coactivator 6	https://www.ncbi.nlm.nih.gov/genome/?term=NCOA6
NCTIN1		
NDUFB1	NADH:ubiquinone oxidoreductase subunit B1	https://www.ncbi.nlm.nih.gov/genome/?term=NDUFB1
NEK1	NIMA related kinase 1	https://www.ncbi.nlm.nih.gov/genome/?term=NEK1
NEK4	NIMA related kinase 4	https://www.ncbi.nlm.nih.gov/genome/?term=NEK4

NFAM1	NFAT activating protein with ITAM motif 1	https://www.ncbi.nlm.nih.gov/genome/?term=NFAM1
NFKBIZ	NFKB inhibitor zeta	https://www.ncbi.nlm.nih.gov/genome/?term=NFKBIZ
NID2	nidogen 2	https://www.ncbi.nlm.nih.gov/genome/?term=NID2
NINJ1	ninjurin 1	https://www.ncbi.nlm.nih.gov/genome/?term=NINJ1
NIPA2	NIPA magnesium transporter 2	https://www.ncbi.nlm.nih.gov/genome/?term=NIPA2
NIPBL	NIPBL cohesin loading factor	https://www.ncbi.nlm.nih.gov/genome/?term=NIPBL
NKAIN2	sodium/potassium transporting ATPase interacting 2	https://www.ncbi.nlm.nih.gov/genome/?term=NKAIN2
NOCT	nocturnin	https://www.ncbi.nlm.nih.gov/genome/?term=NOCT
NOL4	nucleolar protein 4	https://www.ncbi.nlm.nih.gov/genome/?term=NOL4
NOLC1	nucleolar and coiled-body phosphoprotein 1	https://www.ncbi.nlm.nih.gov/genome/?term=NOLC1
NOSTRIN	nitric oxide synthase trafficking	https://www.ncbi.nlm.nih.gov/genome/?term=NOSTRIN
NOTCH2	notch receptor 2	https://www.ncbi.nlm.nih.gov/genome/?term=NOTCH2
NPAS3	neuronal PAS domain protein 3	https://www.ncbi.nlm.nih.gov/genome/?term=NPAS3
NPFFR2	neuropeptide FF receptor 2	https://www.ncbi.nlm.nih.gov/genome/?term=NPFFR2
NPTX1	neuronal pentraxin 1	https://www.ncbi.nlm.nih.gov/genome/?term=NPTX1
NR2F2	nuclear receptor subfamily 2 group F member 2	https://www.ncbi.nlm.nih.gov/genome/?term=NR2F2
NR3C1	nuclear receptor subfamily 3 group C member 1	https://www.ncbi.nlm.nih.gov/genome/?term=NR3C1
NR3C2	nuclear receptor subfamily 3 group C member 2	https://www.ncbi.nlm.nih.gov/genome/?term=NR3C2
NRF1	nuclear respiratory factor 1	https://www.ncbi.nlm.nih.gov/genome/?term=NRF1
NRG2	nuclear factor, erythroid 2 like 1	https://www.ncbi.nlm.nih.gov/genome/?term=NRG2
NRG4	neuregulin 2	https://www.ncbi.nlm.nih.gov/genome/?term=NRG4
NRSA2	neuregulin 4	https://www.ncbi.nlm.nih.gov/genome/?term=NRSA2
NRXN1	neurexin 1	https://www.ncbi.nlm.nih.gov/genome/?term=NRXN1
NT5DC2	5'-nucleotidase domain containing 2	https://www.ncbi.nlm.nih.gov/genome/?term=NT5DC2
NTAN1	N-terminal asparagine amidase	https://www.ncbi.nlm.nih.gov/genome/?term=NTAN1
NTM	neurotrimin	https://www.ncbi.nlm.nih.gov/genome/?term=NTM
NUDT15	nudix hydrolase 15	https://www.ncbi.nlm.nih.gov/genome/?term=NUDT15

NUMB	NUMB endocytic adaptor protein	https://www.ncbi.nlm.nih.gov/genome/?term=NUMB
NUP133	nucleoporin 133	https://www.ncbi.nlm.nih.gov/genome/?term=NUP133
NUP54	nucleoporin 54	https://www.ncbi.nlm.nih.gov/genome/?term=NUP54
NXPE3	neurexophilin and PC-esterase domain family member 3	https://www.ncbi.nlm.nih.gov/genome/?term=NXPE3
OLIG1	oligodendrocyte transcription factor 1	https://www.ncbi.nlm.nih.gov/genome/?term=OLIG1
OMA1	OMA1 zinc metallopeptidase	https://www.ncbi.nlm.nih.gov/genome/?term=OMA1
OPCML	opioid binding protein/cell adhesion molecule like	https://www.ncbi.nlm.nih.gov/genome/?term=OPCML
OPTC	opticin	https://www.ncbi.nlm.nih.gov/genome/?term=OPTC
OR10K1	olfactory receptor family 10 subfamily K member 1	https://www.ncbi.nlm.nih.gov/genome/?term=OR10K1
OR13C8	olfactory receptor family 13 subfamily C member 8	https://www.ncbi.nlm.nih.gov/genome/?term=OR13C8
OR2B11	olfactory receptor family 2 subfamily B member 11	https://www.ncbi.nlm.nih.gov/genome/?term=OR2B11
OR4D6	olfactory receptor family 4 subfamily D member 6	https://www.ncbi.nlm.nih.gov/genome/?term=OR4D6
OR51A7	olfactory receptor family 51 subfamily A member 7	https://www.ncbi.nlm.nih.gov/genome/?term=OR51A7
OR9A4	olfactory receptor family 9 subfamily A member 4	https://www.ncbi.nlm.nih.gov/genome/?term=OR9A4
OTOF	otoferlin	https://www.ncbi.nlm.nih.gov/genome/?term=OTOF
PAFAH2	platelet activating factor acetylhydrolase 2	https://www.ncbi.nlm.nih.gov/genome/?term=PAFAH2
PARP12	poly(ADP-ribose) polymerase family member 12	https://www.ncbi.nlm.nih.gov/genome/?term=PARP12
PARVG	parvin gamma	https://www.ncbi.nlm.nih.gov/genome/?term=PARVG
PAX2	paired box 2	https://www.ncbi.nlm.nih.gov/genome/?term=PAX2
PAX3	paired box 3	https://www.ncbi.nlm.nih.gov/genome/?term=PAX3
PCDH18	protocadherin 18	https://www.ncbi.nlm.nih.gov/genome/?term=PCDH18
PCDHA1	protocadherin alpha 1	https://www.ncbi.nlm.nih.gov/genome/?term=PCDHA1
PCDHB4	protocadherin beta 4	https://www.ncbi.nlm.nih.gov/genome/?term=PCDHB4
PCSK5	proprotein convertase subtilisin/kexin type 5	https://www.ncbi.nlm.nih.gov/genome/?term=PCSK5
PDE4D	phosphodiesterase 4D	https://www.ncbi.nlm.nih.gov/genome/?term=PDE4D
PDE4DIP	phosphodiesterase 4D interacting protein	https://www.ncbi.nlm.nih.gov/genome/?term=PDE4DIP
PDE5A	phosphodiesterase 5A	https://www.ncbi.nlm.nih.gov/genome/?term=PDE5A

PDE7B	phosphodiesterase 7B	https://www.ncbi.nlm.nih.gov/genome/?term=PDE7B
PDILT	protein disulfide isomerase like, testis expressed	https://www.ncbi.nlm.nih.gov/genome/?term=PDILT
PDRG1	p53 and DNA damage regulated 1	https://www.ncbi.nlm.nih.gov/genome/?term=PDRG1
PDXDC1	pyridoxal dependent decarboxylase domain containing 1	https://www.ncbi.nlm.nih.gov/genome/?term=PDXDC1
PEX7	peroxisomal biogenesis factor 7	https://www.ncbi.nlm.nih.gov/genome/?term=PEX7
PHF2	PHD finger protein 2	https://www.ncbi.nlm.nih.gov/genome/?term=PHF2
PHF20	PHD finger protein 20	https://www.ncbi.nlm.nih.gov/genome/?term=PHF20
PHLDB3	pleckstrin homology like domain family B member 3	https://www.ncbi.nlm.nih.gov/genome/?term=PHLDB3
PIK3C3	phosphatidylinositol 3-kinase catalytic subunit type 3	https://www.ncbi.nlm.nih.gov/genome/?term=PIK3C3
PITRM1	pitrilysin metalloproteinase 1	https://www.ncbi.nlm.nih.gov/genome/?term=PITRM1
PJA2	praja ring finger ubiquitin ligase 2	https://www.ncbi.nlm.nih.gov/genome/?term=PJA2
PKD1L1	polycystin 1 like 1, transient receptor potential channel interacting	https://www.ncbi.nlm.nih.gov/genome/?term=PKD1L1
PLA2G2E	phospholipase A2 group IIE	https://www.ncbi.nlm.nih.gov/genome/?term=PLA2G2E
PLA2G3	phospholipase A2 group III	https://www.ncbi.nlm.nih.gov/genome/?term=PLA2G3
PLAC1	placenta enriched 1	https://www.ncbi.nlm.nih.gov/genome/?term=PLAC1
PLAC8L1	PLAC8 like 1	https://www.ncbi.nlm.nih.gov/genome/?term=PLAC8L1
PLAG1	PLAG1 zinc finger	https://www.ncbi.nlm.nih.gov/genome/?term=PLAG1
PLCE1	phospholipase C epsilon 1	https://www.ncbi.nlm.nih.gov/genome/?term=PLCE1
PLEKHH1	pleckstrin homology, MyTH4 and FERM domain containing H1	https://www.ncbi.nlm.nih.gov/genome/?term=PLEKHH1
PLEKHM3	pleckstrin homology domain containing M3	https://www.ncbi.nlm.nih.gov/genome/?term=PLEKHM3
PLIN3	perilipin 3	https://www.ncbi.nlm.nih.gov/genome/?term=PLIN3
PLXNA4	plexin A4	https://www.ncbi.nlm.nih.gov/genome/?term=PLXNA4
PMEL	premelanosome protein	https://www.ncbi.nlm.nih.gov/genome/?term=PMEL
PML	promyelocytic leukemia	https://www.ncbi.nlm.nih.gov/genome/?term=PML
Pol		
POLI	DNA polymerase iota	https://www.ncbi.nlm.nih.gov/genome/?term=POLI
POLR1E	RNA polymerase I subunit E	https://www.ncbi.nlm.nih.gov/genome/?term=POLR1E

POMC	proopiomelanocortin	https://www.ncbi.nlm.nih.gov/genome/?term=POMC
POP1	POP1 homolog, ribonuclease P/MRP subunit	https://www.ncbi.nlm.nih.gov/genome/?term=POP1
PPAP2A	phospholipid phosphatase 1	https://www.ncbi.nlm.nih.gov/genome/?term=PPAP2A
PPAPDC1B	phospholipid phosphatase 5	https://www.ncbi.nlm.nih.gov/genome/?term=PPAPDC1B
PPARD	peroxisome proliferator activated receptor delta	https://www.ncbi.nlm.nih.gov/genome/?term=PPARD
PPFIBP1	PPFIA binding protein 1	https://www.ncbi.nlm.nih.gov/genome/?term=PPFIBP1
PPM1D	protein phosphatase, Mg ²⁺ /Mn ²⁺ dependent 1D	https://www.ncbi.nlm.nih.gov/genome/?term=PPM1D
PPP1R13B	protein phosphatase 1 regulatory subunit 13B	https://www.ncbi.nlm.nih.gov/genome/?term=PPP1R13B
PPP2CA	protein phosphatase 2 catalytic subunit alpha	https://www.ncbi.nlm.nih.gov/genome/?term=PPP2CA
PRICKLE4	prickle planar cell polarity protein 4	https://www.ncbi.nlm.nih.gov/genome/?term=PRICKLE4
PRKAG1	protein kinase AMP-activated non-catalytic subunit gamma 1	https://www.ncbi.nlm.nih.gov/genome/?term=PRKAG1
PRKAG3	protein kinase AMP-activated non-catalytic subunit gamma 3	https://www.ncbi.nlm.nih.gov/genome/?term=PRKAG3
PRKCZ	protein kinase C zeta	https://www.ncbi.nlm.nih.gov/genome/?term=PRKCZ
PRKG2	protein kinase cGMP-dependent 2	https://www.ncbi.nlm.nih.gov/genome/?term=PRKG2
PRMT3	protein arginine methyltransferase 3	https://www.ncbi.nlm.nih.gov/genome/?term=PRMT3
PROM1	prominin 1	https://www.ncbi.nlm.nih.gov/genome/?term=PROM1
PRR11	proline rich 11	https://www.ncbi.nlm.nih.gov/genome/?term=PRR11
PRX	periaxin	https://www.ncbi.nlm.nih.gov/genome/?term=PRX
PSMB7	proteasome 20S subunit beta 7	https://www.ncbi.nlm.nih.gov/genome/?term=PSMB7
PSPH	phosphoserine phosphatase	https://www.ncbi.nlm.nih.gov/genome/?term=PSPH
PSTK	phosphoseryl-tRNA kinase	https://www.ncbi.nlm.nih.gov/genome/?term=PSTK
PTPN4	protein tyrosine phosphatase non-receptor type 4	https://www.ncbi.nlm.nih.gov/genome/?term=PTPN4
PTPRR	protein tyrosine phosphatase receptor type R	https://www.ncbi.nlm.nih.gov/genome/?term=PTPRR
PTPRS	protein tyrosine phosphatase receptor type S	https://www.ncbi.nlm.nih.gov/genome/?term=PTPRS
PUSL1	pseudouridine synthase like 1	https://www.ncbi.nlm.nih.gov/genome/?term=PUSL1
PVRL3	nectin cell adhesion molecule 3	https://www.ncbi.nlm.nih.gov/genome/?term=PVRL3
Q2ABD2	taste 2 receptor member 38	https://www.ncbi.nlm.nih.gov/genome/?term=Q2ABD2

RAB3GAP1	RAB3 GTPase activating protein catalytic subunit 1	https://www.ncbi.nlm.nih.gov/genome/?term=RAB3GAP1
RABGAP1L	RAB GTPase activating protein 1 like	https://www.ncbi.nlm.nih.gov/genome/?term=RABGAP1L
RABL3	RAB, member of RAS oncogene family like 3	https://www.ncbi.nlm.nih.gov/genome/?term=RABL3
RALGAPA2	Ral GTPase activating protein catalytic subunit alpha 2	https://www.ncbi.nlm.nih.gov/genome/?term=RALGAPA2
RALY	RALY heterogeneous nuclear ribonucleoprotein	https://www.ncbi.nlm.nih.gov/genome/?term=RALY
RANBP17	RAN binding protein 17	https://www.ncbi.nlm.nih.gov/genome/?term=RANBP17
RAPH1	Ras association (RalGDS/AF-6) and pleckstrin homology domains 1	https://www.ncbi.nlm.nih.gov/genome/?term=RAPH1
RASGEF1B	RasGEF domain family member 1B	https://www.ncbi.nlm.nih.gov/genome/?term=RASGEF1B
RBM11	RNA binding motif protein 11	https://www.ncbi.nlm.nih.gov/genome/?term=RBM11
RBP5	retinol binding protein 5	https://www.ncbi.nlm.nih.gov/genome/?term=RBP5
RCSD1	RCSD domain containing 1	https://www.ncbi.nlm.nih.gov/genome/?term=RCSD1
REEP1	receptor accessory protein 1	https://www.ncbi.nlm.nih.gov/genome/?term=REEP1
RELL1	RELT like 1	https://www.ncbi.nlm.nih.gov/genome/?term=RELL1
RELT	RELT TNF receptor	https://www.ncbi.nlm.nih.gov/genome/?term=RELT
RET	ret proto-oncogene	https://www.ncbi.nlm.nih.gov/genome/?term=RET
RFTN2	raftlin family member 2	https://www.ncbi.nlm.nih.gov/genome/?term=RFTN2
RG9MTD3	tRNA methyltransferase 10B	https://www.ncbi.nlm.nih.gov/genome/?term=RG9MTD3
RHBDD1	rhomboid domain containing 1	https://www.ncbi.nlm.nih.gov/genome/?term=RHBDD1
RHPN1	rhophilin Rho GTPase binding protein 1	https://www.ncbi.nlm.nih.gov/genome/?term=RHPN1
RIMKLA	ribosomal modification protein rimK like family member A	https://www.ncbi.nlm.nih.gov/genome/?term=RIMKLA
RNASE6	ribonuclease A family member k6	https://www.ncbi.nlm.nih.gov/genome/?term=RNASE6
RNF103	ring finger protein 103	https://www.ncbi.nlm.nih.gov/genome/?term=RNF103
RNF144B	ring finger protein 144B	https://www.ncbi.nlm.nih.gov/genome/?term=RNF144B
RNPC3	RNA binding region (RNP1, RRM) containing 3	https://www.ncbi.nlm.nih.gov/genome/?term=RNPC3
ROBO1	roundabout guidance receptor 1	https://www.ncbi.nlm.nih.gov/genome/?term=ROBO1
RPL3	ribosomal protein L3	https://www.ncbi.nlm.nih.gov/genome/?term=RPL3
RPL31	ribosomal protein L31	https://www.ncbi.nlm.nih.gov/genome/?term=RPL31

RRN3	RRN3 homolog, RNA polymerase I transcription factor	https://www.ncbi.nlm.nih.gov/genome/?term=RRN3
RRN3P1	RRN3 pseudogene 1	https://www.ncbi.nlm.nih.gov/genome/?term=RRN3P1
RRNRP2		
RSL1D1	ribosomal L1 domain containing 1	https://www.ncbi.nlm.nih.gov/genome/?term=RSL1D1
RSPO2	R-spondin 2	https://www.ncbi.nlm.nih.gov/genome/?term=RSPO2
RTP3	receptor transporter protein 3	https://www.ncbi.nlm.nih.gov/genome/?term=RTP3
RXFP2	relaxin family peptide receptor 2	https://www.ncbi.nlm.nih.gov/genome/?term=RXFP2
RYR1	ryanodine receptor 1	https://www.ncbi.nlm.nih.gov/genome/?term=RYR1
S100A12	S100 calcium binding protein A12	https://www.ncbi.nlm.nih.gov/genome/?term=S100A12
SAE1	SUMO1 activating enzyme subunit 1	https://www.ncbi.nlm.nih.gov/genome/?term=SAE1
SCARB2	scavenger receptor class B member 2	https://www.ncbi.nlm.nih.gov/genome/?term=SCARB2
SCN9A	sodium voltage-gated channel alpha subunit 9	https://www.ncbi.nlm.nih.gov/genome/?term=SCN9A
SCP2D1	SCP2 sterol binding domain containing 1	https://www.ncbi.nlm.nih.gov/genome/?term=SCP2D1
SCPEP1	serine carboxypeptidase 1	https://www.ncbi.nlm.nih.gov/genome/?term=SCPEP1
SCRIB	scribble planar cell polarity protein	https://www.ncbi.nlm.nih.gov/genome/?term=SCRIB
SDAD1	SDA1 domain containing 1	https://www.ncbi.nlm.nih.gov/genome/?term=SDAD1
SDHAF3	succinate dehydrogenase complex assembly factor 3	https://www.ncbi.nlm.nih.gov/genome/?term=SDHAF3
SDK2	sidekick cell adhesion molecule 2	https://www.ncbi.nlm.nih.gov/genome/?term=SDK2
SEC24A	SEC24 homolog A, COPII coat complex component	https://www.ncbi.nlm.nih.gov/genome/?term=SEC24A
SEC63	SEC63 homolog, protein translocation regulator	https://www.ncbi.nlm.nih.gov/genome/?term=SEC63
SEMA3D	semaphorin 3D	https://www.ncbi.nlm.nih.gov/genome/?term=SEMA3D
SEMA6A	semaphorin 6A	https://www.ncbi.nlm.nih.gov/genome/?term=SEMA6A
SENP5	SUMO specific peptidase 5	https://www.ncbi.nlm.nih.gov/genome/?term=SENP5
SENP7	SUMO specific peptidase 7	https://www.ncbi.nlm.nih.gov/genome/?term=SENP7
SEPT10	septin 10	https://www.ncbi.nlm.nih.gov/genome/?term=SEPT10
SERINC3	serine incorporator 3	https://www.ncbi.nlm.nih.gov/genome/?term=SERINC3
SETBP1	SET binding protein 1	https://www.ncbi.nlm.nih.gov/genome/?term=SETBP1

SETD9	SET domain containing 9	https://www.ncbi.nlm.nih.gov/genome/?term=SETD9
SETMAR	SET domain and mariner transposase fusion gene	https://www.ncbi.nlm.nih.gov/genome/?term=SETMAR
SF3B1	splicing factor 3b subunit 1	https://www.ncbi.nlm.nih.gov/genome/?term=Sf3b1
SGCD	sarcoglycan delta	https://www.ncbi.nlm.nih.gov/genome/?term=SGCD
SH2D5	SH2 domain containing 5	https://www.ncbi.nlm.nih.gov/genome/?term=SH2D5
SH3GL2	SH3 domain containing GRB2 like 2, endophilin A1	https://www.ncbi.nlm.nih.gov/genome/?term=SH3GL2
SHC4	SHC adaptor protein 4	https://www.ncbi.nlm.nih.gov/genome/?term=SHC4
SIAE	sialic acid acetyltransferase	https://www.ncbi.nlm.nih.gov/genome/?term=SIAE
SKA2	spindle and kinetochore associated complex subunit 2	https://www.ncbi.nlm.nih.gov/genome/?term=SKA2
SKI	SKI proto-oncogene	https://www.ncbi.nlm.nih.gov/genome/?term=SKI
SKP1	S-phase kinase associated protein 1	https://www.ncbi.nlm.nih.gov/genome/?term=SKP1
SLC22A13	solute carrier family 22 member 13	https://www.ncbi.nlm.nih.gov/genome/?term=SLC22A13
SLC22A15	solute carrier family 22 member 15	https://www.ncbi.nlm.nih.gov/genome/?term=SLC22A15
SLC22A18	solute carrier family 22 member 18	https://www.ncbi.nlm.nih.gov/genome/?term=SLC22A18
SLC25A38	solute carrier family 25 member 38	https://www.ncbi.nlm.nih.gov/genome/?term=SLC25A38
SLC35D1	solute carrier family 35 member D1	https://www.ncbi.nlm.nih.gov/genome/?term=SLC35D1
SLC35F5	solute carrier family 35 member F5	https://www.ncbi.nlm.nih.gov/genome/?term=SLC35F5
SLC39A7	solute carrier family 39 member 7	https://www.ncbi.nlm.nih.gov/genome/?term=SLC39A7
SLC39A8	solute carrier family 39 member 8	https://www.ncbi.nlm.nih.gov/genome/?term=SLC39A8
SLC41A2	solute carrier family 41 member 2	https://www.ncbi.nlm.nih.gov/genome/?term=SLC41A2
SLC43A1	solute carrier family 43 member 1	https://www.ncbi.nlm.nih.gov/genome/?term=SLC43A1
SLC46A1	solute carrier family 46 member 1	https://www.ncbi.nlm.nih.gov/genome/?term=SLC46A1
SLC5A1	solute carrier family 5 member 1	https://www.ncbi.nlm.nih.gov/genome/?term=SLC5A1
SLC5A4	solute carrier family 5 member 4	https://www.ncbi.nlm.nih.gov/genome/?term=SLC5A4
SLC6A1	solute carrier family 6 member 1	https://www.ncbi.nlm.nih.gov/genome/?term=SLC6A1
SLC6A17	solute carrier family 6 member 17	https://www.ncbi.nlm.nih.gov/genome/?term=SLC6A17
SLC9A6	solute carrier family 9 member A6	https://www.ncbi.nlm.nih.gov/genome/?term=SLC9A6

SLCO1A2	solute carrier organic anion transporter family member 1A2	https://www.ncbi.nlm.nih.gov/genome/?term=SLCO1A2
SMAD2	SMAD family member 2	https://www.ncbi.nlm.nih.gov/genome/?term=SMAD2
SMC4	structural maintenance of chromosomes 4	https://www.ncbi.nlm.nih.gov/genome/?term=SMC4
SMG1	SMG1 nonsense mediated mRNA decay associated PI3K related kinase	https://www.ncbi.nlm.nih.gov/genome/?term=SMG1
SMG6	SMG6 nonsense mediated mRNA decay factor	https://www.ncbi.nlm.nih.gov/genome/?term=SMG6
SMIM23	small integral membrane protein 23	https://www.ncbi.nlm.nih.gov/genome/?term=SMIM23
SMO	smoothened, frizzled class receptor	https://www.ncbi.nlm.nih.gov/genome/?term=SMO
SMYD2	SET and MYND domain containing 2	https://www.ncbi.nlm.nih.gov/genome/?term=SMYD2
SNAP29	synaptosome associated protein 29	https://www.ncbi.nlm.nih.gov/genome/?term=SNAP29
SNCG	synuclein gamma	https://www.ncbi.nlm.nih.gov/genome/?term=SNCG
SNRPD1	small nuclear ribonucleoprotein D1 polypeptide	https://www.ncbi.nlm.nih.gov/genome/?term=SNRPD1
SOCS4	suppressor of cytokine signaling 4	https://www.ncbi.nlm.nih.gov/genome/?term=SOCS4
SOX10	SRY-box transcription factor 10	https://www.ncbi.nlm.nih.gov/genome/?term=SOX10
SOX2	SRY-box transcription factor 2	https://www.ncbi.nlm.nih.gov/genome/?term=SOX2
SOX6	SRY-box transcription factor 6	https://www.ncbi.nlm.nih.gov/genome/?term=SOX6
SOX9	SRY-box transcription factor 9	https://www.ncbi.nlm.nih.gov/genome/?term=SOX9
SPATA19	spermatogenesis associated 19	https://www.ncbi.nlm.nih.gov/genome/?term=SPATA19
SPATA21	spermatogenesis associated 21	https://www.ncbi.nlm.nih.gov/genome/?term=SPATA21
SPATA7	spermatogenesis associated 7	https://www.ncbi.nlm.nih.gov/genome/?term=SPATA7
SPERT	chibby family member 2	https://www.ncbi.nlm.nih.gov/genome/?term=SPERT
SPHKAP	SPHK1 interactor, AKAP domain containing	https://www.ncbi.nlm.nih.gov/genome/?term=SPHKAP
SPINT1	serine peptidase inhibitor, Kunitz type 1	https://www.ncbi.nlm.nih.gov/genome/?term=SPINT1
SPTAN1	spectrin alpha, non-erythrocytic 1	https://www.ncbi.nlm.nih.gov/genome/?term=SPTAN1
SPTBN5	spectrin beta, non-erythrocytic 5	https://www.ncbi.nlm.nih.gov/genome/?term=SPTBN5
SREBF1	sterol regulatory element binding transcription factor 1	https://www.ncbi.nlm.nih.gov/genome/?term=SREBF1
SRP72	signal recognition particle 72	https://www.ncbi.nlm.nih.gov/genome/?term=SRP72
SRRM2	serine/arginine repetitive matrix 2	https://www.ncbi.nlm.nih.gov/genome/?term=SRRM2

STAB1	stabilin 1	https://www.ncbi.nlm.nih.gov/genome/?term=STAB1
STARD5	StAR related lipid transfer domain containing 5	https://www.ncbi.nlm.nih.gov/genome/?term=STARD5
STARD6	StAR related lipid transfer domain containing 6	https://www.ncbi.nlm.nih.gov/genome/?term=STARD6
STC2	stanniocalcin 2	https://www.ncbi.nlm.nih.gov/genome/?term=STC2
STK10	serine/threonine kinase 10	https://www.ncbi.nlm.nih.gov/genome/?term=STK10
STK11IP	serine/threonine kinase 11 interacting protein	https://www.ncbi.nlm.nih.gov/genome/?term=STK11IP
STS	steroid sulfatase	https://www.ncbi.nlm.nih.gov/genome/?term=STS
STX7	syntaxin 7	https://www.ncbi.nlm.nih.gov/genome/?term=STX7
STXBP6	syntaxin binding protein 6	https://www.ncbi.nlm.nih.gov/genome/?term=STXBP6
SUN3	Sad1 and UNC84 domain containing 3	https://www.ncbi.nlm.nih.gov/genome/?term=SUN3
SURF2	surfeit 2	https://www.ncbi.nlm.nih.gov/genome/?term=SURF2
SUSD3	sushi domain containing 3	https://www.ncbi.nlm.nih.gov/genome/?term=SUSD3
SYNJ2	synaptojanin 2	https://www.ncbi.nlm.nih.gov/genome/?term=SYNJ2
SYNM	synemin	https://www.ncbi.nlm.nih.gov/genome/?term=SYNM
SYTL1	synaptotagmin like 1	https://www.ncbi.nlm.nih.gov/genome/?term=SYTL1
TAOK1	TAO kinase 1	https://www.ncbi.nlm.nih.gov/genome/?term=TAOK1
TAS2R1	taste 2 receptor member 1	https://www.ncbi.nlm.nih.gov/genome/?term=TAS2R1
TAS2R16	taste 2 receptor member 16	https://www.ncbi.nlm.nih.gov/genome/?term=TAS2R16
TAS2R3	taste 2 receptor member 3	https://www.ncbi.nlm.nih.gov/genome/?term=TAS2R3
TAS2R38	taste 2 receptor member 38	https://www.ncbi.nlm.nih.gov/genome/?term=TAS2R38
TBC1D9	TBC1 domain family member 9	https://www.ncbi.nlm.nih.gov/genome/?term=TBC1D9
TBXAS1	thromboxane A synthase 1	https://www.ncbi.nlm.nih.gov/genome/?term=TBXAS1
TCOF1	treacle ribosome biogenesis factor 1	https://www.ncbi.nlm.nih.gov/genome/?term=TCOF1
TCTN1	tectonic family member 1	https://www.ncbi.nlm.nih.gov/genome/?term=TCTN1
TCTN3	tectonic family member 3	https://www.ncbi.nlm.nih.gov/genome/?term=TCTN3
TEKT3	tektin 3	https://www.ncbi.nlm.nih.gov/genome/?term=TEKT3
TEX14	testis expressed 14, intercellular bridge forming factor	https://www.ncbi.nlm.nih.gov/genome/?term=TEX14

TF	transferrin	https://www.ncbi.nlm.nih.gov/genome/?term=TF
TFCP2L1	transcription factor CP2 like 1	https://www.ncbi.nlm.nih.gov/genome/?term=TFCP2L1
TH	tyrosine hydroxylase	https://www.ncbi.nlm.nih.gov/genome/?term=TH
THBS2	thrombospondin 2	https://www.ncbi.nlm.nih.gov/genome/?term=THBS2
THEGL	theg spermatid protein like	https://www.ncbi.nlm.nih.gov/genome/?term=THEGL
THUMPD1	THUMP domain containing 1	https://www.ncbi.nlm.nih.gov/genome/?term=THUMPD1
THYN1	thymocyte nuclear protein 1	https://www.ncbi.nlm.nih.gov/genome/?term=THYN1
TLX3	T cell leukemia homeobox 3	https://www.ncbi.nlm.nih.gov/genome/?term=TLX3
TMEM114	transmembrane protein 114	https://www.ncbi.nlm.nih.gov/genome/?term=TMEM114
TMEM132D	transmembrane protein 132D	https://www.ncbi.nlm.nih.gov/genome/?term=TMEM132D
TMEM159	transmembrane protein 159	https://www.ncbi.nlm.nih.gov/genome/?term=TMEM159
TMEM182	transmembrane protein 182	https://www.ncbi.nlm.nih.gov/genome/?term=TMEM182
TMEM242	transmembrane protein 242	https://www.ncbi.nlm.nih.gov/genome/?term=TMEM242
TMEM59L	transmembrane protein 59 like	https://www.ncbi.nlm.nih.gov/genome/?term=TMEM59L
TMEM71	transmembrane protein 71	https://www.ncbi.nlm.nih.gov/genome/?term=TMEM71
TNFRSF9	TNF receptor superfamily member 9	https://www.ncbi.nlm.nih.gov/genome/?term=TNFRSF9
TNKS2	tankyrase 2	https://www.ncbi.nlm.nih.gov/genome/?term=TNKS2
TOE1	target of EGR1, exonuclease	https://www.ncbi.nlm.nih.gov/genome/?term=TOE1
TP53BP1	tumor protein p53 binding protein 1	https://www.ncbi.nlm.nih.gov/genome/?term=TP53BP1
TPH1	tryptophan hydroxylase 1	https://www.ncbi.nlm.nih.gov/genome/?term=TPH1
TRA2B	transformer 2 beta homolog	https://www.ncbi.nlm.nih.gov/genome/?term=TRA2B
TRAPPC8	trafficking protein particle complex 8	https://www.ncbi.nlm.nih.gov/genome/?term=TRAPPC8
TRBV25OR9-2	T cell receptor beta variable 25/OR9-2 (pseudogene)	https://www.ncbi.nlm.nih.gov/genome/?term=TRBV25OR9-2
TRDN	triadin	https://www.ncbi.nlm.nih.gov/genome/?term=TRDN
TRIM16	tripartite motif containing 16	https://www.ncbi.nlm.nih.gov/genome/?term=TRIM16
TRIM59	tripartite motif containing 59	https://www.ncbi.nlm.nih.gov/genome/?term=TRIM59
TRIO	trio Rho guanine nucleotide exchange factor	https://www.ncbi.nlm.nih.gov/genome/?term=TRIO

TRMT61A	tRNA methyltransferase 61A	https://www.ncbi.nlm.nih.gov/genome/?term=TRMT61A
TRPM1	transient receptor potential cation channel subfamily M member 1	https://www.ncbi.nlm.nih.gov/genome/?term=TRPM1
TRPV6	transient receptor potential cation channel subfamily V member 6	https://www.ncbi.nlm.nih.gov/genome/?term=TRPV6
TRY1	serine protease 1	https://www.ncbi.nlm.nih.gov/genome/?term=TRY1
TRY2	serine protease 2	https://www.ncbi.nlm.nih.gov/genome/?term=TRY2
TRY3	serine protease 3	https://www.ncbi.nlm.nih.gov/genome/?term=TRY3
TSTD2	thiosulfate sulfurtransferase like domain containing 2	https://www.ncbi.nlm.nih.gov/genome/?term=TSTD2
TTC21B	tetratricopeptide repeat domain 21B	https://www.ncbi.nlm.nih.gov/genome/?term=TTC21B
TTC39A	tetratricopeptide repeat domain 39A	https://www.ncbi.nlm.nih.gov/genome/?term=TTC39A
TUBGCP5	tubulin gamma complex associated protein 5	https://www.ncbi.nlm.nih.gov/genome/?term=TUBGCP5
TVP23B	trans-golgi network vesicle protein 23 homolog B	https://www.ncbi.nlm.nih.gov/genome/?term=TVP23B
TVP23C	trans-golgi network vesicle protein 23 homolog C	https://www.ncbi.nlm.nih.gov/genome/?term=TVP23C
TXN2	thioredoxin 2	https://www.ncbi.nlm.nih.gov/genome/?term=TXN2
TXNRD2	thioredoxin reductase 2	https://www.ncbi.nlm.nih.gov/genome/?term=TXNRD2
TYK2	tyrosine kinase 2	https://www.ncbi.nlm.nih.gov/genome/?term=TYK2
TYRP1	tyrosinase related protein 1	https://www.ncbi.nlm.nih.gov/genome/?term=TYRP1
U2	RNA, U2 small nuclear 1	https://www.ncbi.nlm.nih.gov/genome/?term=U2
UBE2B	ubiquitin conjugating enzyme E2 B	https://www.ncbi.nlm.nih.gov/genome/?term=UBE2B
UBXN10	UBX domain protein 10	https://www.ncbi.nlm.nih.gov/genome/?term=UBXN10
ULBP3	UL16 binding protein 3	https://www.ncbi.nlm.nih.gov/genome/?term=ULBP3
UMOD	uromodulin	https://www.ncbi.nlm.nih.gov/genome/?term=UMOD
UNC93A	unc-93 homolog A	https://www.ncbi.nlm.nih.gov/genome/?term=UNC93A
URB2	URB2 ribosome biogenesis homolog	https://www.ncbi.nlm.nih.gov/genome/?term=URB2
USP45	ubiquitin specific peptidase 45	https://www.ncbi.nlm.nih.gov/genome/?term=USP45
UVRAG	UV radiation resistance associated	https://www.ncbi.nlm.nih.gov/genome/?term=UVRAG
V1R	vomeroneasal 1 receptor 51	https://www.ncbi.nlm.nih.gov/genome/?term=V1R
VDAC1	voltage dependent anion channel 1	https://www.ncbi.nlm.nih.gov/genome/?term=VDAC1

VEZT	vezatin, adherens junctions transmembrane protein	https://www.ncbi.nlm.nih.gov/genome/?term=VEZT
VPS26B	VPS26, retromer complex component B	https://www.ncbi.nlm.nih.gov/genome/?term=VPS26B
VRK1	VRK serine/threonine kinase 1	https://www.ncbi.nlm.nih.gov/genome/?term=VRK1
VWC2	von Willebrand factor C domain containing 2	https://www.ncbi.nlm.nih.gov/genome/?term=VWC2
VWDE	von Willebrand factor D and EGF domains	https://www.ncbi.nlm.nih.gov/genome/?term=VWDE
WASF3	WASP family member 3	https://www.ncbi.nlm.nih.gov/genome/?term=WASF3
WDR17	WD repeat domain 17	https://www.ncbi.nlm.nih.gov/genome/?term=WDR17
WDR62	WD repeat domain 62	https://www.ncbi.nlm.nih.gov/genome/?term=WDR62
WDR90	WD repeat domain 90	https://www.ncbi.nlm.nih.gov/genome/?term=WDR90
WFDC8	WAP four-disulfide core domain 8	https://www.ncbi.nlm.nih.gov/genome/?term=WFDC8
WIPF2	WAS/WASL interacting protein family member 2	https://www.ncbi.nlm.nih.gov/genome/?term=WIPF2
WIPF3	WAS/WASL interacting protein family member 3	https://www.ncbi.nlm.nih.gov/genome/?term=WIPF3
WNK2	WNK lysine deficient protein kinase 2	https://www.ncbi.nlm.nih.gov/genome/?term=WNK2
WWC1	WW and C2 domain containing 1	https://www.ncbi.nlm.nih.gov/genome/?term=WWC1
XCR1	X-C motif chemokine receptor 1	https://www.ncbi.nlm.nih.gov/genome/?term=XCR1
XPBP	X-C motif chemokine receptor 1	https://www.ncbi.nlm.nih.gov/genome/?term=XPBP
XPC	XPC complex subunit, DNA damage recognition and repair factor	https://www.ncbi.nlm.nih.gov/genome/?term=XPC
XPO6	exportin 6	https://www.ncbi.nlm.nih.gov/genome/?term=XPO6
YSK4	mitogen-activated protein kinase kinase kinase 19	https://www.ncbi.nlm.nih.gov/genome/?term=YSK4
YWHAH	tyrosine 3-monooxygenase/tryptophan 5-monooxygenase activation protein eta	https://www.ncbi.nlm.nih.gov/genome/?term=YWHAH
ZC3H3	zinc finger CCCH-type containing 3	https://www.ncbi.nlm.nih.gov/genome/?term=ZC3H3
ZFAT	zinc finger and AT-hook domain containing	https://www.ncbi.nlm.nih.gov/genome/?term=ZFAT
ZFYVE19	zinc finger FYVE-type containing 19	https://www.ncbi.nlm.nih.gov/genome/?term=ZFYVE19
ZMYND10	zinc finger MYND-type containing 10	https://www.ncbi.nlm.nih.gov/genome/?term=ZMYND10
ZNF236	zinc finger protein 236	https://www.ncbi.nlm.nih.gov/genome/?term=ZNF236
ZNF286A	zinc finger protein 286A	https://www.ncbi.nlm.nih.gov/genome/?term=ZNF286A
ZNF286B	zinc finger protein 286B (pseudogene)	https://www.ncbi.nlm.nih.gov/genome/?term=ZNF286B

ZNF436	zinc finger protein 436	https://www.ncbi.nlm.nih.gov/genome/?term=ZNF436
ZNF492	zinc finger protein 492	https://www.ncbi.nlm.nih.gov/genome/?term=ZNF492
ZNF516	zinc finger protein 516	https://www.ncbi.nlm.nih.gov/genome/?term=ZNF516
ZNF521	zinc finger protein 521	https://www.ncbi.nlm.nih.gov/genome/?term=ZNF521
ZNF555	zinc finger protein 555	https://www.ncbi.nlm.nih.gov/genome/?term=ZNF555
ZNF622	zinc finger protein 622	https://www.ncbi.nlm.nih.gov/genome/?term=ZNF622
ZNF679	zinc finger protein 679	https://www.ncbi.nlm.nih.gov/genome/?term=ZNF679
ZNF780B	zinc finger protein 780B	https://www.ncbi.nlm.nih.gov/genome/?term=ZNF780B
ZP2	zona pellucida glycoprotein 2	https://www.ncbi.nlm.nih.gov/genome/?term=ZP2
ZPBP	zona pellucida binding protein	https://www.ncbi.nlm.nih.gov/genome/?term=ZPBP
ZZEF1	zinc finger ZZ-type and EF-hand domain containing 1	https://www.ncbi.nlm.nih.gov/genome/?term=ZZEF1

Supplemental File 1b: List of candidate Neural Crest genes and their annotated terms (Benítez-Burraco et al., 2017)

Gene abbreviation	Gene name	NCBI link
ALX1	<u>ALX homeobox 1</u>	https://www.ncbi.nlm.nih.gov/gene/?term=ALX1
ALX3	<u>ALX homeobox 3</u>	https://www.ncbi.nlm.nih.gov/gene/?term=ALX3
ALX4	<u>ALX homeobox 4</u>	https://www.ncbi.nlm.nih.gov/gene/?term=ALX4
ASCL1	<u>achaete-scute family bHLH transcription factor 1</u>	https://www.ncbi.nlm.nih.gov/gene/?term=ASCL1
BDNF	<u>brain derived neurotrophic factor</u>	https://www.ncbi.nlm.nih.gov/gene/?term=BDNF
BMP2	<u>bone morphogenetic protein 2</u>	https://www.ncbi.nlm.nih.gov/gene/?term=BMP2
BMP4	<u>bone morphogenetic protein 4</u>	https://www.ncbi.nlm.nih.gov/gene/?term=BMP4
BMP7	<u>bone morphogenetic protein 7</u>	https://www.ncbi.nlm.nih.gov/gene/?term=BMP7
CAD7	<u>cadherin 7</u>	https://www.ncbi.nlm.nih.gov/gene/?term=CAD7
CDH2	<u>cadherin 2</u>	https://www.ncbi.nlm.nih.gov/gene/?term=CDH2
CDH6	<u>cadherin 6</u>	https://www.ncbi.nlm.nih.gov/gene/?term=CDH6
CMYC	<u>MYC proto-oncogene, bHLH transcription factor</u>	https://www.ncbi.nlm.nih.gov/gene/?term=CMYC
COL1A2	<u>collagen type I alpha 2 chain</u>	https://www.ncbi.nlm.nih.gov/gene/?term=COL1A2
COL2A1	<u>collagen type II alpha 1 chain</u>	https://www.ncbi.nlm.nih.gov/gene/?term=COL2A1
CRKL	<u>CRK like proto-oncogene, adaptor protein</u>	https://www.ncbi.nlm.nih.gov/gene/?term=CRKL
DCT	<u>dopachrome tautomerase</u>	https://www.ncbi.nlm.nih.gov/gene/?term=DCT
DLX5	<u>distal-less homeobox 5</u>	https://www.ncbi.nlm.nih.gov/gene/?term=DLX5
DLX6	<u>distal-less homeobox 6</u>	https://www.ncbi.nlm.nih.gov/gene/?term=DLX6
EDN1	<u>endothelin 1</u>	https://www.ncbi.nlm.nih.gov/gene/?term=EDN1
EDN3	<u>endothelin 3</u>	https://www.ncbi.nlm.nih.gov/gene/?term=EDN3
EDNRA	<u>endothelin receptor type A</u>	https://www.ncbi.nlm.nih.gov/gene/?term=EDNRA
EDNRB	<u>endothelin receptor type B</u>	https://www.ncbi.nlm.nih.gov/gene/?term=EDNRB
EFNB1	<u>ephrin B1</u>	https://www.ncbi.nlm.nih.gov/gene/?term=EFNB1
EFNB2	<u>ephrin B2</u>	https://www.ncbi.nlm.nih.gov/gene/?term=EFNB2

<u>ETS1</u>	<u>ETS proto-oncogene 1, transcription factor</u>	https://www.ncbi.nlm.nih.gov/gene/?term=ETS1
<u>FGF2</u>	<u>fibroblast growth factor 2</u>	https://www.ncbi.nlm.nih.gov/gene/?term=FGF2
<u>FGF8</u>	<u>fibroblast growth factor 8</u>	https://www.ncbi.nlm.nih.gov/gene/?term=FGF8
<u>FOXD3</u>	<u>forkhead box D3</u>	https://www.ncbi.nlm.nih.gov/gene/?term=FOXD3
<u>GBX2</u>	<u>gastrulation brain homeobox 2</u>	https://www.ncbi.nlm.nih.gov/gene/?term=GBX2
<u>GDNF</u>	<u>glial cell derived neurotrophic factor</u>	https://www.ncbi.nlm.nih.gov/gene/?term=GDNF
<u>GFAP</u>	<u>glial fibrillary acidic protein</u>	https://www.ncbi.nlm.nih.gov/gene/?term=GFAP
<u>GJB1</u>	<u>gap junction protein beta 1</u>	https://www.ncbi.nlm.nih.gov/gene/?term=GJB1
<u>GLI3</u>	<u>GLI family zinc finger 3</u>	https://www.ncbi.nlm.nih.gov/gene/?term=GLI3
<u>GSC</u>	<u>goosecoid homeobox</u>	https://www.ncbi.nlm.nih.gov/gene/?term=GSC
<u>HDAC</u>	<u>histone deacetylase 9</u>	https://www.ncbi.nlm.nih.gov/gene/?term=HDAC
<u>HES1</u>	<u>hes family bHLH transcription factor 1</u>	https://www.ncbi.nlm.nih.gov/gene/?term=HES1
<u>HES5</u>	<u>hes family bHLH transcription factor 5</u>	https://www.ncbi.nlm.nih.gov/gene/?term=HES5
<u>HOXA1</u>	<u>homeobox A1</u>	https://www.ncbi.nlm.nih.gov/gene/?term=HOXA1
<u>HOXA2</u>	<u>homeobox A2</u>	https://www.ncbi.nlm.nih.gov/gene/?term=HOXA2
<u>HOXA3</u>	<u>homeobox A3</u>	https://www.ncbi.nlm.nih.gov/gene/?term=HOXA3
<u>HOXB1</u>	<u>homeobox B1</u>	https://www.ncbi.nlm.nih.gov/gene/?term=HOXB1
<u>ID3</u>	<u>inhibitor of DNA binding 3, HLH protein</u>	https://www.ncbi.nlm.nih.gov/gene/?term=ID3
<u>ISL1</u>	<u>ISL LIM homeobox 1</u>	https://www.ncbi.nlm.nih.gov/gene/?term=ISL1
<u>ITGB1</u>	<u>integrin subunit beta 1</u>	https://www.ncbi.nlm.nih.gov/gene/?term=ITGB1
<u>KIF1B</u>	<u>kinesin family member 1B</u>	https://www.ncbi.nlm.nih.gov/gene/?term=KIF1B
<u>LHX1</u>	<u>LIM homeobox 1</u>	https://www.ncbi.nlm.nih.gov/gene/?term=LHX1
<u>LHX2</u>	<u>LIM homeobox 2</u>	https://www.ncbi.nlm.nih.gov/gene/?term=LHX2
<u>MASH1</u>	<u>achaete-scute family bHLH transcription factor 1</u>	https://www.ncbi.nlm.nih.gov/gene/?term=MASH1
<u>MAX</u>	<u>MYC associated factor X</u>	https://www.ncbi.nlm.nih.gov/gene/?term=MAX
<u>MITF</u>	<u>melanocyte inducing transcription factor</u>	https://www.ncbi.nlm.nih.gov/gene/?term=MITF
<u>MSX1</u>	<u>msh homeobox 1</u>	https://www.ncbi.nlm.nih.gov/gene/?term=MSX1

<u>MSX2</u>	<u>msh homeobox 2</u>	https://www.ncbi.nlm.nih.gov/gene/?term=MSX2
<u>NEUROD</u>	<u>neuronal differentiation 1</u>	https://www.ncbi.nlm.nih.gov/gene/?term=NEUROD
<u>NEUROG1</u>	<u>neurogenin 1</u>	https://www.ncbi.nlm.nih.gov/gene/?term=NEUROG1
<u>NF1</u>	<u>neurofibromin 1</u>	https://www.ncbi.nlm.nih.gov/gene/?term=NF1
<u>NFKB</u>	<u>nuclear factor kappa B subunit 1</u>	https://www.ncbi.nlm.nih.gov/gene/?term=NFKB
<u>NOTCH</u>	<u>notch receptor 1</u>	https://www.ncbi.nlm.nih.gov/gene/?term=NOTCH
<u>NRP1</u>	<u>neuropilin 1</u>	https://www.ncbi.nlm.nih.gov/gene/?term=NRP1
<u>NRP2</u>	<u>neuropilin 2</u>	https://www.ncbi.nlm.nih.gov/gene/?term=NRP2
<u>OLIG1</u>	<u>oligodendrocyte transcription factor 1</u>	https://www.ncbi.nlm.nih.gov/gene/?term=OLIG1
<u>OLIG2</u>	<u>oligodendrocyte transcription factor 2</u>	https://www.ncbi.nlm.nih.gov/gene/?term=OLIG2
<u>PAX3</u>	<u>paired box 3</u>	https://www.ncbi.nlm.nih.gov/gene/?term=PAX3
<u>PAX7</u>	<u>paired box 7</u>	https://www.ncbi.nlm.nih.gov/gene/?term=PAX7
<u>PHOX2B</u>	<u>paired like homeobox 2B</u>	https://www.ncbi.nlm.nih.gov/gene/?term=PHOX2B
<u>PMP22</u>	<u>peroxisomal membrane protein 2</u>	https://www.ncbi.nlm.nih.gov/gene/?term=PMP22
<u>POMT1</u>	<u>protein O-mannosyltransferase 1</u>	https://www.ncbi.nlm.nih.gov/gene/?term=POMT1
<u>RET</u>	<u>ret proto-oncogene</u>	https://www.ncbi.nlm.nih.gov/gene/?term=RET
<u>RHOB</u>	<u>ras homolog family member B</u>	https://www.ncbi.nlm.nih.gov/gene/?term=RHOB
<u>ROBO1</u>	<u>roundabout guidance receptor 1</u>	https://www.ncbi.nlm.nih.gov/gene/?term=ROBO1
<u>ROBO2</u>	<u>roundabout guidance receptor 2</u>	https://www.ncbi.nlm.nih.gov/gene/?term=ROBO2
<u>SDHB</u>	<u>succinate dehydrogenase complex iron sulfur subunit B</u>	https://www.ncbi.nlm.nih.gov/gene/?term=SDHB
<u>SDHD</u>	<u>succinate dehydrogenase complex subunit D</u>	https://www.ncbi.nlm.nih.gov/gene/?term=SDHD
<u>SNAIL1</u>	<u>snail family transcriptional repressor 1</u>	https://www.ncbi.nlm.nih.gov/gene/?term=SNAIL1
<u>SNAIL2</u>	<u>snail family transcriptional repressor 2</u>	https://www.ncbi.nlm.nih.gov/gene/?term=SNAIL2
<u>SOX10</u>	<u>SRY-box transcription factor 10</u>	https://www.ncbi.nlm.nih.gov/gene/?term=SOX10
<u>SOX5</u>	<u>SRY-box transcription factor 5</u>	https://www.ncbi.nlm.nih.gov/gene/?term=SOX5
<u>SOX9</u>	<u>SRY-box transcription factor 9</u>	https://www.ncbi.nlm.nih.gov/gene/?term=SOX9
<u>TBX1</u>	<u>T-box transcription factor 1</u>	https://www.ncbi.nlm.nih.gov/gene/?term=TBX1

<u>TFAP2A</u>	<u>transcription factor AP-2 alpha</u>	https://www.ncbi.nlm.nih.gov/gene/?term=TFAP2A
<u>TMEM127</u>	<u>transmembrane protein 127</u>	https://www.ncbi.nlm.nih.gov/gene/?term=TMEM127
<u>TWIST</u>	<u>twist family bHLH transcription factor 1</u>	https://www.ncbi.nlm.nih.gov/gene/?term=TWIST
<u>VHL</u>	<u>von Hippel-Lindau tumor suppressor</u>	https://www.ncbi.nlm.nih.gov/gene/?term=VHL
<u>WNT1</u>	<u>Wnt family member 1</u>	https://www.ncbi.nlm.nih.gov/gene/?term=WNT1
<u>WNT3a</u>	<u>Wnt family member 3A</u>	https://www.ncbi.nlm.nih.gov/gene/?term=WNT3a
<u>WNT6</u>	<u>Wnt family member 6</u>	https://www.ncbi.nlm.nih.gov/gene/?term=WNT6
<u>WNT7B</u>	<u>Wnt family member 7B</u>	https://www.ncbi.nlm.nih.gov/gene/?term=WNT7B
<u>WNT8</u>	<u>dickkopf WNT signaling pathway inhibitor 1</u>	https://www.ncbi.nlm.nih.gov/gene/?term=WNT8
<u>ZEB2</u>	<u>zinc finger E-box binding homeobox 2</u>	https://www.ncbi.nlm.nih.gov/gene/?term=ZEB2
<u>ZIC1</u>	<u>Zic family member 1</u>	https://www.ncbi.nlm.nih.gov/gene/?term=ZIC1

Supplemental File 2: List of HUGO gene IDs for genes tested for positive selection

TNMD
C1orf112
NIPAL3
ENPP4
CFTR
CYP51A1
KRIT1
LAP3
HS3ST1
WNT16
HECW1
MAD1L1
LASP1
SNX11
RBM5
SARM1
KDM1A
RBM6
CAMKK1
RECQL
VPS50
HSPB6
ARHGAP33
NDUFAB1
PDK4
ZMYND10
ABCB5
CDC27
CALCR
FBXL3
ITGAL
PDK2
ITGA3
ZFX
LAMP2
ITGA2B
ASB4
GDE1
REX1BD
ABCC8
CACNG3
TMEM132A
TAC1
ZNF263
SPATA20
CACNA1G
TNFRSF12A
DLX6
MAP3K9
RALA
BAIAP2L1
KDM7A

ETV1
AGK
ALDH3B1
TTC22
PHTF2
USH1C
GGCT
DBF4
TBXA2R
IFRD1
COX10
GTF2IRD1
PAF1
VPS41
ARHGAP44
ELAC2
SCIN
CDKL3
UPP2
MARK4
CCDC124
PAFAH1B1
KIAA0100
SLC13A2
GAS7
TRAPPC6A
MATK
CD79B
ST7L
PAX6
RPUSD1
RHBDF1
CACNA2D2
BAIAP3
TSR3
PIGQ
CRAMP1
DNAJC11
FMO3
MYLIP
PSMB1
SYN1
JARID2
CDKL5
CAMK1G
NADK
TFAP2B
TFAP2D
ADAM22
SYPL1
CYB561
SPAG9
CELSR3
AASS
PLEKHG6
SS18L2

MGST1
CRY1
PGLYRP1
NFIX
ST3GAL1
MMP25
MAPK8IP2
MED24
RHOBTB2
HEATR5B
SEC62
RPS20
CSDE1
UBE3C
REV3L
MASP2
IYD
FAM76A
TRAF3IP3
POMT2
VTA1
MLXIPL
BAZ1B
RANBP9
SPRTN
EEF1AKNMT
ZNF207
UQCRC1
STARD3NL
CD9
HHATL
NCAPD2
IFFO1
GIPR
PHF7
SEMA3G
NISCH
STAB1
FUZ
LRRC23
BTK
HFE
SCMH1
FYN
HIVEP2
FMO1
ELOA
LYPLA2
CLCN6
MRC2
NME1-NME2
SLC6A7
TSPAN9
APBA3
MKS1
ABHD5

AKAP8L
MBTD1
UTP18
RNF216
PTBP1
DPF1
SYT7
LARS2
PIK3C2A
PLAUR
ANLN
WIZ
RABGAP1
DCN
QPCTL
PPP5C
MAP4K3
ZBTB32
TYROBP
ERCC1
SEMA3B
MBTPS2
PRICKLE3
LTF
EXTL3
NR1H4
ELOVL5
CALCOCO1
MAP4K5
SLC7A14
CLDN11
SLC25A39
MVP
NUB1
PGM3
RWDD2A
CLK1
POLR3B
ANGEL1
RNF14
DDX11
GPRC5A
MAMLD1
TACC3
UFL1
CAPN1
ACP3
SLC30A9
MTMR11
COX15
CCDC88C
YAF2
ZMYND11
WAS
DPEP1
NPC1L1

XYLT2
STMN4
ISL1
CHDH
IL20RA
CLCA1
GLT8D1
ATP2C1
IGF1
RALBP1
RUFY3
CNTN1
SLC11A1
WWTR1
AGPS
STEEP1
TTC27
VSIG2
PHLDB1
MARCO
CYP24A1
PRDM11
SYT13
SNAI2
HGF
ZRANB1
NCDN
ADGRA2
ZFP64
MNAT1
SAM4A
RUNX3
MRE11
PLEKHB1
SERPINB1
SLC7A9
SPAST
OSBPL5
AQR
CPS1
C8B
FHL1
RTF2
SLC45A4
RNF10
ZDHHC6
GRAMD1B
RB1CC1
ERP44
ALAS1
AKAP11
GLRX2
SNAPC1
DERA
STRAP
ABCC2

DEF6
PLEKHO1
GCLM
UBR2
DEPDC1
CCDC28A
RRAGD
HSF2
PHF20
NR1H3
NCAPH2
TOMM34
SEC63
KPNA6
VIM
FAS
CD44
KCNG1
AGPAT4
SLAMF7
MIPEP
PRKCH
INSRR
B4GALT7
SH2D2A
VRK2
TNFRSF1B
VEZT
BRD9
SNX1
TBPL1
BCLAF1
SLC39A9
ANK1
IBSP
TFB1M
RABEP1
HMGB3
NUP160
BAK1
MUSK
IKZF2
GRN
FAM13B
ARHGAP31
CENPQ
SARS1
RANBP3
ARID4A
EIPR1
PNPLA6
IFT88
ALG1
ZCCHC8
CHPF2
LRRRC7

FUT8
UBA6
GAB2
ATP6V0A1
PIAS1
SLC4A7
MAP2K3
EFCAB1
TMSB10
ASTE1
RNF19A
PEX3
GABARAPL2
MYOC
SH3YL1
FAM136A
VCL
DEPDC1B
NSMAF
ADSS2
STAP1
TIMP2
RFC1
TBC1D23
CUL3
OTC
CYP46A1
ZZZ3
SLC18A1
USP2
CASR
FLT4
FBXO42
MFAP3
MRI1
METTL1
HOXC8
AGA
PI4K2B
MAT2B
EDC4
CLEC16A
MSR1
CDH1
MTREX
DNAH5
RIPOR1
C6
RAI14
SOX30
PNKP
BEST2
PHLPP2
SPDL1
STAU2
SLC66A1

CTNS
PHF23
INPP4A
RAB27B
PSMA4
LSG1
PARP3
TNC
THAP3
RIPOR3
TDP1
AIFM2
MED17
RETSAT
CAPG
AP2S1
ZBPB
BARX2
DCUN1D1
JADE2
ZIC2
LCP2
TRIT1
GUCA2B
CUL7
CTNNA1
PHKA2
CNTLN
HSPA5
DSG2
GEMIN8
GPM6B
PREX2
WDR37
YTHDC2
ATP6V1H
POLR2B
FAM214A
ARAP2
TPR
CP
DTNBP1
XK
C12orf4
WWC3
ARHGAP6
FAM184B
GOPC
ROS1
USP28
TSPAN17
ZNF800
TNFRSF17
SNX29
MRPS10
RSF1

VPS13D
FAM120A
R3HDM1
COL9A2
KITLG
ERCC8
H6PD
VAMP3
EPN3
LTBP1
ELN
RFC2
NEDD4L
FOXP3
PPP1R3F
HEXB
PTCD2
NEXMIF
JKAMP
DKK3
NFE2L3
LIMA1
LETMD1
PTGER3
COL23A1
FAM160A2
HERPUD1
HOMER3
RAD51
PIK3CB
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TNS1
REXO1

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IKZF5
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CPQ
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CALB1
BPNT2
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OAZ1
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TYK2
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SYNGR4
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EXOSC3
ZFAND5
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DNTT
GATA3
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CRACD
LAMTOR3
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MANBA
UBE2D3
ELF2
NDUFC1
TBC1D9
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KLHL5
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CRYAB

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FBXO3
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MYF5
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METAP2
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FOXM1

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CDCA3
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USP5
TPI1

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RFX4
RIC8B
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NEDD9
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FANCE
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CILK1
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GZMK
APBB3

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TTL
IL1A
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GALNT3
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IGFBP5
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CCT4
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OTX1
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ODC1
BIRC6
NOL10
PLEKHB2
GORASP2

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SDC1
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SOS1
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RALGPS2
ANGPTL1
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CDK18
RAB29

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DARS2
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RCOR3
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PPP1R8

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GTF3C3
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ECRG4
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SEN5
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FKBP15
CTNNAL1
ABITRAM
DYNC2I2
SET
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GLE1
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CNTRL

TRIM32
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KDSR
VPS4B
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VSX2
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OARD1
UNC5CL
AARS2
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SPDEF
MAD2L1BP

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RIOK1
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PRDX5
BCL2L12

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TRPM4

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MTSS2
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PIK3C2B

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SBF2
RRAS2
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DSC1

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BIVM
TPP2
POGLUT2
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TRAFD1

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NCOA2

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ACTRT2
DUS1L

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XKR6
FEZ2
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KCNG3
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OR2K2
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SOSTDC1
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FAM98B
GAA
CANT1

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APLN
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DLK2
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MCRIP2
PDZD3
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MYOZ2
SYNPO2

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TMCC1
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OVOL1
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ABCB8
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YTHDF2

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ARL2
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ITGA1
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FASTKD5
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RNASEK
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YJEFN3
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EID1
POLR2M
FDXACB1
TRIL
TIFAB
DNAAF4

SMIM3
HMBS
DND1
POLG2
CAPNS2
GPR142
HP
C11orf97
TAS2R38
GATC
ZBED6
FNTB
RPL36A-HNRNPH2
GALNT4
CNPY2
CUX1
TEX49
CHURC1
C17orf49
RTEL1
PDF
RNASE12
SPESP1
SPECC1L-ADORA2A
BCL2L2-PABPN1
SYNJ2BP-COX16
C20orf141
RNASE4
MC1R
HOXB7
FRRS1L
PMF1-BGLAP
ARMH2
MRC1
HSPB9
TLE7
SERTM2
XKR7
CCPG1
TMEM178B
CLEC19A
FIGNL2
PECAM1
TEN1-CDK3
GAN
C15orf65
TCF24
SMIM36
CLK2
GFY
GATAD2B
KRTAP3-1
DSEL
ATP23
C17orf114
MYMX

DENND11
IQSEC3
SKA1
TDO2
SPON1
OVCA2
FAM189B
PKLR
MRPL12
INTS3
LSM14A
C19orf84
DNAJC28
CCNQ
GTF2I
ATP6V1G3
PAXBP1
MYZAP
TMEM50B
DPEP2NB
CTSO
KRT12
SCAMP3
KRT23
OTUD7B
GJA5
RBP3
RBM8A
TIMM23
RNF115
CFAP298-TCP10L
RPL17
SEC22B
TXNIP
SRGAP2
BAHCC1
RASSF5
STRADA
KLF14
NCOA4
MRPS21
GDF10
AARSD1
C17orf113
ATF7-NPFF
S1PR2
CALR3
TRABD2B
MAGIX
IKBKG
SPIB
CCDC194
SLC25A53
EGLN2
ARHGAP19-SLIT1
COMMD3-BMI1

FMC1-LUC7L2
MEI4
NCBP2AS2
BORCS7-ASMT
URGCP-MRPS24
GAS2L2
RPS10-NUDT3
C17orf50
RASL10B
SRXN1
CCL5
LIX1L
SMIM32
ANKRD34A
GTF2H5
KMT2B
CFAP206
MUSTN1
DCP1A
ATP6V1FNB
ARL2-SNX15
GRIN2B
LYPD4
SNURF
ZBTB8B
C1QTNF3-AMACR
TM4SF19-DYNLT2B
PANK4
FAM181A
AGBL1
NAP1L4
EEF1D
CHCHD10
B2M
DDX24
USP27X
NOL12
PTPRK
INO80B-WBP1
TMPRSS11E
CASTOR2
PUF60
PRIMA1
SMDT1
NATD1
SOCS7
ADRA2B
SCRIB
DECR2
VASN
CDIP1
PROP1
TMEM269
DLG5
DERL3
PRPF8

C8orf89
YWHAE
LY6H
RCC1L
SEBOX
LHX1
PVALB
NMRAL1
KRTAP7-1
NPHP3-ACAD11
CLPTM1L
ITPK1
CCDC92
PIWIL1
PPP4R3B
SYNRG
NUDT18
ZNF2
GPR20
YTHDC1
FAM120B
PRAG1
MMP11
DYNLT2
MPV17L
BDH1
DLL1
ALOX5
ARHGAP11A
TTC34
GRIFIN
BFAR
GON7
NAPEPLD
KLF13
NTAN1
SMARCB1
MLLT6
U2AF1L5
NDE1
TMEM251
NCF4
DUSP14
UHRF1
ORAI1
AATF
SDCCAG8
SLC22A18
ERMARD
HNF1B
RNH1
PIK3R6
SCARF1
ZNF623
TMEM179
SINHCAF

UNC79
PLCH2
TAF9
APBA2
PLPPR1
BAAT
RAB7B
DACH1
PYCR3
MIF
CEP170
DNAJA3
CWC25
TC2N
WNT9B
TAF15
PLA2G10
MYT1
IFI27L2
C17orf98
CEP20
TRPV6
PDCD1
HEATR9
SALL3
RXFP3
MTMR10
ARHGEF26
MARF1
PIGW
BTBD7
CDK7
OTUB2
FAM243B
HERC2
PIP4K2B
SRCIN1
TJP1
ZNF280B
HMOX2
ELANE
NEFL
SCG5
GSTT1
MROH6
PSMB3
CCDC125
SRD5A2
SPC25
NEU4
CISD3
TIGD5
TFPT
DUSP8
SSTR3
GFUS

RDH13
GGNBP2
PPP4R4
NDUFA3
MYO19
G6PC2
CDC42EP5
NAPRT
RRN3
TIMM22
C17orf78
LENG1
DHRS11
SLC43A2
NR2E3
ZNHIT3
C11orf98
MRM1
PCGF2
IQCA1L
ASB2
GSDMD
CCDC166
UBR7
BMERB1
SERF1B
MMP28
OR2S2
SMIM34B
TSTD3
AK6
GARRE1
TAMM41
GATD3B
OR8B4
PCDH20
RASA3
CACFD1
TRAPPC4
TMEM42
FBL
PADI3
VPS11
SURF1
ZNF660
HHAT
HYOU1
CEP72
BORCS5
REXO4
PAGR1
TUBGCP5
RPS25
RPL7A
OR5P2
PADI6

SURF4
DUSP16
CENATAC
MATR3
NDUFA6
MED22
SURF2
ATG16L1
SLC2A6
MLXIP
PSMC4
SERTAD4
FOXR1
ZNF35
SURF6
DYRK1B
BLACAT1
BCL2L14
PADI1
FOXO6
RCC2
INPP5D
DUSP29
KIAA1143
KCNIP4
RYBP
KAT6B
SAG
RPS6KA1
SLC16A1
TMEM265
RPH3AL
GREM1
NSMCE3
DLGAP2
ADORA3
CORO7
SLC25A26
CTIF
CALB2
ECH1
ASAP3
C1orf232
BCL7A
B3GALNT2
RINL
E2F2
NFKBIB
MAP4K1
PRSS22
TCEA3
HNRNPL
FBXO17
MAG11
HNRNPR
EIF3K

LGALS4
ZNF436
MRPS12
ATAD1
ZNF445
ID3
IBTK
LBHD2
TPBG
CCER2
SIRT2
SARS2
TEX52
CTXND2
EEF1B2
CCDC195
NDUFS1
GPR1
INO80D
PRRT1B
C19orf85
FAM169B
FRG1
EXOC3L2
TCF20
VSIG10L2
PRSS50
SPEM2
SMCR8
TMEM256
CANX
MAML1
TNK1
GPR22
HBP1
ZBTB4
VPS53
LTC4S
TPTEP2-CSNK1E
FGF11
IGSF6
CHRNA1
GNG14
TMEM159
PLSCR3
PLCL2
KPNA7
PRKAR2B
SQSTM1
DUS4L
SMURF1
LLGL1
EEF2K
SCO2
DCHS2
TMEM102

TOP3A
RUFY1
POLR3E
ANKS4B
PDZD9
SHMT1
PERCC1
TMEM256-PLSCR3
THSD8
MIEF2
MGAT4B
LYNX1-SLURP2
FLII
SPEM1
TMEM247
OR8S1
PDE11A
GMPR2
EEF1AKMT4
CARMIL3
HSF1
SMIM41
DCAF11
DHRS4
ADCY4
EPHA1
CCDC39
OR2F1
DHRS1
PSME2
KBTBD4
RUVBL1
TINF2
PSME1
EEF1AKMT4-ECE2
TMEM14C
OR6B1
MED18
FDFT1
AGPAT5
RHO
PLEKHM3
REC8
CHORDC1
MTMR9
CPSF1
SESN2
ADIPOR2
CLDN23
GATA4
MTCH2
MGAT4C
TSSK4
RNF31
ZFP1
FNBP4

RABGGTA
CIDEB
MDP1
LTB4R2
PTPMT1
CPNE6
PAK1IP1
PCK2
SLC39A4
NEDD8
IPO4
MSRA
TMEM249
SGPP1
ABCF2-H2BE1
BOP1
FITM1
NOP9
PPP1R3B
TRIM17
TGM1
EMC9
LRTM2
NDUFS3
ATP5IF1
C3orf52
NEDD8-MDP1
FBXL6
ZYG
ADCK5
LTB4R
DGAT1
NFATC4
NRL
AGBL2
GET1-SH3BGR
ASDURF
DERPC
ARMCX5-GPRASP2
SMIM40
GUCA1ANB
GTF2H1
C1RL
TNRC6A
EIF5A
NOC4L
ACAP1
SLC2A4
IL27RA
PPP1R27
PODNL1
ASF1B
MCRIP1
SLC5A11
PEX5
C19orf67

STING1
TNNT3
STRA6
GRK1
GCGR
SMIM33
DNAJC18
RFX1
CLDN7
CC2D1A
MCTS1
ECSCR
LDHA
NEURL4
CTDNEP1
ADGRL1
GPS2
TWIST2
ARHGAP17
ATP4B
CYP11A1
C1GALT1C1
CTTN
CCDC33
UBL7
CLSTN3
GJA10
HPS5
DCAF15
SEMA7A
RLN3
CASP8AP2
ELP5
SAMD1
FAM20C
DDX51
YBX2
NANOS3
ISLR
TMEM95
C1R
DUS4L-BCAP29

Supplemental File 3: genes with significant evidence of positive selection

TNMD
CALCR
KDM7A
ARHGAP44
ADAM22
MMP25
SCMH1
PLAUR
TYROBP
NUB1
GPRC5A
TACC3
ACP3
SLC11A1
PHLDB1
MARCO
ABCC2
NCAPH2
INSRR
ANK1
ARHGAP31
SARS1
FAM136A
SLC18A1
PI4K2B
CLEC16A
CDH1
BARX2
ZIC2
CP
DTNBP1
XK
ELN
HEXB
COL23A1
NNAT
KCNQ1
TRAPPC3
EIF2AK2
MCOLN3
ITIH1
TRAF1
F7
TMCC3
RIMBP2
BCAT1
CDH3
CA11
ST3GAL6
ANKS1A
SPEN
FAM107B

ISOC1
ZFAT
DNTTIP2
CDHR2
ZZEF1
MCAM
STXBP2
MCCC1
P2RY10
TP73
CDH17
KIF22
CARMIL1
SMARCD3
WDR70
BCKDHB
ITGAE
DIS3
CYLD
SLCO1A2
MYBPC2
TRIP6
SH3BP2
NID2
RFX2
SLC4A11
KIF16B
FUS
ARHGAP4
NDUFB2
IRAK3
LYZ
SI
PLEKHG2
TF
SCFD1
SNAP23
XYLB
GABRP
NUP188
SH2D3C
DSP
SETD1A
TRMT2A
TBC1D10A
HSCB
LMF2
HIF1A
ZFYVE21
PCNX1
RPS6KA5
YY1
ACIN1
MMP9
ABHD12
CTSZ

GID8
PLCB4
SAMHD1
MAP1LC3A
CEP76
MIB1
SRPX
SMS
MAGED2
UGGT2
MMP15
SETD6
ZNF174
AQP8
BCKDK
SYT17
RPAP1
SPG11
SGK3
RP1
FCGRT
TRMT1
DMPK
SGTA
PRX
NUMBL
HNRNPUL1
COMP
LSR
SCN1B
PON3
NPVF
WASL
SPAM1
IMPDH1
CORO2A
C5
DDX58
RAPGEF1
GATA3
NSMCE4A
PALD1
MICU1
TLX1
EDRF1
AKAP10
COL1A1
VAT1
INPP4B
GLRB
PPARGC1A
SIAE
DTX4
ATG2A
APOA5
PDHX

MADD
ASIC1
SLC11A2
FOXM1
ENDOU
ATN1
PTPN6
SRSF9
RNGTT
SLC26A8
RHAG
COL9A1
MED23
VNN1
PERP
TMEM30A
TTK
HARS2
DROSHA
SLC27A6
GNPDA1
HMGXB3
PDGFRB
CLDN16
XRN1
NEK11
HEMK1
MAPKAPK3
CLCN2
NEK4
NCL
CENPA
GCA
PECR
EHBP1
SLC9A2
BIRC6
LCT
C2orf42
QSOX1
FBXO2
CRYZ
EXOC8
ACADM
PRDX6
ESYT2
A4GNT
IFT46
TNNT2
FASTKD2
ATP10B
SPACA1
ZC2HC1B
VAMP8
RPN2
SENP5

HEATR1
CNTRL
SLIRP
IFIT2
PYROXD2
MXI1
PANK3
PLEKHG1
MTERF2
TBX2
DPPA4
CRY2
PLG
RBBP6
NEUROG3
EBPL
ITIH5
MXD4
MOGAT1
GCNT7
ZNF1
VAMP7
LYPD3
CRISP2
TRERF1
HROB
GTF2F1
ALKBH7
ATG4C
GPCPD1
BFSP1
NCLN
FRMD8
PRR12
AHDC1
KTN1
RGS13
TAS2R4
PLA2G5
EPS15L1
KDR
MGAT3
LIF
CCDC32
DLL4
SUMF2
CSRP3
DCTD
PLD2
PHF20L1
LDLR
ACE2
FAM98C
ACSBG2
MLLT1
METTL26

GMFG
SMPDL3B
HIP1R
ANGPTL6
DKC1
ZNF341
DIAPH1
NPHP4
TNS4
SNRPA1
ACTR10
TRIM21
IMMT
RAMP1
PTPRE
LANCL2
KDM6B
GUCY2D
MTSS2
RIN2
KANK4
LGR6
TMCC2
GPALPP1
SLC39A11
ZNF414
RTN3
ATP13A3
DYDC2
MEN1
CHL1
PRPF38B
RAX
DSC2
DSG1
DSC1
UBAC2
CARS2
HNF1A
KRT85
NHSL1
KIAA0513
KCNK1
TAF5L
RNASEL
DNAJB2
COX5B
EDNRB
GPNMB
TBRG4
ZFHX2
MARCHF7
KCTD3
TXN
DAB2IP
ZNF189

HEMGN
FAM8A1
GGH
NEK1
SORL1
GIPC2
CGREF1
ATRAID
TRIM54
ENTPD1
ANXA7
FAM149B1
HECW2
COX17
MNS1
FGF5
PPA2
PARVG
SCAF11
SLC15A4
TARBP2
NIPA2
BAHD1
PIF1
LINS1
LMAN1L
SLC5A2
DEF8
PCTP
SLC39A6
ZMYND15
NARF
ZNF750
NFIC
PLPP2
FEM1A
VAV1
DOP1B
ILDR2
NUF2
ISG20L2
RORC
SNX27
RFX5
POGZ
DTL
SOX13
PLEKHA6
ATP6V1C2
ASXL2
ABHD1
NXPH2
SPAG16
NR1I2
SRPRB
UCN2

AHSG
PLAC8
NAF1
ROPN1L
SSBP2
SLC25A48
TNFRSF21
DAAM2
PRSS35
AIG1
TMEM181
NOM1
ASB10
SH3KBP1
ZMYM3
AWAT2
ST18
TACC1
ST8SIA6
HTR7
CYP17A1
TUT1
HSD17B12
DGKZ
GLYAT
SERPING1
ARFGAP2
CCDC82
CHEK1
COMMD7
KIAA1755
CDH22
TRPT1
DLAT
PTS
SCLT1
FAM160B1
EDNRA
BEND6
SETBP1
BMP3
CPB1
TMEM87B
ZDHHC7
TBCEL
CC2D1B
DIPK1A
AK9
OXA1L
LARP1
CYLC2
ART3
SCAF4
SUPV3L1
PDE6D
FCHO2

C8A
SYN2
PWWP3B
ETS2
MX1
UBN2
SKI
WIPI2
KRTCAP3
PAFAH2
ESYT3
TENT5B
PEX2
LARGE2
MYL1
CHRM1
TCTN2
ATOH8
COL4A3
TBC1D10B
ZRSR2
PTAFR
NPR1
MUC15
HIC2
ITGAM
KCNAB3
ZNF282
GLB1
EMB
OR9K2
RNF139
MBD3L1
ALK
CLDN20
SCAND1
ZNF318
MAP6
FGG
CXXC5
SYCE1
IFNB1
DRC3
LAMB2
HINFP
CORO1B
MUS81
METAP1D
EXO1
GTF2IRD2B
STARD6
DES
OR52W1
HSF5
GJC3
CLEC14A

SIX5
CAVIN1
ACAD9
PNPLA2
BOLA1
MSC
PFAS
SNX18
C3orf38
CYC1
GATA2
TMEM31
CDH5
MYADM
RNF227
FIZ1
EXOC3
RCC1
GSX2
CLRN3
PPA1
FAM83H
DIPK2A
KCNIP1
C1S
BGN
C1orf116
GDPGP1
COA5
CCR3
UPP1
ACP7
B3GALT5
SLC35F3
OLFML1
ADAP2
LRTOMT
IRAK1
CMSS1
SRPK3
POU3F2
NUTM1
RNLS
FAM43A
LAMP1
SETD4
SAPCD2
KLK12
SMYD4
UBE2H
KATNA1
RPS19BP1
C5orf52
AMTN
SLC18A3
PEAR1

ZFP69
CYHR1
RILPL1
RAB42
PLA2G4E
LAMTOR4
PLSCR1
SELL
NDOR1
FBLL1
CLEC20A
CC2D2B
QRFP
RBM34
SLC15A5
ALKBH2
NUGGC
WDSUB1
SEMA4A
XPNPEP3
PIK3R4
SLC6A9
ZSCAN25
ZNF420
ARRDC1
PCBP2
PDCD1LG2
CFAP43
SLC22A12
ZNF667
HOXC4
UVRAG
NTRK1
ZXDB
ZNF652
EPS8L3
MT-ND4
ZFP2
KIFBP
ARMCX6
EFCAB2
GLYATL3
GIGYF2
RNASE13
LNP1
ACKR1
CHUK
SIPA1
SYNJ2BP
ADAT3
DDX47
MBLAC1
FOXI3
NOTO
B3GALT9
GPR33

LRRC69
ACSM4
GRXCR1
FASTKD5
SKOR2
CEBPZOS
VAMP2
PRR29
SLC26A6
TEX50
MCIDAS
PSMB8
TMEM250
STPG4
RPP21
ARPC4
C8orf58
NFS1
LY75-CD302
TMEM200B
TRIL
ATP23
DPEP2NB
RNF115
MEI4
DCP1A
SCRIB
PROP1
DERL3
SDCCAG8
APBA2
DACH1
HEATR9
SALL3
ARHGEF26
SCG5
GSTT1
CISD3
GFUS
PPP4R4
MYO19
OR2S2
MATR3
CORO7
ZNF445
EXOC3L2
PERCC1
LYNX1-SLURP2
SPEM1
CARMIL3
SMIM41
AGPAT5
REC8
RNF31
TMEM249
NFATC4

AGBL2
SEMA7A
NANOS3
ISLR
TMEM95
C1R

Supplemental File 4: Results of the enrichment analyses (enriched Panther pathway terms)

geneSet	description	link	size	overlap	expect	enrichmentRatio	pValue	FDR	overlapId	userId
P04375	5HT3 type receptor mediated signaling pathway	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P04375	12	4	0.623803095759234	6.412280.701.754380	0.0024298477859624468	0.1416563342810584	8773;6570;6844;8673	SLC18A1;SNAP23;VAMP8;VAMP2
P0050	Plasminogen activating cascade	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P00050	13	4	0.6757865937072504	5.919028.340.080970	0.0033724716922153286	0.1416563342810584	5340;2266;4318;5329	PLAUR;MMP9;PLG;FGG
P0042	Muscarinic acetylcholine receptor 1 and 3 signaling pathway	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P00042	31	6	16.114911.080711300	37.232597.623.089900	0.004207613889536388	0.1416563342810584	8773;1128;6844;5332;6572;8673	SNAP23;PLCB4;VAMP8;CHRM1;SLC18A3;VAMP2
P04376	5HT4 type receptor mediated signaling pathway	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P04376	17	4	0.8837209302325582	4.526315.789.473680	0.009574804032375539	0.24176380181748236	8773;6570;6844;8673	SLC18A1;SNAP23;VAMP8;VAMP2
P04379	Beta3 adrenergic receptor signaling pathway	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAcc	13	3	0.6757865937072504	4.439271.255.060720	0.026487417645411293	0.32914231755500256	8773;6844;8673	SNAP23;VAMP8;VAMP2

		ession=P 04379								
P 0 4 3 7 4	5HT2 type receptor mediated signaling pathway	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P04374	35	5	18. 194 .25 4.4 45. 964 .40 0	27.481 .203.0 07.518 .700	0.03171 928521 960165 6	0.32914 231755 500256	8773 ;657 0;68 44;5 332; 8673	SLC18A1 ;SNAP23; PLCB4;V AMP8;VA MP2
P 0 5 9 1 6	Opioid prodynorp hin pathway	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P05916	14	3	0.7 277 701 778 385 772	412.21 8.045. 112.78 2	0.03247 389715 446402 6	0.32914 231755 500256	8773 ;684 4;86 73	SNAP23; VAMP8;V AMP2
P 0 4 3 8 0	Cortocotro pin releasing factor receptor signaling pathway	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P04380	14	3	0.7 277 701 778 385 772	412.21 8.045. 112.78 2	0.03247 389715 446402 6	0.32914 231755 500256	8773 ;684 4;86 73	SNAP23; VAMP8;V AMP2
P 0 0 0 1 1	Blood coagulatio n	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P00011	25	4	12. 995 .89 6.0 32. 831 .70 0	30.778 .947.3 68.421 .000	0.03712 621268 692873	0.32914 231755 500256	5340 ;226 6;21 55;5 329	PLAUR;F 7;PLG;FG G
P 0 4 3 7 7	Beta1 adrenergic receptor signaling pathway	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P04377	15	3	0.7 797 537 619 699 042	38.473 .684.2 10.526 .300	0.03910 601792 732704	0.32914 231755 500256	8773 ;684 4;86 73	SNAP23; VAMP8;V AMP2
P 0 5 9 1 7	Opioid proopiome lanocortin pathway	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P05917	15	3	0.7 797 537 619 699 042	38.473 .684.2 10.526 .300	0.03910 601792 732704	0.32914 231755 500256	8773 ;684 4;86 73	SNAP23; VAMP8;V AMP2

P00030	Hypoxia response via HIF activation	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P00030	15	3	0.7797537619699042	38.473684210.526300	0.03910601792732704	0.32914231755500256	7295;6097;3091	HIF1A;TXN;RORC
P05915	Opioid proenkephalin pathway	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P05915	16	3	0.8317373461012312	3.606907.894.736840	0.04637240510125218	0.3345437796590336	8773;6844;8673	SNAP23;VAMP8;VAMP2
P04378	Beta2 adrenergic receptor signaling pathway	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P04378	16	3	0.8317373461012312	3.606907.894.736840	0.04637240510125218	0.3345437796590336	8773;6844;8673	SNAP23;VAMP8;VAMP2
P04391	Oxytocin receptor mediated signaling pathway	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P04391	28	4	14.555403.55677150	274.812.030075.188	0.05344445085032723	0.34250113364750123	8773;6844;5332;8673	SNAP23;PLCB4;VAMP8;VAMP2
P00002	Alpha adrenergic receptor signaling pathway	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P00002	17	3	0.8837209302325582	33.947368.421.052600	0.05425760533029722	0.34250113364750123	8773;6844;5332	SNAP23;PLCB4;VAMP2
P00040	Metabotropic glutamate receptor group II pathway	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P00040	18	3	0.9357045143638851	32.061403.508.771900	0.06274269922382636	0.3727654483297919	8773;6844;8673	SNAP23;VAMP8;VAMP2

P 0 4 3 9 4	Thyrotropin-releasing hormone receptor signaling pathway	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P04394	32	4	16.634 .74 6.9 22.024 .60 0	24.046 .052.6 31.578 .900	0.08035 734910 526449	0.40369 697796 22145	8773 ;684 4;53 32;8 673	SNAP23; PLCB4;V AMP8;VA MP2
P 0 0 4 3	Muscarinic acetylcholine receptor 2 and 4 signaling pathway	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P00043	32	4	16.634 .74 6.9 22.024 .60 0	24.046 .052.6 31.578 .900	0.08035 734910 526449	0.40369 697796 22145	8773 ;684 4;65 72;8 673	SNAP23; VAMP8;S LC18A3; VAMP2
P 0 4 3 7 3	5HT1 type receptor mediated signaling pathway	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P04373	20	3	1.0 39.671 .68 2.6 26.530	28.855 .263.1 57.894 .700	0.08142 282684 026414	0.40369 697796 22145	8773 ;657 0;68 44	SLC18A1 ;SNAP23; VAMP2
P 0 0 0 1	Adrenaline and noradrenaline biosynthesis	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P00001	21	3	10.916 .55 2.6 67.578 .60 0	274.81 2.030. 075.18 8	0.09156 740588 423673	0.40369 697796 22145	8773 ;657 0;68 44	SLC18A1 ;SNAP23; VAMP2
P 0 0 4 4	Nicotinic acetylcholine receptor signaling pathway	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P00044	47	5	2.4 43.228 .45 4.1 72.360	20.464 .725.6 43.896 .900	0.09259 811281 453945	0.40369 697796 22145	8773 ;684 4;65 72;8 0179 ;867 3	SNAP23; VAMP8;S LC18A3; VAMP2;M YO19
P 0 0 5 4	Toll receptor signaling pathway	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P00054	34	4	17.674 .41 8.6 04.651 .10 0	2.263. 157.89 4.736. 840	0.09592 799476 32985	0.40369 697796 22145	1147 ;345 6;36 54;1 1213	IRAK3;IF NB1;IRA K1;CHUK

P 0 0 0 1 0	B cell activation	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P00010	34	4	17.674 .41 8.6 04. 651 .10 0	2.263. 157.89 4.736. 840	0.09592 799476 32985	0.40369 697796 22145	1147 ;740 9;57 77;4 776	PTPN6;V AV1;CHUK; NFATC4
P 0 0 0 3 7	Ionotropic glutamate receptor pathway	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P00037	22	3	11. 436 .38 8.5 08. 891 .90 0	2.623. 205.74 1.626. 790	0.10221 182192 482403	0.40394 781329 513557	8773 ;684 4;86 73	SNAP23; VAMP8;V AMP2
P 0 0 0 1 2	Cadherin signaling pathway	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P00012	63	6	3.2 74. 965 .80 0.2 73. 590	1.832. 080.20 0.501. 250	0.10398 656579 874777	0.40394 781329 513557	999; 1001 ;100 3;10 15;5 4825 ;644 05	CDH1;CD H3;CDHR 2;CDH17; CDH22;C DH5
P 0 0 0 3 9	Metabotropic glutamate receptor group III pathway	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P00039	27	3	14. 035 .56 7.7 15. 458 .20 0	21.374 .269.0 05.847 .900	0.16189 264740 208342	0.60559 842176 33491	8773 ;684 4;86 73	SNAP23; VAMP8;V AMP2
P 0 0 0 0 5	Angiogenesis	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P00005	10 5	8	5.4 58. 276 .33 3.7 89. 320	14.656 .641.6 04.010 .000	0.17285 035416 28399	0.60915 688033 85425	5338 ;215 5;51 59;5 777; 3791 ;786 7;30 91;5 4567	F7;HIF1A ;PTPN6;P DGFRB; MAPKAP K3;KDR; DLL4;PL D2
P 0 5 9 1 2	Dopamine receptor mediated signaling pathway	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P05912	28	3	14. 555 .40 3.5 56. 771 .50 0	206.10 9.022. 556.39 1	0.17490 643098 82944	0.60915 688033 85425	8773 ;684 4;86 73	SNAP23; VAMP8;V AMP2

P 0 0 0 2 9	Huntington disease	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P00029	77	6	4.002735978.112.170	14.989747.095.010200	0.2064538841562351	0.6950614099926582	8976;7161;9026;1537;1429;10493	TP73;WASL;VAT1;CRYZ;HIP1R;CYC1
P 0 0 0 3 1	Inflammation mediated by chemokine and cytokine signaling pathway	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P00031	95	7	493.844.049.247.606	14.174515.235.457.000	0.21908138076587602	0.7137812728178542	6003;1147;7409;1232;10093;4776;5332	PLCB4;RGS13;VAV1;CCR3;CHUK;ARPC4;NFATC4
P 0 0 0 1 6	Cytoskeletal regulation by Rho GTPase	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P00016	32	3	16.634.746.922.024.600	1.803.453.947.368.420	0.2295393429005027	0.7244835510297116	8976;1729;10093	WASL;DIAPH1;ARPC4
P 0 0 0 3 2	Insulin/IGF pathway-mitogen activated protein kinase kinase/MA P kinase cascade	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P00032	20	2	1.039.671.682.626.530	19.236842.105.263.100	0.27910502929172964	0.8513988124074395	9252;3645	INSRR;RPS6KA5
P 0 0 0 0 4	Alzheimer disease-presenilin pathway	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P00004	69	5	35.868.673.050.615.500	13.939740.655.987.700	0.2866095012064648	0.8513988124074395	999;4318;1001;4324;64386	MMP25;CDH1;CDH3;MMP9;MMP15
P 0 0 0 1 5	Circadian clock system	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P00015	7	1	0.3638850889192886	274.812.030.075.188	0.31234929122694677	0.8565768531778164	1408	CRY2

P04392	P53 pathway feedback loops 1	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P04392	7	1	0.3638850889	274.812.030.075.188	0.31234929122694677	0.8565768531778164	7161	TP73
P00057	Wnt signaling pathway	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P00057	143	9	7.433.652.530.79.750	12.107.103.422.892.800	0.32213056350334046	0.8565768531778164	999;1001;1003;1015;4776;5332;6604;54825;64405	CDH1;CDH3;CDHR2;CDH17;SMARCD3;PLCB4;CDH22;CDH5;NFATC4
P00056	VEGF signaling pathway	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P00056	39	3	2.027.359.781.121.750	1.479.757.085.020.240	0.3307573987518301	0.8565768531778164	3791;7867;3091	HIF1A;MAPKAPK3;KDR
P00053	T cell activation	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P00053	39	3	2.027.359.781.121.750	1.479.757.085.020.240	0.3307573987518301	0.8565768531778164	1147;7409;4776	VAV1;CHUK;NFATC4
P00041	Metabotropic glutamate receptor group I pathway	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P00041	9	1	0.46785225718194257	21.374.269.005.847.900	0.38233359749169293	0.930638674594358	5332	PLCB4
P00034	Integrin signalling pathway	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAcc	115	7	5.978.112.175.102.590	11.709.382.151.029.700	0.38945588373869144	0.930638674594358	1277;3684;1297;3682;3913;128	ITGAE;RAPGEF1;COL1A1;COL9A1;COL4A3;ITGAM;LAM2

		ession=P 00034							5;28 89	
P 0 0 0 2 3	General transcription regulation	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P00023	26	2	13. 515 .73 1.8 74. 145 .00 0	14.797 .570.8 50.202 .400	0.39556 105889 122783	0.93063 867459 4358	2962 ;802 98	MTERF2; GTF2F1
P 0 0 0 1 9	Endothelin signaling pathway	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P00019	44	3	22. 872 .77 7.0 17. 783 .80 0	1.311. 602.87 0.813. 390	0.40356 492775 58101	0.93063 867459 4358	1910 ;190 9;53 32	PLCB4;E DNRB;ED NRA
P 0 5 9 1 8	p38 MAPK pathway	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P05918	27	2	14. 035 .56 7.7 15. 458 .20 0	142.49 5.126. 705.65 3	0.41425 453181 035976	0.93063 867459 4358	9252 ;786 7	RPS6KA5 ;MAPKAP K3
P 0 2 7 7 5	Salvage pyrimidine ribonucleotides	http://www.pantherdb.org/pathway/pathwayDiagram.jsp?catAccession=P02775	10	1	0.5 198 358 413 132 695	19.236 .842.1 05.263 .100	0.41464 099363 11496	0.93063 867459 4358	7378	UPP1

Supplemental File 5: Redundancy in terms reduced with affinity propagation

P04 375	P04 376	P04 374	P04 373	P00 001								
P00 050	P00 011											
P04 379	P05 916	P04 380	P04 377	P05 917	P05 915	P04 378	P00 040	P00 043	P00 044	P00 037	P00 039	P05 912
P00 030												
P04 391	P00 042	P00 002	P04 394	P00 041	P00 019							
P00 054												
P00 010	P00 031	P00 053										
P00 012	P00 004	P00 057										
P00 005	P00 056											
P00 029	P00 016	P04 392										
P00 032	P05 918											
P00 015												
P00 034												
P00 023												
P02 775												

Supplemental File 6: Redundancy in terms reduced with weighted set crossover

Coverage: 0.790322580645161

P00042

P00050

P00005

P00012

P00029

P00054

P00031

P00034

P00030

P04375

Supplemental File 7: GO Slim summary of Biological Process

GO:0065007	biological regulation	426
GO:0008152	metabolic process	406
GO:0050896	response to stimulus	316
GO:0032501	multicellular organismal process	279
GO:0051179	localization	250
GO:0016043	cellular component organization	241
GO:0032502	developmental process	238
GO:0007154	cell communication	213
GO:0051704	multi-organism process	86
GO:0008283	cell proliferation	79
GO:0000003	reproduction	50
GO:0040007	growth	27

Supplemental File 8: GO Slim summary of Cellular Component

GO:0016020	membrane	325
GO:0005634	nucleus	249
GO:0032991	protein-containing complex	190
GO:0031974	membrane-enclosed lumen	185
GO:0012505	endomembrane system	182
GO:0005829	cytosol	174
GO:0031982	vesicle	163
GO:0005615	extracellular space	112
GO:0042995	cell projection	91
GO:0005856	cytoskeleton	77
GO:0005783	endoplasmic reticulum	70
GO:0005739	mitochondrion	59
GO:0005794	Golgi apparatus	52
GO:0005773	vacuole	42
GO:0005768	endosome	37
GO:0031975	envelope	35
GO:0005694	chromosome	31
GO:0031012	extracellular matrix	26
GO:0042579	microbody	3
GO:0005811	lipid droplet	3
GO:0005840	ribosome	2

Supplemental File 9: GO Slim summary of Molecular Function

GO:0005515	protein binding	433
GO:0043167	ion binding	229
GO:0003676	nucleic acid binding	147
GO:0016740	transferase activity	94
GO:0016787	hydrolase activity	92
GO:0000166	nucleotide binding	67
GO:0005215	transporter activity	47
GO:0060089	molecular transducer activity	37
GO:0030234	enzyme regulator activity	36
GO:0008289	lipid binding	30
GO:0005198	structural molecule activity	28
GO:0003682	chromatin binding	24
GO:0060090	molecular adaptor activity	12
GO:0030246	carbohydrate binding	8
GO:0009055	electron transfer activity	3
GO:0045182	translation regulator activity	2
GO:0016209	antioxidant activity	2
GO:0019825	oxygen binding	1

Supplemental File 10: Category terms for the user uploaded gene IDs and positively selected gene annotations

userId	geneSymbol	geneName	entrezgene	gLink
TNMD	TNMD	tenomodulin	64102	https://www.ncbi.nlm.nih.gov/gene/?term=64102
CALCR	CALCR	calcitonin receptor	799	https://www.ncbi.nlm.nih.gov/gene/?term=799
KDM7A	KDM7A	lysine demethylase 7A	80853	https://www.ncbi.nlm.nih.gov/gene/?term=80853
ARHGAP44	ARHGAP44	Rho GTPase activating protein 44	9912	https://www.ncbi.nlm.nih.gov/gene/?term=9912
ADAM22	ADAM22	ADAM metalloproteinase domain 22	53616	https://www.ncbi.nlm.nih.gov/gene/?term=53616
MMP25	MMP25	matrix metalloproteinase 25	64386	https://www.ncbi.nlm.nih.gov/gene/?term=64386
SCMH1	SCMH1	Scm polycomb group protein homolog 1	22955	https://www.ncbi.nlm.nih.gov/gene/?term=22955
PLAUR	PLAUR	plasminogen activator, urokinase receptor	5329	https://www.ncbi.nlm.nih.gov/gene/?term=5329
TYROBP	TYROBP	TYRO protein tyrosine kinase binding protein	7305	https://www.ncbi.nlm.nih.gov/gene/?term=7305
NUB1	NUB1	negative regulator of ubiquitin like proteins 1	51667	https://www.ncbi.nlm.nih.gov/gene/?term=51667
GPRC5A	GPRC5A	G protein-coupled receptor class C group 5 member A	9052	https://www.ncbi.nlm.nih.gov/gene/?term=9052
TACC3	TACC3	transforming acidic coiled-coil containing protein 3	10460	https://www.ncbi.nlm.nih.gov/gene/?term=10460
SLC11A1	SLC11A1	solute carrier family 11 member 1	6556	https://www.ncbi.nlm.nih.gov/gene/?term=6556
PHLDB1	PHLDB1	pleckstrin homology like domain family B member 1	23187	https://www.ncbi.nlm.nih.gov/gene/?term=23187
MARCO	MARCO	macrophage receptor with collagenous structure	8685	https://www.ncbi.nlm.nih.gov/gene/?term=8685
ABCC2	ABCC2	ATP binding cassette subfamily C member 2	1244	https://www.ncbi.nlm.nih.gov/gene/?term=1244
NCAPH2	NCAPH2	non-SMC condensin II complex subunit H2	29781	https://www.ncbi.nlm.nih.gov/gene/?term=29781
INSRR	INSRR	insulin receptor related receptor	3645	https://www.ncbi.nlm.nih.gov/gene/?term=3645
ANK1	ANK1	ankyrin 1	286	https://www.ncbi.nlm.nih.gov/gene/?term=286
ARHGAP31	ARHGAP31	Rho GTPase activating protein 31	57514	https://www.ncbi.nlm.nih.gov/gene/?term=57514
FAM136A	FAM136A	family with sequence similarity 136 member A	84908	https://www.ncbi.nlm.nih.gov/gene/?term=84908
SLC18A1	SLC18A1	solute carrier family 18 member A1	6570	https://www.ncbi.nlm.nih.gov/gene/?term=6570

PI4K2B	PI4K2B	phosphatidylinositol 4-kinase type 2 beta	55300	https://www.ncbi.nlm.nih.gov/gene/?term=55300
CLEC16A	CLEC16A	C-type lectin domain containing 16A	23274	https://www.ncbi.nlm.nih.gov/gene/?term=23274
CDH1	CDH1	cadherin 1	999	https://www.ncbi.nlm.nih.gov/gene/?term=999
BARX2	BARX2	BARX homeobox 2	8538	https://www.ncbi.nlm.nih.gov/gene/?term=8538
ZIC2	ZIC2	Zic family member 2	7546	https://www.ncbi.nlm.nih.gov/gene/?term=7546
CP	CP	ceruloplasmin	1356	https://www.ncbi.nlm.nih.gov/gene/?term=1356
DTNBP1	DTNBP1	dystrobrevin binding protein 1	84062	https://www.ncbi.nlm.nih.gov/gene/?term=84062
XK	XK	X-linked Kx blood group	7504	https://www.ncbi.nlm.nih.gov/gene/?term=7504
ELN	ELN	elastin	2006	https://www.ncbi.nlm.nih.gov/gene/?term=2006
HEXB	HEXB	hexosaminidase subunit beta	3074	https://www.ncbi.nlm.nih.gov/gene/?term=3074
COL23A1	COL23A1	collagen type XXIII alpha 1 chain	91522	https://www.ncbi.nlm.nih.gov/gene/?term=91522
NNAT	NNAT	neuronatin	4826	https://www.ncbi.nlm.nih.gov/gene/?term=4826
KCNQ1	KCNQ1	potassium voltage-gated channel subfamily Q member 1	3784	https://www.ncbi.nlm.nih.gov/gene/?term=3784
TRAPPC3	TRAPPC3	trafficking protein particle complex 3	27095	https://www.ncbi.nlm.nih.gov/gene/?term=27095
EIF2AK2	EIF2AK2	eukaryotic translation initiation factor 2 alpha kinase 2	5610	https://www.ncbi.nlm.nih.gov/gene/?term=5610
MCOLN3	MCOLN3	mucopolipin 3	55283	https://www.ncbi.nlm.nih.gov/gene/?term=55283
ITIH1	ITIH1	inter-alpha-trypsin inhibitor heavy chain 1	3697	https://www.ncbi.nlm.nih.gov/gene/?term=3697
TRAF1	TRAF1	TNF receptor associated factor 1	7185	https://www.ncbi.nlm.nih.gov/gene/?term=7185
F7	F7	coagulation factor VII	2155	https://www.ncbi.nlm.nih.gov/gene/?term=2155
TMCC3	TMCC3	transmembrane and coiled-coil domain family 3	57458	https://www.ncbi.nlm.nih.gov/gene/?term=57458
RIMBP2	RIMBP2	RIMS binding protein 2	23504	https://www.ncbi.nlm.nih.gov/gene/?term=23504
BCAT1	BCAT1	branched chain amino acid transaminase 1	586	https://www.ncbi.nlm.nih.gov/gene/?term=586
CDH3	CDH3	cadherin 3	1001	https://www.ncbi.nlm.nih.gov/gene/?term=1001
CA11	CA11	carbonic anhydrase 11	770	https://www.ncbi.nlm.nih.gov/gene/?term=770
ST3GAL6	ST3GAL6	ST3 beta-galactoside alpha-2,3-sialyltransferase 6	10402	https://www.ncbi.nlm.nih.gov/gene/?term=10402

ANKS1A	ANKS1A	ankyrin repeat and sterile alpha motif domain containing 1A	23294	https://www.ncbi.nlm.nih.gov/gene/?term=23294
SPEN	SPEN	spen family transcriptional repressor	23013	https://www.ncbi.nlm.nih.gov/gene/?term=23013
FAM107B	FAM107B	family with sequence similarity 107 member B	83641	https://www.ncbi.nlm.nih.gov/gene/?term=83641
ISOC1	ISOC1	isochorismatase domain containing 1	51015	https://www.ncbi.nlm.nih.gov/gene/?term=51015
ZFAT	ZFAT	zinc finger and AT-hook domain containing	57623	https://www.ncbi.nlm.nih.gov/gene/?term=57623
DNTTIP2	DNTTIP2	deoxynucleotidyltransferase terminal interacting protein 2	30836	https://www.ncbi.nlm.nih.gov/gene/?term=30836
CDHR2	CDHR2	cadherin related family member 2	54825	https://www.ncbi.nlm.nih.gov/gene/?term=54825
ZZEF1	ZZEF1	zinc finger ZZ-type and EF-hand domain containing 1	23140	https://www.ncbi.nlm.nih.gov/gene/?term=23140
MCAM	MCAM	melanoma cell adhesion molecule	4162	https://www.ncbi.nlm.nih.gov/gene/?term=4162
STXBP2	STXBP2	syntaxin binding protein 2	6813	https://www.ncbi.nlm.nih.gov/gene/?term=6813
MCCC1	MCCC1	methylcrotonoyl-CoA carboxylase 1	56922	https://www.ncbi.nlm.nih.gov/gene/?term=56922
P2RY10	P2RY10	P2Y receptor family member 10	27334	https://www.ncbi.nlm.nih.gov/gene/?term=27334
TP73	TP73	tumor protein p73	7161	https://www.ncbi.nlm.nih.gov/gene/?term=7161
CDH17	CDH17	cadherin 17	1015	https://www.ncbi.nlm.nih.gov/gene/?term=1015
KIF22	KIF22	kinesin family member 22	3835	https://www.ncbi.nlm.nih.gov/gene/?term=3835
CARMIL1	CARMIL1	capping protein regulator and myosin 1 linker 1	55604	https://www.ncbi.nlm.nih.gov/gene/?term=55604
SMARCD3	SMARCD3	SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily d, member 3	6604	https://www.ncbi.nlm.nih.gov/gene/?term=6604
WDR70	WDR70	WD repeat domain 70	55100	https://www.ncbi.nlm.nih.gov/gene/?term=55100
BCKDHB	BCKDHB	branched chain keto acid dehydrogenase E1 subunit beta	594	https://www.ncbi.nlm.nih.gov/gene/?term=594
ITGAE	ITGAE	integrin subunit alpha E	3682	https://www.ncbi.nlm.nih.gov/gene/?term=3682
DIS3	DIS3	DIS3 homolog, exosome endoribonuclease and 3'-5' exoribonuclease	22894	https://www.ncbi.nlm.nih.gov/gene/?term=22894

CYLD	CYLD	CYLD lysine 63 deubiquitinase	1540	https://www.ncbi.nlm.nih.gov/gene/?term=1540
SLCO1A2	SLCO1A2	solute carrier organic anion transporter family member 1A2	6579	https://www.ncbi.nlm.nih.gov/gene/?term=6579
MYBPC2	MYBPC2	myosin binding protein C, fast type	4606	https://www.ncbi.nlm.nih.gov/gene/?term=4606
TRIP6	TRIP6	thyroid hormone receptor interactor 6	7205	https://www.ncbi.nlm.nih.gov/gene/?term=7205
SH3BP2	SH3BP2	SH3 domain binding protein 2	6452	https://www.ncbi.nlm.nih.gov/gene/?term=6452
NID2	NID2	nidogen 2	22795	https://www.ncbi.nlm.nih.gov/gene/?term=22795
RFX2	RFX2	regulatory factor X2	5990	https://www.ncbi.nlm.nih.gov/gene/?term=5990
SLC4A11	SLC4A11	solute carrier family 4 member 11	83959	https://www.ncbi.nlm.nih.gov/gene/?term=83959
KIF16B	KIF16B	kinesin family member 16B	55614	https://www.ncbi.nlm.nih.gov/gene/?term=55614
FUS	FUS	FUS RNA binding protein	2521	https://www.ncbi.nlm.nih.gov/gene/?term=2521
ARHGAP4	ARHGAP4	Rho GTPase activating protein 4	393	https://www.ncbi.nlm.nih.gov/gene/?term=393
NDUFB2	NDUFB2	NADH:ubiquinone oxidoreductase subunit B2	4708	https://www.ncbi.nlm.nih.gov/gene/?term=4708
IRAK3	IRAK3	interleukin 1 receptor associated kinase 3	11213	https://www.ncbi.nlm.nih.gov/gene/?term=11213
LYZ	LYZ	lysozyme	4069	https://www.ncbi.nlm.nih.gov/gene/?term=4069
SI	SI	sucrase-isomaltase	6476	https://www.ncbi.nlm.nih.gov/gene/?term=6476
PLEKHG2	PLEKHG2	pleckstrin homology and RhoGEF domain containing G2	64857	https://www.ncbi.nlm.nih.gov/gene/?term=64857
TF	TF	transferrin	7018	https://www.ncbi.nlm.nih.gov/gene/?term=7018
SCFD1	SCFD1	sec1 family domain containing 1	23256	https://www.ncbi.nlm.nih.gov/gene/?term=23256
SNAP23	SNAP23	synaptosome associated protein 23	8773	https://www.ncbi.nlm.nih.gov/gene/?term=8773
XYLB	XYLB	xylulokinase	9942	https://www.ncbi.nlm.nih.gov/gene/?term=9942
GABRP	GABRP	gamma-aminobutyric acid type A receptor pi subunit	2568	https://www.ncbi.nlm.nih.gov/gene/?term=2568
NUP188	NUP188	nucleoporin 188	23511	https://www.ncbi.nlm.nih.gov/gene/?term=23511
SH2D3C	SH2D3C	SH2 domain containing 3C	10044	https://www.ncbi.nlm.nih.gov/gene/?term=10044
DSP	DSP	desmoplakin	1832	https://www.ncbi.nlm.nih.gov/gene/?term=1832
SETD1A	SETD1A	SET domain containing 1A, histone	9739	https://www.ncbi.nlm.nih.gov/gene/?term=9739

		lysine methyltransferase		
TRMT2A	TRMT2A	tRNA methyltransferase 2 homolog A	27037	https://www.ncbi.nlm.nih.gov/gene/?term=27037
TBC1D10A	TBC1D10A	TBC1 domain family member 10A	83874	https://www.ncbi.nlm.nih.gov/gene/?term=83874
HSCB	HSCB	HscB mitochondrial iron-sulfur cluster cochaperone	150274	https://www.ncbi.nlm.nih.gov/gene/?term=150274
LMF2	LMF2	lipase maturation factor 2	91289	https://www.ncbi.nlm.nih.gov/gene/?term=91289
HIF1A	HIF1A	hypoxia inducible factor 1 subunit alpha	3091	https://www.ncbi.nlm.nih.gov/gene/?term=3091
ZFYVE21	ZFYVE21	zinc finger FYVE-type containing 21	79038	https://www.ncbi.nlm.nih.gov/gene/?term=79038
PCNX1	PCNX1	pecanex 1	22990	https://www.ncbi.nlm.nih.gov/gene/?term=22990
RPS6KA5	RPS6KA5	ribosomal protein S6 kinase A5	9252	https://www.ncbi.nlm.nih.gov/gene/?term=9252
YY1	YY1	YY1 transcription factor	7528	https://www.ncbi.nlm.nih.gov/gene/?term=7528
ACIN1	ACIN1	apoptotic chromatin condensation inducer 1	22985	https://www.ncbi.nlm.nih.gov/gene/?term=22985
MMP9	MMP9	matrix metalloproteinase 9	4318	https://www.ncbi.nlm.nih.gov/gene/?term=4318
ABHD12	ABHD12	abhydrolase domain containing 12	26090	https://www.ncbi.nlm.nih.gov/gene/?term=26090
CTSZ	CTSZ	cathepsin Z	1522	https://www.ncbi.nlm.nih.gov/gene/?term=1522
GID8	GID8	GID complex subunit 8 homolog	54994	https://www.ncbi.nlm.nih.gov/gene/?term=54994
PLCB4	PLCB4	phospholipase C beta 4	5332	https://www.ncbi.nlm.nih.gov/gene/?term=5332
SAMHD1	SAMHD1	SAM and HD domain containing deoxynucleoside triphosphate triphosphohydrolase 1	25939	https://www.ncbi.nlm.nih.gov/gene/?term=25939
MAP1LC3A	MAP1LC3A	microtubule associated protein 1 light chain 3 alpha	84557	https://www.ncbi.nlm.nih.gov/gene/?term=84557
CEP76	CEP76	centrosomal protein 76	79959	https://www.ncbi.nlm.nih.gov/gene/?term=79959
MIB1	MIB1	mindbomb E3 ubiquitin protein ligase 1	57534	https://www.ncbi.nlm.nih.gov/gene/?term=57534
SRPX	SRPX	sushi repeat containing protein X-linked	8406	https://www.ncbi.nlm.nih.gov/gene/?term=8406
SMS	SMS	spermine synthase	6611	https://www.ncbi.nlm.nih.gov/gene/?term=6611
MAGED2	MAGED2	MAGE family member D2	10916	https://www.ncbi.nlm.nih.gov/gene/?term=10916

UGGT2	UGGT2	UDP-glucose glycoprotein glucosyltransferase 2	55757	https://www.ncbi.nlm.nih.gov/gene/?term=55757
MMP15	MMP15	matrix metalloproteinase 15	4324	https://www.ncbi.nlm.nih.gov/gene/?term=4324
SETD6	SETD6	SET domain containing 6, protein lysine methyltransferase	79918	https://www.ncbi.nlm.nih.gov/gene/?term=79918
ZNF174	ZNF174	zinc finger protein 174	7727	https://www.ncbi.nlm.nih.gov/gene/?term=7727
AQP8	AQP8	aquaporin 8	343	https://www.ncbi.nlm.nih.gov/gene/?term=343
BCKDK	BCKDK	branched chain ketoacid dehydrogenase kinase	10295	https://www.ncbi.nlm.nih.gov/gene/?term=10295
SYT17	SYT17	synaptotagmin 17	51760	https://www.ncbi.nlm.nih.gov/gene/?term=51760
RPAP1	RPAP1	RNA polymerase II associated protein 1	26015	https://www.ncbi.nlm.nih.gov/gene/?term=26015
SPG11	SPG11	SPG11, spatacsin vesicle trafficking associated	80208	https://www.ncbi.nlm.nih.gov/gene/?term=80208
SGK3	SGK3	serum/glucocorticoid regulated kinase family member 3	23678	https://www.ncbi.nlm.nih.gov/gene/?term=23678
RP1	RP1	RP1, axonemal microtubule associated	6101	https://www.ncbi.nlm.nih.gov/gene/?term=6101
FCGRT	FCGRT	Fc fragment of IgG receptor and transporter	2217	https://www.ncbi.nlm.nih.gov/gene/?term=2217
TRMT1	TRMT1	tRNA methyltransferase 1	55621	https://www.ncbi.nlm.nih.gov/gene/?term=55621
DMPK	DMPK	DM1 protein kinase	1760	https://www.ncbi.nlm.nih.gov/gene/?term=1760
SGTA	SGTA	small glutamine rich tetratricopeptide repeat containing alpha	6449	https://www.ncbi.nlm.nih.gov/gene/?term=6449
PRX	PRX	periaxin	57716	https://www.ncbi.nlm.nih.gov/gene/?term=57716
NUMBL	NUMBL	NUMB like, endocytic adaptor protein	9253	https://www.ncbi.nlm.nih.gov/gene/?term=9253
HNRNPU L1	HNRNPUL1	heterogeneous nuclear ribonucleoprotein U like 1	11100	https://www.ncbi.nlm.nih.gov/gene/?term=11100
COMP	COMP	cartilage oligomeric matrix protein	1311	https://www.ncbi.nlm.nih.gov/gene/?term=1311
LSR	LSR	lipolysis stimulated lipoprotein receptor	51599	https://www.ncbi.nlm.nih.gov/gene/?term=51599
SCN1B	SCN1B	sodium voltage-gated channel beta subunit 1	6324	https://www.ncbi.nlm.nih.gov/gene/?term=6324
PON3	PON3	paraoxonase 3	5446	https://www.ncbi.nlm.nih.gov/gene/?term=5446

NPVF	NPVF	neuropeptide VF precursor	64111	https://www.ncbi.nlm.nih.gov/gene/?term=64111
WASL	WASL	Wiskott-Aldrich syndrome like	8976	https://www.ncbi.nlm.nih.gov/gene/?term=8976
SPAM1	SPAM1	sperm adhesion molecule 1	6677	https://www.ncbi.nlm.nih.gov/gene/?term=6677
IMPDH1	IMPDH1	inosine monophosphate dehydrogenase 1	3614	https://www.ncbi.nlm.nih.gov/gene/?term=3614
CORO2A	CORO2A	coronin 2A	7464	https://www.ncbi.nlm.nih.gov/gene/?term=7464
C5	C5	complement C5	727	https://www.ncbi.nlm.nih.gov/gene/?term=727
DDX58	DDX58	DEXD/H-box helicase 58	23586	https://www.ncbi.nlm.nih.gov/gene/?term=23586
RAPGEF1	RAPGEF1	Rap guanine nucleotide exchange factor 1	2889	https://www.ncbi.nlm.nih.gov/gene/?term=2889
GATA3	GATA3	GATA binding protein 3	2625	https://www.ncbi.nlm.nih.gov/gene/?term=2625
NSMCE4A	NSMCE4A	NSE4 homolog A, SMC5-SMC6 complex component	54780	https://www.ncbi.nlm.nih.gov/gene/?term=54780
PALD1	PALD1	phosphatase domain containing paladin 1	27143	https://www.ncbi.nlm.nih.gov/gene/?term=27143
MICU1	MICU1	mitochondrial calcium uptake 1	10367	https://www.ncbi.nlm.nih.gov/gene/?term=10367
TLX1	TLX1	T cell leukemia homeobox 1	3195	https://www.ncbi.nlm.nih.gov/gene/?term=3195
EDRF1	EDRF1	erythroid differentiation regulatory factor 1	26098	https://www.ncbi.nlm.nih.gov/gene/?term=26098
AKAP10	AKAP10	A-kinase anchoring protein 10	11216	https://www.ncbi.nlm.nih.gov/gene/?term=11216
COL1A1	COL1A1	collagen type I alpha 1 chain	1277	https://www.ncbi.nlm.nih.gov/gene/?term=1277
VAT1	VAT1	vesicle amine transport 1	10493	https://www.ncbi.nlm.nih.gov/gene/?term=10493
INPP4B	INPP4B	inositol polyphosphate-4-phosphatase type II B	8821	https://www.ncbi.nlm.nih.gov/gene/?term=8821
GLRB	GLRB	glycine receptor beta	2743	https://www.ncbi.nlm.nih.gov/gene/?term=2743
PPARGC1A	PPARGC1A	PPARG coactivator 1 alpha	10891	https://www.ncbi.nlm.nih.gov/gene/?term=10891
SIAE	SIAE	sialic acid acetyltransferase	54414	https://www.ncbi.nlm.nih.gov/gene/?term=54414
DTX4	DTX4	deltex E3 ubiquitin ligase 4	23220	https://www.ncbi.nlm.nih.gov/gene/?term=23220
ATG2A	ATG2A	autophagy related 2A	23130	https://www.ncbi.nlm.nih.gov/gene/?term=23130
APOA5	APOA5	apolipoprotein A5	116519	https://www.ncbi.nlm.nih.gov/gene/?term=116519
PDHX	PDHX	pyruvate dehydrogenase complex component X	8050	https://www.ncbi.nlm.nih.gov/gene/?term=8050

MADD	MADD	MAP kinase activating death domain	8567	https://www.ncbi.nlm.nih.gov/gene/?term=8567
ASIC1	ASIC1	acid sensing ion channel subunit 1	41	https://www.ncbi.nlm.nih.gov/gene/?term=41
SLC11A2	SLC11A2	solute carrier family 11 member 2	4891	https://www.ncbi.nlm.nih.gov/gene/?term=4891
FOXM1	FOXM1	forkhead box M1	2305	https://www.ncbi.nlm.nih.gov/gene/?term=2305
ENDOU	ENDOU	endonuclease, poly(U) specific	8909	https://www.ncbi.nlm.nih.gov/gene/?term=8909
ATN1	ATN1	atrophin 1	1822	https://www.ncbi.nlm.nih.gov/gene/?term=1822
PTPN6	PTPN6	protein tyrosine phosphatase, non-receptor type 6	5777	https://www.ncbi.nlm.nih.gov/gene/?term=5777
SRSF9	SRSF9	serine and arginine rich splicing factor 9	8683	https://www.ncbi.nlm.nih.gov/gene/?term=8683
RNGTT	RNGTT	RNA guanylyltransferase and 5'-phosphatase	8732	https://www.ncbi.nlm.nih.gov/gene/?term=8732
SLC26A8	SLC26A8	solute carrier family 26 member 8	116369	https://www.ncbi.nlm.nih.gov/gene/?term=116369
RHAG	RHAG	Rh associated glycoprotein	6005	https://www.ncbi.nlm.nih.gov/gene/?term=6005
COL9A1	COL9A1	collagen type IX alpha 1 chain	1297	https://www.ncbi.nlm.nih.gov/gene/?term=1297
MED23	MED23	mediator complex subunit 23	9439	https://www.ncbi.nlm.nih.gov/gene/?term=9439
VNN1	VNN1	vanin 1	8876	https://www.ncbi.nlm.nih.gov/gene/?term=8876
PERP	PERP	PERP, TP53 apoptosis effector	64065	https://www.ncbi.nlm.nih.gov/gene/?term=64065
TMEM30A	TMEM30A	transmembrane protein 30A	55754	https://www.ncbi.nlm.nih.gov/gene/?term=55754
TTK	TTK	TTK protein kinase	7272	https://www.ncbi.nlm.nih.gov/gene/?term=7272
HARS2	HARS2	histidyl-tRNA synthetase 2, mitochondrial	23438	https://www.ncbi.nlm.nih.gov/gene/?term=23438
DROSHA	DROSHA	drosha ribonuclease III	29102	https://www.ncbi.nlm.nih.gov/gene/?term=29102
SLC27A6	SLC27A6	solute carrier family 27 member 6	28965	https://www.ncbi.nlm.nih.gov/gene/?term=28965
GNPDA1	GNPDA1	glucosamine-6-phosphate deaminase 1	10007	https://www.ncbi.nlm.nih.gov/gene/?term=10007
HMGXB3	HMGXB3	HMG-box containing 3	22993	https://www.ncbi.nlm.nih.gov/gene/?term=22993
PDGFRB	PDGFRB	platelet derived growth factor receptor beta	5159	https://www.ncbi.nlm.nih.gov/gene/?term=5159
CLDN16	CLDN16	claudin 16	10686	https://www.ncbi.nlm.nih.gov/gene/?term=10686
XRN1	XRN1	5'-3' exoribonuclease 1	54464	https://www.ncbi.nlm.nih.gov/gene/?term=54464

NEK11	NEK11	NIMA related kinase 11	79858	https://www.ncbi.nlm.nih.gov/gene/?term=79858
HEMK1	HEMK1	HemK methyltransferase family member 1	51409	https://www.ncbi.nlm.nih.gov/gene/?term=51409
MAPKAPK3	MAPKAPK3	mitogen-activated protein kinase-activated protein kinase 3	7867	https://www.ncbi.nlm.nih.gov/gene/?term=7867
CLCN2	CLCN2	chloride voltage-gated channel 2	1181	https://www.ncbi.nlm.nih.gov/gene/?term=1181
NEK4	NEK4	NIMA related kinase 4	6787	https://www.ncbi.nlm.nih.gov/gene/?term=6787
NCL	NCL	nucleolin	4691	https://www.ncbi.nlm.nih.gov/gene/?term=4691
CENPA	CENPA	centromere protein A	1058	https://www.ncbi.nlm.nih.gov/gene/?term=1058
GCA	GCA	grancalcin	25801	https://www.ncbi.nlm.nih.gov/gene/?term=25801
PECR	PECR	peroxisomal trans-2-enoyl-CoA reductase	55825	https://www.ncbi.nlm.nih.gov/gene/?term=55825
EHBP1	EHBP1	EH domain binding protein 1	23301	https://www.ncbi.nlm.nih.gov/gene/?term=23301
SLC9A2	SLC9A2	solute carrier family 9 member A2	6549	https://www.ncbi.nlm.nih.gov/gene/?term=6549
BIRC6	BIRC6	baculoviral IAP repeat containing 6	57448	https://www.ncbi.nlm.nih.gov/gene/?term=57448
LCT	LCT	lactase	3938	https://www.ncbi.nlm.nih.gov/gene/?term=3938
C2orf42	C2orf42	chromosome 2 open reading frame 42	54980	https://www.ncbi.nlm.nih.gov/gene/?term=54980
QSOX1	QSOX1	quiescin sulfhydryl oxidase 1	5768	https://www.ncbi.nlm.nih.gov/gene/?term=5768
FBXO2	FBXO2	F-box protein 2	26232	https://www.ncbi.nlm.nih.gov/gene/?term=26232
CRYZ	CRYZ	crystallin zeta	1429	https://www.ncbi.nlm.nih.gov/gene/?term=1429
EXOC8	EXOC8	exocyst complex component 8	149371	https://www.ncbi.nlm.nih.gov/gene/?term=149371
ACADM	ACADM	acyl-CoA dehydrogenase medium chain	34	https://www.ncbi.nlm.nih.gov/gene/?term=34
PRDX6	PRDX6	peroxiredoxin 6	9588	https://www.ncbi.nlm.nih.gov/gene/?term=9588
ESYT2	ESYT2	extended synaptotagmin 2	57488	https://www.ncbi.nlm.nih.gov/gene/?term=57488
A4GNT	A4GNT	alpha-1,4-N-acetylglucosaminyltransferase	51146	https://www.ncbi.nlm.nih.gov/gene/?term=51146
IFT46	IFT46	intraflagellar transport 46	56912	https://www.ncbi.nlm.nih.gov/gene/?term=56912
TNNT2	TNNT2	troponin T2, cardiac type	7139	https://www.ncbi.nlm.nih.gov/gene/?term=7139
FASTKD2	FASTKD2	FAST kinase domains 2	22868	https://www.ncbi.nlm.nih.gov/gene/?term=22868

ATP10B	ATP10B	ATPase phospholipid transporting 10B (putative)	23120	https://www.ncbi.nlm.nih.gov/gene/?term=23120
SPACA1	SPACA1	sperm acrosome associated 1	81833	https://www.ncbi.nlm.nih.gov/gene/?term=81833
ZC2HC1B	ZC2HC1B	zinc finger C2HC-type containing 1B	153918	https://www.ncbi.nlm.nih.gov/gene/?term=153918
VAMP8	VAMP8	vesicle associated membrane protein 8	8673	https://www.ncbi.nlm.nih.gov/gene/?term=8673
RPN2	RPN2	ribophorin II	6185	https://www.ncbi.nlm.nih.gov/gene/?term=6185
SENP5	SENP5	SUMO specific peptidase 5	205564	https://www.ncbi.nlm.nih.gov/gene/?term=205564
HEATR1	HEATR1	HEAT repeat containing 1	55127	https://www.ncbi.nlm.nih.gov/gene/?term=55127
CNTRL	CNTRL	centriolin	11064	https://www.ncbi.nlm.nih.gov/gene/?term=11064
SLIRP	SLIRP	SRA stem-loop interacting RNA binding protein	81892	https://www.ncbi.nlm.nih.gov/gene/?term=81892
IFIT2	IFIT2	interferon induced protein with tetratricopeptide repeats 2	3433	https://www.ncbi.nlm.nih.gov/gene/?term=3433
PYROXD2	PYROXD2	pyridine nucleotide-disulphide oxidoreductase domain 2	84795	https://www.ncbi.nlm.nih.gov/gene/?term=84795
MXI1	MXI1	MAX interactor 1, dimerization protein	4601	https://www.ncbi.nlm.nih.gov/gene/?term=4601
PANK3	PANK3	pantothenate kinase 3	79646	https://www.ncbi.nlm.nih.gov/gene/?term=79646
PLEKHG1	PLEKHG1	pleckstrin homology and RhoGEF domain containing G1	57480	https://www.ncbi.nlm.nih.gov/gene/?term=57480
MTERF2	MTERF2	mitochondrial transcription termination factor 2	80298	https://www.ncbi.nlm.nih.gov/gene/?term=80298
TBX2	TBX2	T-box 2	6909	https://www.ncbi.nlm.nih.gov/gene/?term=6909
DPPA4	DPPA4	developmental pluripotency associated 4	55211	https://www.ncbi.nlm.nih.gov/gene/?term=55211
CRY2	CRY2	cryptochrome circadian regulator 2	1408	https://www.ncbi.nlm.nih.gov/gene/?term=1408
PLG	PLG	plasminogen	5340	https://www.ncbi.nlm.nih.gov/gene/?term=5340
RBBP6	RBBP6	RB binding protein 6, ubiquitin ligase	5930	https://www.ncbi.nlm.nih.gov/gene/?term=5930
NEUROG3	NEUROG3	neurogenin 3	50674	https://www.ncbi.nlm.nih.gov/gene/?term=50674
EBPL	EBPL	EBP like	84650	https://www.ncbi.nlm.nih.gov/gene/?term=84650

ITIH5	ITIH5	inter-alpha-trypsin inhibitor heavy chain family member 5	80760	https://www.ncbi.nlm.nih.gov/gene/?term=80760
MXD4	MXD4	MAX dimerization protein 4	10608	https://www.ncbi.nlm.nih.gov/gene/?term=10608
MOGAT1	MOGAT1	monoacylglycerol O-acyltransferase 1	116255	https://www.ncbi.nlm.nih.gov/gene/?term=116255
GCNT7	GCNT7	glucosaminyl (N-acetyl) transferase family member 7	140687	https://www.ncbi.nlm.nih.gov/gene/?term=140687
ZNFX1	ZNFX1	zinc finger NFX1-type containing 1	57169	https://www.ncbi.nlm.nih.gov/gene/?term=57169
VAMP7	VAMP7	vesicle associated membrane protein 7	6845	https://www.ncbi.nlm.nih.gov/gene/?term=6845
LYPD3	LYPD3	LY6/PLAUR domain containing 3	27076	https://www.ncbi.nlm.nih.gov/gene/?term=27076
CRISP2	CRISP2	cysteine rich secretory protein 2	7180	https://www.ncbi.nlm.nih.gov/gene/?term=7180
TRERF1	TRERF1	transcriptional regulating factor 1	55809	https://www.ncbi.nlm.nih.gov/gene/?term=55809
GTF2F1	GTF2F1	general transcription factor IIF subunit 1	2962	https://www.ncbi.nlm.nih.gov/gene/?term=2962
ALKBH7	ALKBH7	alkB homolog 7	84266	https://www.ncbi.nlm.nih.gov/gene/?term=84266
ATG4C	ATG4C	autophagy related 4C cysteine peptidase	84938	https://www.ncbi.nlm.nih.gov/gene/?term=84938
GPCPD1	GPCPD1	glycerophosphocholine phosphodiesterase 1	56261	https://www.ncbi.nlm.nih.gov/gene/?term=56261
BFSP1	BFSP1	beaded filament structural protein 1	631	https://www.ncbi.nlm.nih.gov/gene/?term=631
NCLN	NCLN	nicalin	56926	https://www.ncbi.nlm.nih.gov/gene/?term=56926
FRMD8	FRMD8	FERM domain containing 8	83786	https://www.ncbi.nlm.nih.gov/gene/?term=83786
PRR12	PRR12	proline rich 12	57479	https://www.ncbi.nlm.nih.gov/gene/?term=57479
AHDC1	AHDC1	AT-hook DNA binding motif containing 1	27245	https://www.ncbi.nlm.nih.gov/gene/?term=27245
KTN1	KTN1	kinectin 1	3895	https://www.ncbi.nlm.nih.gov/gene/?term=3895
RGS13	RGS13	regulator of G protein signaling 13	6003	https://www.ncbi.nlm.nih.gov/gene/?term=6003
TAS2R4	TAS2R4	taste 2 receptor member 4	50832	https://www.ncbi.nlm.nih.gov/gene/?term=50832
PLA2G5	PLA2G5	phospholipase A2 group V	5322	https://www.ncbi.nlm.nih.gov/gene/?term=5322
EPS15L1	EPS15L1	epidermal growth factor receptor pathway substrate 15 like 1	58513	https://www.ncbi.nlm.nih.gov/gene/?term=58513
KDR	KDR	kinase insert domain receptor	3791	https://www.ncbi.nlm.nih.gov/gene/?term=3791
MGAT3	MGAT3	mannosyl (beta-1,4)-glycoprotein beta-1,4-N-	4248	https://www.ncbi.nlm.nih.gov/gene/?term=4248

		acetylglucosaminyltransferase		
LIF	LIF	LIF, interleukin 6 family cytokine	3976	https://www.ncbi.nlm.nih.gov/gene/?term=3976
CCDC32	CCDC32	coiled-coil domain containing 32	90416	https://www.ncbi.nlm.nih.gov/gene/?term=90416
DLL4	DLL4	delta like canonical Notch ligand 4	54567	https://www.ncbi.nlm.nih.gov/gene/?term=54567
SUMF2	SUMF2	sulfatase modifying factor 2	25870	https://www.ncbi.nlm.nih.gov/gene/?term=25870
CSRP3	CSRP3	cysteine and glycine rich protein 3	8048	https://www.ncbi.nlm.nih.gov/gene/?term=8048
DCTD	DCTD	dCMP deaminase	1635	https://www.ncbi.nlm.nih.gov/gene/?term=1635
PLD2	PLD2	phospholipase D2	5338	https://www.ncbi.nlm.nih.gov/gene/?term=5338
PHF20L1	PHF20L1	PHD finger protein 20 like 1	51105	https://www.ncbi.nlm.nih.gov/gene/?term=51105
LDLR	LDLR	low density lipoprotein receptor	3949	https://www.ncbi.nlm.nih.gov/gene/?term=3949
ACE2	ACE2	angiotensin I converting enzyme 2	59272	https://www.ncbi.nlm.nih.gov/gene/?term=59272
FAM98C	FAM98C	family with sequence similarity 98 member C	147965	https://www.ncbi.nlm.nih.gov/gene/?term=147965
ACSBG2	ACSBG2	acyl-CoA synthetase bubblegum family member 2	81616	https://www.ncbi.nlm.nih.gov/gene/?term=81616
MLLT1	MLLT1	MLLT1, super elongation complex subunit	4298	https://www.ncbi.nlm.nih.gov/gene/?term=4298
METTL26	METTL26	methyltransferase like 26	84326	https://www.ncbi.nlm.nih.gov/gene/?term=84326
GMFG	GMFG	glia maturation factor gamma	9535	https://www.ncbi.nlm.nih.gov/gene/?term=9535
SMPDL3B	SMPDL3B	sphingomyelin phosphodiesterase acid like 3B	27293	https://www.ncbi.nlm.nih.gov/gene/?term=27293
HIP1R	HIP1R	huntingtin interacting protein 1 related	9026	https://www.ncbi.nlm.nih.gov/gene/?term=9026
ANGPTL6	ANGPTL6	angiopoietin like 6	83854	https://www.ncbi.nlm.nih.gov/gene/?term=83854
DKC1	DKC1	dyskerin pseudouridine synthase 1	1736	https://www.ncbi.nlm.nih.gov/gene/?term=1736
ZNF341	ZNF341	zinc finger protein 341	84905	https://www.ncbi.nlm.nih.gov/gene/?term=84905
DIAPH1	DIAPH1	diaphanous related formin 1	1729	https://www.ncbi.nlm.nih.gov/gene/?term=1729
NPHP4	NPHP4	nephrocystin 4	261734	https://www.ncbi.nlm.nih.gov/gene/?term=261734
TNS4	TNS4	tensin 4	84951	https://www.ncbi.nlm.nih.gov/gene/?term=84951
SNRPA1	SNRPA1	small nuclear ribonucleoprotein polypeptide A'	6627	https://www.ncbi.nlm.nih.gov/gene/?term=6627

ACTR10	ACTR10	actin related protein 10	55860	https://www.ncbi.nlm.nih.gov/gene/?term=55860
TRIM21	TRIM21	tripartite motif containing 21	6737	https://www.ncbi.nlm.nih.gov/gene/?term=6737
IMMT	IMMT	inner membrane mitochondrial protein	10989	https://www.ncbi.nlm.nih.gov/gene/?term=10989
RAMP1	RAMP1	receptor activity modifying protein 1	10267	https://www.ncbi.nlm.nih.gov/gene/?term=10267
PTPRE	PTPRE	protein tyrosine phosphatase, receptor type E	5791	https://www.ncbi.nlm.nih.gov/gene/?term=5791
LANCL2	LANCL2	LanC like 2	55915	https://www.ncbi.nlm.nih.gov/gene/?term=55915
KDM6B	KDM6B	lysine demethylase 6B	23135	https://www.ncbi.nlm.nih.gov/gene/?term=23135
GUCY2D	GUCY2D	guanylate cyclase 2D, retinal	3000	https://www.ncbi.nlm.nih.gov/gene/?term=3000
RIN2	RIN2	Ras and Rab interactor 2	54453	https://www.ncbi.nlm.nih.gov/gene/?term=54453
KANK4	KANK4	KN motif and ankyrin repeat domains 4	163782	https://www.ncbi.nlm.nih.gov/gene/?term=163782
LGR6	LGR6	leucine rich repeat containing G protein-coupled receptor 6	59352	https://www.ncbi.nlm.nih.gov/gene/?term=59352
TMCC2	TMCC2	transmembrane and coiled-coil domain family 2	9911	https://www.ncbi.nlm.nih.gov/gene/?term=9911
GPALPP1	GPALPP1	GPALPP motifs containing 1	55425	https://www.ncbi.nlm.nih.gov/gene/?term=55425
SLC39A11	SLC39A11	solute carrier family 39 member 11	201266	https://www.ncbi.nlm.nih.gov/gene/?term=201266
ZNF414	ZNF414	zinc finger protein 414	84330	https://www.ncbi.nlm.nih.gov/gene/?term=84330
RTN3	RTN3	reticulon 3	10313	https://www.ncbi.nlm.nih.gov/gene/?term=10313
ATP13A3	ATP13A3	ATPase 13A3	79572	https://www.ncbi.nlm.nih.gov/gene/?term=79572
DYDC2	DYDC2	DPY30 domain containing 2	84332	https://www.ncbi.nlm.nih.gov/gene/?term=84332
MEN1	MEN1	menin 1	4221	https://www.ncbi.nlm.nih.gov/gene/?term=4221
CHL1	CHL1	cell adhesion molecule L1 like	10752	https://www.ncbi.nlm.nih.gov/gene/?term=10752
PRPF38B	PRPF38B	pre-mRNA processing factor 38B	55119	https://www.ncbi.nlm.nih.gov/gene/?term=55119
RAX	RAX	retina and anterior neural fold homeobox	30062	https://www.ncbi.nlm.nih.gov/gene/?term=30062
DSC2	DSC2	desmocollin 2	1824	https://www.ncbi.nlm.nih.gov/gene/?term=1824
DSG1	DSG1	desmoglein 1	1828	https://www.ncbi.nlm.nih.gov/gene/?term=1828
DSC1	DSC1	desmocollin 1	1823	https://www.ncbi.nlm.nih.gov/gene/?term=1823
UBAC2	UBAC2	UBA domain containing 2	337867	https://www.ncbi.nlm.nih.gov/gene/?term=337867

CARS2	CARS2	cysteinyl-tRNA synthetase 2, mitochondrial	79587	https://www.ncbi.nlm.nih.gov/gene/?term=79587
HNF1A	HNF1A	HNF1 homeobox A	6927	https://www.ncbi.nlm.nih.gov/gene/?term=6927
KRT85	KRT85	keratin 85	3891	https://www.ncbi.nlm.nih.gov/gene/?term=3891
NHSL1	NHSL1	NHS like 1	57224	https://www.ncbi.nlm.nih.gov/gene/?term=57224
KIAA0513	KIAA0513	KIAA0513	9764	https://www.ncbi.nlm.nih.gov/gene/?term=9764
KCNK1	KCNK1	potassium two pore domain channel subfamily K member 1	3775	https://www.ncbi.nlm.nih.gov/gene/?term=3775
TAF5L	TAF5L	TATA-box binding protein associated factor 5 like	27097	https://www.ncbi.nlm.nih.gov/gene/?term=27097
RNASEL	RNASEL	ribonuclease L	6041	https://www.ncbi.nlm.nih.gov/gene/?term=6041
DNAJB2	DNAJB2	DnaJ heat shock protein family (Hsp40) member B2	3300	https://www.ncbi.nlm.nih.gov/gene/?term=3300
COX5B	COX5B	cytochrome c oxidase subunit 5B	1329	https://www.ncbi.nlm.nih.gov/gene/?term=1329
EDNRB	EDNRB	endothelin receptor type B	1910	https://www.ncbi.nlm.nih.gov/gene/?term=1910
GPNMB	GPNMB	glycoprotein nmb	10457	https://www.ncbi.nlm.nih.gov/gene/?term=10457
TBRG4	TBRG4	transforming growth factor beta regulator 4	9238	https://www.ncbi.nlm.nih.gov/gene/?term=9238
ZFH2	ZFH2	zinc finger homeobox 2	85446	https://www.ncbi.nlm.nih.gov/gene/?term=85446
KCTD3	KCTD3	potassium channel tetramerization domain containing 3	51133	https://www.ncbi.nlm.nih.gov/gene/?term=51133
TXN	TXN	thioredoxin	7295	https://www.ncbi.nlm.nih.gov/gene/?term=7295
DAB2IP	DAB2IP	DAB2 interacting protein	153090	https://www.ncbi.nlm.nih.gov/gene/?term=153090
ZNF189	ZNF189	zinc finger protein 189	7743	https://www.ncbi.nlm.nih.gov/gene/?term=7743
HEMGN	HEMGN	hemogen	55363	https://www.ncbi.nlm.nih.gov/gene/?term=55363
FAM8A1	FAM8A1	family with sequence similarity 8 member A1	51439	https://www.ncbi.nlm.nih.gov/gene/?term=51439
GGH	GGH	gamma-glutamyl hydrolase	8836	https://www.ncbi.nlm.nih.gov/gene/?term=8836
NEK1	NEK1	NIMA related kinase 1	4750	https://www.ncbi.nlm.nih.gov/gene/?term=4750
SORL1	SORL1	sortilin related receptor 1	6653	https://www.ncbi.nlm.nih.gov/gene/?term=6653
GIPC2	GIPC2	GIPC PDZ domain containing family member 2	54810	https://www.ncbi.nlm.nih.gov/gene/?term=54810

CGREF1	CGREF1	cell growth regulator with EF-hand domain 1	10669	https://www.ncbi.nlm.nih.gov/gene/?term=10669
ATRAID	ATRAID	all-trans retinoic acid induced differentiation factor	51374	https://www.ncbi.nlm.nih.gov/gene/?term=51374
TRIM54	TRIM54	tripartite motif containing 54	57159	https://www.ncbi.nlm.nih.gov/gene/?term=57159
ENTPD1	ENTPD1	ectonucleoside triphosphate diphosphohydrolase 1	953	https://www.ncbi.nlm.nih.gov/gene/?term=953
ANXA7	ANXA7	annexin A7	310	https://www.ncbi.nlm.nih.gov/gene/?term=310
FAM149B1	FAM149B1	family with sequence similarity 149 member B1	317662	https://www.ncbi.nlm.nih.gov/gene/?term=317662
HECW2	HECW2	HECT, C2 and WW domain containing E3 ubiquitin protein ligase 2	57520	https://www.ncbi.nlm.nih.gov/gene/?term=57520
COX17	COX17	cytochrome c oxidase copper chaperone COX17	10063	https://www.ncbi.nlm.nih.gov/gene/?term=10063
MNS1	MNS1	meiosis specific nuclear structural 1	55329	https://www.ncbi.nlm.nih.gov/gene/?term=55329
FGF5	FGF5	fibroblast growth factor 5	2250	https://www.ncbi.nlm.nih.gov/gene/?term=2250
PPA2	PPA2	pyrophosphatase (inorganic) 2	27068	https://www.ncbi.nlm.nih.gov/gene/?term=27068
PARVG	PARVG	parvin gamma	64098	https://www.ncbi.nlm.nih.gov/gene/?term=64098
SCAF11	SCAF11	SR-related CTD associated factor 11	9169	https://www.ncbi.nlm.nih.gov/gene/?term=9169
SLC15A4	SLC15A4	solute carrier family 15 member 4	121260	https://www.ncbi.nlm.nih.gov/gene/?term=121260
TARBP2	TARBP2	TARBP2, RISC loading complex RNA binding subunit	6895	https://www.ncbi.nlm.nih.gov/gene/?term=6895
NIPA2	NIPA2	NIPA magnesium transporter 2	81614	https://www.ncbi.nlm.nih.gov/gene/?term=81614
BAHD1	BAHD1	bromo adjacent homology domain containing 1	22893	https://www.ncbi.nlm.nih.gov/gene/?term=22893
PIF1	PIF1	PIF1 5'-to-3' DNA helicase	80119	https://www.ncbi.nlm.nih.gov/gene/?term=80119
LINS1	LINS1	lines homolog 1	55180	https://www.ncbi.nlm.nih.gov/gene/?term=55180
LMAN1L	LMAN1L	lectin, mannose binding 1 like	79748	https://www.ncbi.nlm.nih.gov/gene/?term=79748
SLC5A2	SLC5A2	solute carrier family 5 member 2	6524	https://www.ncbi.nlm.nih.gov/gene/?term=6524
DEF8	DEF8	differentially expressed in FDCP 8 homolog	54849	https://www.ncbi.nlm.nih.gov/gene/?term=54849
PCTP	PCTP	phosphatidylcholine transfer protein	58488	https://www.ncbi.nlm.nih.gov/gene/?term=58488

SLC39A6	SLC39A6	solute carrier family 39 member 6	25800	https://www.ncbi.nlm.nih.gov/gene/?term=25800
ZMYND15	ZMYND15	zinc finger MYND-type containing 15	84225	https://www.ncbi.nlm.nih.gov/gene/?term=84225
NARF	NARF	nuclear prelamin A recognition factor	26502	https://www.ncbi.nlm.nih.gov/gene/?term=26502
ZNF750	ZNF750	zinc finger protein 750	79755	https://www.ncbi.nlm.nih.gov/gene/?term=79755
NFIC	NFIC	nuclear factor I C	4782	https://www.ncbi.nlm.nih.gov/gene/?term=4782
PLPP2	PLPP2	phospholipid phosphatase 2	8612	https://www.ncbi.nlm.nih.gov/gene/?term=8612
FEM1A	FEM1A	fem-1 homolog A	55527	https://www.ncbi.nlm.nih.gov/gene/?term=55527
VAV1	VAV1	vav guanine nucleotide exchange factor 1	7409	https://www.ncbi.nlm.nih.gov/gene/?term=7409
DOP1B	DOP1B	DOP1 leucine zipper like protein B	9980	https://www.ncbi.nlm.nih.gov/gene/?term=9980
ILDR2	ILDR2	immunoglobulin like domain containing receptor 2	387597	https://www.ncbi.nlm.nih.gov/gene/?term=387597
NUF2	NUF2	NDC80 kinetochore complex component NUF2	83540	https://www.ncbi.nlm.nih.gov/gene/?term=83540
ISG20L2	ISG20L2	interferon stimulated exonuclease gene 20 like 2	81875	https://www.ncbi.nlm.nih.gov/gene/?term=81875
RORC	RORC	RAR related orphan receptor C	6097	https://www.ncbi.nlm.nih.gov/gene/?term=6097
SNX27	SNX27	sorting nexin family member 27	81609	https://www.ncbi.nlm.nih.gov/gene/?term=81609
RFX5	RFX5	regulatory factor X5	5993	https://www.ncbi.nlm.nih.gov/gene/?term=5993
POGZ	POGZ	pogo transposable element derived with ZNF domain	23126	https://www.ncbi.nlm.nih.gov/gene/?term=23126
DTL	DTL	denticleless E3 ubiquitin protein ligase homolog	51514	https://www.ncbi.nlm.nih.gov/gene/?term=51514
SOX13	SOX13	SRY-box 13	9580	https://www.ncbi.nlm.nih.gov/gene/?term=9580
PLEKHA6	PLEKHA6	pleckstrin homology domain containing A6	22874	https://www.ncbi.nlm.nih.gov/gene/?term=22874
ATP6V1C2	ATP6V1C2	ATPase H+ transporting V1 subunit C2	245973	https://www.ncbi.nlm.nih.gov/gene/?term=245973
ASXL2	ASXL2	ASXL transcriptional regulator 2	55252	https://www.ncbi.nlm.nih.gov/gene/?term=55252
ABHD1	ABHD1	abhydrolase domain containing 1	84696	https://www.ncbi.nlm.nih.gov/gene/?term=84696
NXPH2	NXPH2	neurexophilin 2	11249	https://www.ncbi.nlm.nih.gov/gene/?term=11249
SPAG16	SPAG16	sperm associated antigen 16	79582	https://www.ncbi.nlm.nih.gov/gene/?term=79582

NR1I2	NR1I2	nuclear receptor subfamily 1 group I member 2	8856	https://www.ncbi.nlm.nih.gov/gene/?term=8856
SRPRB	SRPRB	SRP receptor subunit beta	58477	https://www.ncbi.nlm.nih.gov/gene/?term=58477
UCN2	UCN2	urocortin 2	90226	https://www.ncbi.nlm.nih.gov/gene/?term=90226
AHSG	AHSG	alpha 2-HS glycoprotein	197	https://www.ncbi.nlm.nih.gov/gene/?term=197
PLAC8	PLAC8	placenta specific 8	51316	https://www.ncbi.nlm.nih.gov/gene/?term=51316
NAF1	NAF1	nuclear assembly factor 1 ribonucleoprotein	92345	https://www.ncbi.nlm.nih.gov/gene/?term=92345
ROPN1L	ROPN1L	rhopilin associated tail protein 1 like	83853	https://www.ncbi.nlm.nih.gov/gene/?term=83853
SSBP2	SSBP2	single stranded DNA binding protein 2	23635	https://www.ncbi.nlm.nih.gov/gene/?term=23635
SLC25A48	SLC25A48	solute carrier family 25 member 48	153328	https://www.ncbi.nlm.nih.gov/gene/?term=153328
TNFRSF21	TNFRSF21	TNF receptor superfamily member 21	27242	https://www.ncbi.nlm.nih.gov/gene/?term=27242
DAAM2	DAAM2	dishevelled associated activator of morphogenesis 2	23500	https://www.ncbi.nlm.nih.gov/gene/?term=23500
PRSS35	PRSS35	serine protease 35	167681	https://www.ncbi.nlm.nih.gov/gene/?term=167681
AIG1	AIG1	androgen induced 1	51390	https://www.ncbi.nlm.nih.gov/gene/?term=51390
TMEM181	TMEM181	transmembrane protein 181	57583	https://www.ncbi.nlm.nih.gov/gene/?term=57583
NOM1	NOM1	nucleolar protein with MIF4G domain 1	64434	https://www.ncbi.nlm.nih.gov/gene/?term=64434
ASB10	ASB10	ankyrin repeat and SOCS box containing 10	136371	https://www.ncbi.nlm.nih.gov/gene/?term=136371
SH3KBP1	SH3KBP1	SH3 domain containing kinase binding protein 1	30011	https://www.ncbi.nlm.nih.gov/gene/?term=30011
ZMYM3	ZMYM3	zinc finger MYM-type containing 3	9203	https://www.ncbi.nlm.nih.gov/gene/?term=9203
AWAT2	AWAT2	acyl-CoA wax alcohol acyltransferase 2	158835	https://www.ncbi.nlm.nih.gov/gene/?term=158835
ST18	ST18	ST18, C2H2C-type zinc finger	9705	https://www.ncbi.nlm.nih.gov/gene/?term=9705
TACC1	TACC1	transforming acidic coiled-coil containing protein 1	6867	https://www.ncbi.nlm.nih.gov/gene/?term=6867
ST8SIA6	ST8SIA6	ST8 alpha-N-acetylneuraminide alpha-2,8-sialyltransferase 6	338596	https://www.ncbi.nlm.nih.gov/gene/?term=338596
HTR7	HTR7	5-hydroxytryptamine receptor 7	3363	https://www.ncbi.nlm.nih.gov/gene/?term=3363

CYP17A1	CYP17A1	cytochrome P450 family 17 subfamily A member 1	1586	https://www.ncbi.nlm.nih.gov/gene/?term=1586
TUT1	TUT1	terminal uridylyl transferase 1, U6 snRNA-specific	64852	https://www.ncbi.nlm.nih.gov/gene/?term=64852
HSD17B12	HSD17B12	hydroxysteroid 17-beta dehydrogenase 12	51144	https://www.ncbi.nlm.nih.gov/gene/?term=51144
DGKZ	DGKZ	diacylglycerol kinase zeta	8525	https://www.ncbi.nlm.nih.gov/gene/?term=8525
GLYAT	GLYAT	glycine-N-acyltransferase	10249	https://www.ncbi.nlm.nih.gov/gene/?term=10249
SERPING1	SERPING1	serpin family G member 1	710	https://www.ncbi.nlm.nih.gov/gene/?term=710
ARFGAP2	ARFGAP2	ADP ribosylation factor GTPase activating protein 2	84364	https://www.ncbi.nlm.nih.gov/gene/?term=84364
CCDC82	CCDC82	coiled-coil domain containing 82	79780	https://www.ncbi.nlm.nih.gov/gene/?term=79780
CHEK1	CHEK1	checkpoint kinase 1	1111	https://www.ncbi.nlm.nih.gov/gene/?term=1111
COMMD7	COMMD7	COMM domain containing 7	149951	https://www.ncbi.nlm.nih.gov/gene/?term=149951
KIAA1755	KIAA1755	KIAA1755	85449	https://www.ncbi.nlm.nih.gov/gene/?term=85449
CDH22	CDH22	cadherin 22	64405	https://www.ncbi.nlm.nih.gov/gene/?term=64405
TRPT1	TRPT1	tRNA phosphotransferase 1	83707	https://www.ncbi.nlm.nih.gov/gene/?term=83707
DLAT	DLAT	dihydrolipoamide S-acetyltransferase	1737	https://www.ncbi.nlm.nih.gov/gene/?term=1737
PTS	PTS	6-pyruvoyltetrahydropterin synthase	5805	https://www.ncbi.nlm.nih.gov/gene/?term=5805
SCLT1	SCLT1	sodium channel and clathrin linker 1	132320	https://www.ncbi.nlm.nih.gov/gene/?term=132320
FAM160B1	FAM160B1	family with sequence similarity 160 member B1	57700	https://www.ncbi.nlm.nih.gov/gene/?term=57700
EDNRA	EDNRA	endothelin receptor type A	1909	https://www.ncbi.nlm.nih.gov/gene/?term=1909
BEND6	BEND6	BEN domain containing 6	221336	https://www.ncbi.nlm.nih.gov/gene/?term=221336
SETBP1	SETBP1	SET binding protein 1	26040	https://www.ncbi.nlm.nih.gov/gene/?term=26040
BMP3	BMP3	bone morphogenetic protein 3	651	https://www.ncbi.nlm.nih.gov/gene/?term=651
CPB1	CPB1	carboxypeptidase B1	1360	https://www.ncbi.nlm.nih.gov/gene/?term=1360
TMEM87B	TMEM87B	transmembrane protein 87B	84910	https://www.ncbi.nlm.nih.gov/gene/?term=84910
ZDHHC7	ZDHHC7	zinc finger DHHC-type containing 7	55625	https://www.ncbi.nlm.nih.gov/gene/?term=55625
TBCEL	TBCEL	tubulin folding cofactor E like	219899	https://www.ncbi.nlm.nih.gov/gene/?term=219899

CC2D1B	CC2D1B	coiled-coil and C2 domain containing 1B	200014	https://www.ncbi.nlm.nih.gov/gene/?term=200014
DIPK1A	DIPK1A	divergent protein kinase domain 1A	388650	https://www.ncbi.nlm.nih.gov/gene/?term=388650
AK9	AK9	adenylate kinase 9	221264	https://www.ncbi.nlm.nih.gov/gene/?term=221264
OXA1L	OXA1L	OXA1L, mitochondrial inner membrane protein	5018	https://www.ncbi.nlm.nih.gov/gene/?term=5018
LARP1	LARP1	La ribonucleoprotein domain family member 1	23367	https://www.ncbi.nlm.nih.gov/gene/?term=23367
CYLC2	CYLC2	cylicin 2	1539	https://www.ncbi.nlm.nih.gov/gene/?term=1539
ART3	ART3	ADP-ribosyltransferase 3	419	https://www.ncbi.nlm.nih.gov/gene/?term=419
SCAF4	SCAF4	SR-related CTD associated factor 4	57466	https://www.ncbi.nlm.nih.gov/gene/?term=57466
SUPV3L1	SUPV3L1	Suv3 like RNA helicase	6832	https://www.ncbi.nlm.nih.gov/gene/?term=6832
PDE6D	PDE6D	phosphodiesterase 6D	5147	https://www.ncbi.nlm.nih.gov/gene/?term=5147
FCHO2	FCHO2	FCH domain only 2	115548	https://www.ncbi.nlm.nih.gov/gene/?term=115548
C8A	C8A	complement C8 alpha chain	731	https://www.ncbi.nlm.nih.gov/gene/?term=731
SYN2	SYN2	synapsin II	6854	https://www.ncbi.nlm.nih.gov/gene/?term=6854
PWWP3B	PWWP3B	PWWP domain containing 3B	139221	https://www.ncbi.nlm.nih.gov/gene/?term=139221
ETS2	ETS2	NA	2114	https://www.ncbi.nlm.nih.gov/gene/?term=2114
MX1	MX1	MX dynamin like GTPase 1	4599	https://www.ncbi.nlm.nih.gov/gene/?term=4599
UBN2	UBN2	ubiquitin 2	254048	https://www.ncbi.nlm.nih.gov/gene/?term=254048
SKI	SKI	SKI proto-oncogene	6497	https://www.ncbi.nlm.nih.gov/gene/?term=6497
WIPI2	WIPI2	WD repeat domain, phosphoinositide interacting 2	26100	https://www.ncbi.nlm.nih.gov/gene/?term=26100
KRTCAP3	KRTCAP3	keratinocyte associated protein 3	200634	https://www.ncbi.nlm.nih.gov/gene/?term=200634
PAFAH2	PAFAH2	platelet activating factor acetylhydrolase 2	5051	https://www.ncbi.nlm.nih.gov/gene/?term=5051
ESYT3	ESYT3	extended synaptotagmin 3	83850	https://www.ncbi.nlm.nih.gov/gene/?term=83850
TENT5B	TENT5B	terminal nucleotidyltransferase 5B	115572	https://www.ncbi.nlm.nih.gov/gene/?term=115572
PEX2	PEX2	peroxisomal biogenesis factor 2	5828	https://www.ncbi.nlm.nih.gov/gene/?term=5828

LARGE2	LARGE2	LARGE xylosyl- and glucuronyltransferase 2	120071	https://www.ncbi.nlm.nih.gov/gene/?term=120071
MYL1	MYL1	myosin light chain 1	4632	https://www.ncbi.nlm.nih.gov/gene/?term=4632
CHRM1	CHRM1	cholinergic receptor muscarinic 1	1128	https://www.ncbi.nlm.nih.gov/gene/?term=1128
TCTN2	TCTN2	tectonic family member 2	79867	https://www.ncbi.nlm.nih.gov/gene/?term=79867
ATOH8	ATOH8	atonal bHLH transcription factor 8	84913	https://www.ncbi.nlm.nih.gov/gene/?term=84913
COL4A3	COL4A3	collagen type IV alpha 3 chain	1285	https://www.ncbi.nlm.nih.gov/gene/?term=1285
TBC1D10B	TBC1D10B	TBC1 domain family member 10B	26000	https://www.ncbi.nlm.nih.gov/gene/?term=26000
ZRSR2	ZRSR2	zinc finger CCCH-type, RNA binding motif and serine/arginine rich 2	8233	https://www.ncbi.nlm.nih.gov/gene/?term=8233
PTAFR	PTAFR	platelet activating factor receptor	5724	https://www.ncbi.nlm.nih.gov/gene/?term=5724
NPR1	NPR1	natriuretic peptide receptor 1	4881	https://www.ncbi.nlm.nih.gov/gene/?term=4881
MUC15	MUC15	mucin 15, cell surface associated	143662	https://www.ncbi.nlm.nih.gov/gene/?term=143662
HIC2	HIC2	HIC ZBTB transcriptional repressor 2	23119	https://www.ncbi.nlm.nih.gov/gene/?term=23119
ITGAM	ITGAM	integrin subunit alpha M	3684	https://www.ncbi.nlm.nih.gov/gene/?term=3684
KCNAB3	KCNAB3	potassium voltage-gated channel subfamily A regulatory beta subunit 3	9196	https://www.ncbi.nlm.nih.gov/gene/?term=9196
ZNF282	ZNF282	zinc finger protein 282	8427	https://www.ncbi.nlm.nih.gov/gene/?term=8427
GLB1	GLB1	galactosidase beta 1	2720	https://www.ncbi.nlm.nih.gov/gene/?term=2720
EMB	EMB	embigin	133418	https://www.ncbi.nlm.nih.gov/gene/?term=133418
OR9K2	OR9K2	olfactory receptor family 9 subfamily K member 2	441639	https://www.ncbi.nlm.nih.gov/gene/?term=441639
RNF139	RNF139	ring finger protein 139	11236	https://www.ncbi.nlm.nih.gov/gene/?term=11236
MBD3L1	MBD3L1	methyl-CpG binding domain protein 3 like 1	85509	https://www.ncbi.nlm.nih.gov/gene/?term=85509
ALK	ALK	ALK receptor tyrosine kinase	238	https://www.ncbi.nlm.nih.gov/gene/?term=238
CLDN20	CLDN20	claudin 20	49861	https://www.ncbi.nlm.nih.gov/gene/?term=49861
SCAND1	SCAND1	SCAN domain containing 1	51282	https://www.ncbi.nlm.nih.gov/gene/?term=51282
ZNF318	ZNF318	zinc finger protein 318	24149	https://www.ncbi.nlm.nih.gov/gene/?term=24149

MAP6	MAP6	microtubule associated protein 6	4135	https://www.ncbi.nlm.nih.gov/gene/?term=4135
FGG	FGG	fibrinogen gamma chain	2266	https://www.ncbi.nlm.nih.gov/gene/?term=2266
CXXC5	CXXC5	CXXC finger protein 5	51523	https://www.ncbi.nlm.nih.gov/gene/?term=51523
SYCE1	SYCE1	synaptonemal complex central element protein 1	93426	https://www.ncbi.nlm.nih.gov/gene/?term=93426
IFNB1	IFNB1	interferon beta 1	3456	https://www.ncbi.nlm.nih.gov/gene/?term=3456
DRC3	DRC3	dynein regulatory complex subunit 3	83450	https://www.ncbi.nlm.nih.gov/gene/?term=83450
LAMB2	LAMB2	laminin subunit beta 2	3913	https://www.ncbi.nlm.nih.gov/gene/?term=3913
HINFP	HINFP	histone H4 transcription factor	25988	https://www.ncbi.nlm.nih.gov/gene/?term=25988
CORO1B	CORO1B	coronin 1B	57175	https://www.ncbi.nlm.nih.gov/gene/?term=57175
MUS81	MUS81	MUS81 structure-specific endonuclease subunit	80198	https://www.ncbi.nlm.nih.gov/gene/?term=80198
METAP1D	METAP1D	methionyl aminopeptidase type 1D, mitochondrial	254042	https://www.ncbi.nlm.nih.gov/gene/?term=254042
EXO1	EXO1	exonuclease 1	9156	https://www.ncbi.nlm.nih.gov/gene/?term=9156
GTF2IRD2B	GTF2IRD2B	GTF2I repeat domain containing 2B	389524	https://www.ncbi.nlm.nih.gov/gene/?term=389524
STARD6	STARD6	StAR related lipid transfer domain containing 6	147323	https://www.ncbi.nlm.nih.gov/gene/?term=147323
DES	DES	desmin	1674	https://www.ncbi.nlm.nih.gov/gene/?term=1674
OR52W1	OR52W1	olfactory receptor family 52 subfamily W member 1	120787	https://www.ncbi.nlm.nih.gov/gene/?term=120787
HSF5	HSF5	heat shock transcription factor 5	124535	https://www.ncbi.nlm.nih.gov/gene/?term=124535
GJC3	GJC3	gap junction protein gamma 3	349149	https://www.ncbi.nlm.nih.gov/gene/?term=349149
CLEC14A	CLEC14A	C-type lectin domain containing 14A	161198	https://www.ncbi.nlm.nih.gov/gene/?term=161198
SIX5	SIX5	SIX homeobox 5	147912	https://www.ncbi.nlm.nih.gov/gene/?term=147912
CAVIN1	CAVIN1	caveolae associated protein 1	284119	https://www.ncbi.nlm.nih.gov/gene/?term=284119
ACAD9	ACAD9	acyl-CoA dehydrogenase family member 9	28976	https://www.ncbi.nlm.nih.gov/gene/?term=28976
PNPLA2	PNPLA2	patatin like phospholipase domain containing 2	57104	https://www.ncbi.nlm.nih.gov/gene/?term=57104
BOLA1	BOLA1	bolA family member 1	51027	https://www.ncbi.nlm.nih.gov/gene/?term=51027

MSC	MSC	musculin	9242	https://www.ncbi.nlm.nih.gov/gene/?term=9242
PFAS	PFAS	phosphoribosylformylglutaminamide synthase	5198	https://www.ncbi.nlm.nih.gov/gene/?term=5198
SNX18	SNX18	sorting nexin 18	112574	https://www.ncbi.nlm.nih.gov/gene/?term=112574
C3orf38	C3orf38	chromosome 3 open reading frame 38	285237	https://www.ncbi.nlm.nih.gov/gene/?term=285237
CYC1	CYC1	cytochrome c1	1537	https://www.ncbi.nlm.nih.gov/gene/?term=1537
GATA2	GATA2	GATA binding protein 2	2624	https://www.ncbi.nlm.nih.gov/gene/?term=2624
TMEM31	TMEM31	transmembrane protein 31	203562	https://www.ncbi.nlm.nih.gov/gene/?term=203562
CDH5	CDH5	cadherin 5	1003	https://www.ncbi.nlm.nih.gov/gene/?term=1003
MYADM	MYADM	myeloid associated differentiation marker	91663	https://www.ncbi.nlm.nih.gov/gene/?term=91663
RNF227	RNF227	ring finger protein 227	284023	https://www.ncbi.nlm.nih.gov/gene/?term=284023
FIZ1	FIZ1	FLT3 interacting zinc finger 1	84922	https://www.ncbi.nlm.nih.gov/gene/?term=84922
EXOC3	EXOC3	exocyst complex component 3	11336	https://www.ncbi.nlm.nih.gov/gene/?term=11336
RCC1	RCC1	regulator of chromosome condensation 1	1104	https://www.ncbi.nlm.nih.gov/gene/?term=1104
GSX2	GSX2	GS homeobox 2	170825	https://www.ncbi.nlm.nih.gov/gene/?term=170825
CLRN3	CLRN3	clarin 3	119467	https://www.ncbi.nlm.nih.gov/gene/?term=119467
PPA1	PPA1	pyrophosphatase (inorganic) 1	5464	https://www.ncbi.nlm.nih.gov/gene/?term=5464
FAM83H	FAM83H	family with sequence similarity 83 member H	286077	https://www.ncbi.nlm.nih.gov/gene/?term=286077
DIPK2A	DIPK2A	divergent protein kinase domain 2A	205428	https://www.ncbi.nlm.nih.gov/gene/?term=205428
KCNIP1	KCNIP1	potassium voltage-gated channel interacting protein 1	30820	https://www.ncbi.nlm.nih.gov/gene/?term=30820
C1S	C1S	complement C1s	716	https://www.ncbi.nlm.nih.gov/gene/?term=716
BGN	BGN	biglycan	633	https://www.ncbi.nlm.nih.gov/gene/?term=633
C1orf116	C1orf116	chromosome 1 open reading frame 116	79098	https://www.ncbi.nlm.nih.gov/gene/?term=79098
GDPGP1	GDPGP1	GDP-D-glucose phosphorylase 1	390637	https://www.ncbi.nlm.nih.gov/gene/?term=390637
COA5	COA5	cytochrome c oxidase assembly factor 5	493753	https://www.ncbi.nlm.nih.gov/gene/?term=493753
CCR3	CCR3	C-C motif chemokine receptor 3	1232	https://www.ncbi.nlm.nih.gov/gene/?term=1232
UPP1	UPP1	uridine phosphorylase 1	7378	https://www.ncbi.nlm.nih.gov/gene/?term=7378

ACP7	ACP7	acid phosphatase 7, tartrate resistant (putative)	390928	https://www.ncbi.nlm.nih.gov/gene/?term=390928
B3GALT5	B3GALT5	beta-1,3-galactosyltransferase 5	10317	https://www.ncbi.nlm.nih.gov/gene/?term=10317
SLC35F3	SLC35F3	solute carrier family 35 member F3	148641	https://www.ncbi.nlm.nih.gov/gene/?term=148641
OLFML1	OLFML1	olfactomedin like 1	283298	https://www.ncbi.nlm.nih.gov/gene/?term=283298
ADAP2	ADAP2	ArfGAP with dual PH domains 2	55803	https://www.ncbi.nlm.nih.gov/gene/?term=55803
LRTOMT	LRTOMT	leucine rich transmembrane and O-methyltransferase domain containing	220074	https://www.ncbi.nlm.nih.gov/gene/?term=220074
IRAK1	IRAK1	interleukin 1 receptor associated kinase 1	3654	https://www.ncbi.nlm.nih.gov/gene/?term=3654
CMSS1	CMSS1	cms1 ribosomal small subunit homolog	84319	https://www.ncbi.nlm.nih.gov/gene/?term=84319
SRPK3	SRPK3	SRSF protein kinase 3	26576	https://www.ncbi.nlm.nih.gov/gene/?term=26576
POU3F2	POU3F2	POU class 3 homeobox 2	5454	https://www.ncbi.nlm.nih.gov/gene/?term=5454
NUTM1	NUTM1	NUT midline carcinoma family member 1	256646	https://www.ncbi.nlm.nih.gov/gene/?term=256646
RNLS	RNLS	renalase, FAD dependent amine oxidase	55328	https://www.ncbi.nlm.nih.gov/gene/?term=55328
FAM43A	FAM43A	family with sequence similarity 43 member A	131583	https://www.ncbi.nlm.nih.gov/gene/?term=131583
LAMP1	LAMP1	lysosomal associated membrane protein 1	3916	https://www.ncbi.nlm.nih.gov/gene/?term=3916
SETD4	SETD4	SET domain containing 4	54093	https://www.ncbi.nlm.nih.gov/gene/?term=54093
SAPCD2	SAPCD2	suppressor APC domain containing 2	89958	https://www.ncbi.nlm.nih.gov/gene/?term=89958
KLK12	KLK12	kallikrein related peptidase 12	43849	https://www.ncbi.nlm.nih.gov/gene/?term=43849
SMYD4	SMYD4	SET and MYND domain containing 4	114826	https://www.ncbi.nlm.nih.gov/gene/?term=114826
UBE2H	UBE2H	ubiquitin conjugating enzyme E2 H	7328	https://www.ncbi.nlm.nih.gov/gene/?term=7328
KATNA1	KATNA1	katanin catalytic subunit A1	11104	https://www.ncbi.nlm.nih.gov/gene/?term=11104
RPS19BP1	RPS19BP1	ribosomal protein S19 binding protein 1	91582	https://www.ncbi.nlm.nih.gov/gene/?term=91582
C5orf52	C5orf52	chromosome 5 open reading frame 52	100190949	https://www.ncbi.nlm.nih.gov/gene/?term=100190949
AMTN	AMTN	amelotin	401138	https://www.ncbi.nlm.nih.gov/gene/?term=401138
SLC18A3	SLC18A3	solute carrier family 18 member A3	6572	https://www.ncbi.nlm.nih.gov/gene/?term=6572

PEAR1	PEAR1	platelet endothelial aggregation receptor 1	375033	https://www.ncbi.nlm.nih.gov/gene/?term=375033
ZFP69	ZFP69	ZFP69 zinc finger protein	339559	https://www.ncbi.nlm.nih.gov/gene/?term=339559
CYHR1	CYHR1	cysteine and histidine rich 1	50626	https://www.ncbi.nlm.nih.gov/gene/?term=50626
RILPL1	RILPL1	Rab interacting lysosomal protein like 1	353116	https://www.ncbi.nlm.nih.gov/gene/?term=353116
RAB42	RAB42	RAB42, member RAS oncogene family	115273	https://www.ncbi.nlm.nih.gov/gene/?term=115273
PLA2G4E	PLA2G4E	phospholipase A2 group IVE	123745	https://www.ncbi.nlm.nih.gov/gene/?term=123745
LAMTOR4	LAMTOR4	late endosomal/lysosomal adaptor, MAPK and MTOR activator 4	389541	https://www.ncbi.nlm.nih.gov/gene/?term=389541
PLSCR1	PLSCR1	phospholipid scramblase 1	5359	https://www.ncbi.nlm.nih.gov/gene/?term=5359
SELL	SELL	selectin L	6402	https://www.ncbi.nlm.nih.gov/gene/?term=6402
NDOR1	NDOR1	NADPH dependent diflavin oxidoreductase 1	27158	https://www.ncbi.nlm.nih.gov/gene/?term=27158
FBLL1	FBLL1	fibrillarin like 1	345630	https://www.ncbi.nlm.nih.gov/gene/?term=345630
CLEC20A	CLEC20A	C-type lectin domain containing 20A	400797	https://www.ncbi.nlm.nih.gov/gene/?term=400797
CC2D2B	CC2D2B	coiled-coil and C2 domain containing 2B	387707	https://www.ncbi.nlm.nih.gov/gene/?term=387707
QRFP	QRFP	pyroglutamylated RFamide peptide	347148	https://www.ncbi.nlm.nih.gov/gene/?term=347148
RBM34	RBM34	RNA binding motif protein 34	23029	https://www.ncbi.nlm.nih.gov/gene/?term=23029
SLC15A5	SLC15A5	solute carrier family 15 member 5	729025	https://www.ncbi.nlm.nih.gov/gene/?term=729025
ALKBH2	ALKBH2	alkB homolog 2, alpha-ketoglutarate dependent dioxygenase	121642	https://www.ncbi.nlm.nih.gov/gene/?term=121642
NUGGC	NUGGC	nuclear GTPase, germinal center associated	389643	https://www.ncbi.nlm.nih.gov/gene/?term=389643
WDSUB1	WDSUB1	WD repeat, sterile alpha motif and U-box domain containing 1	151525	https://www.ncbi.nlm.nih.gov/gene/?term=151525
SEMA4A	SEMA4A	semaphorin 4A	64218	https://www.ncbi.nlm.nih.gov/gene/?term=64218
XPNPEP3	XPNPEP3	X-prolyl aminopeptidase 3	63929	https://www.ncbi.nlm.nih.gov/gene/?term=63929
PIK3R4	PIK3R4	phosphoinositide-3-kinase regulatory subunit 4	30849	https://www.ncbi.nlm.nih.gov/gene/?term=30849
SLC6A9	SLC6A9	solute carrier family 6 member 9	6536	https://www.ncbi.nlm.nih.gov/gene/?term=6536

ZSCAN25	ZSCAN25	zinc finger and SCAN domain containing 25	221785	https://www.ncbi.nlm.nih.gov/gene/?term=221785
ZNF420	ZNF420	zinc finger protein 420	147923	https://www.ncbi.nlm.nih.gov/gene/?term=147923
ARRDC1	ARRDC1	arrestin domain containing 1	92714	https://www.ncbi.nlm.nih.gov/gene/?term=92714
PCBP2	PCBP2	poly(rC) binding protein 2	5094	https://www.ncbi.nlm.nih.gov/gene/?term=5094
PDCD1LG2	PDCD1LG2	programmed cell death 1 ligand 2	80380	https://www.ncbi.nlm.nih.gov/gene/?term=80380
CFAP43	CFAP43	cilia and flagella associated protein 43	80217	https://www.ncbi.nlm.nih.gov/gene/?term=80217
SLC22A12	SLC22A12	solute carrier family 22 member 12	116085	https://www.ncbi.nlm.nih.gov/gene/?term=116085
ZNF667	ZNF667	zinc finger protein 667	63934	https://www.ncbi.nlm.nih.gov/gene/?term=63934
HOXC4	HOXC4	homeobox C4	3221	https://www.ncbi.nlm.nih.gov/gene/?term=3221
UVRAG	UVRAG	UV radiation resistance associated	7405	https://www.ncbi.nlm.nih.gov/gene/?term=7405
NTRK1	NTRK1	neurotrophic receptor tyrosine kinase 1	4914	https://www.ncbi.nlm.nih.gov/gene/?term=4914
ZXDB	ZXDB	zinc finger X-linked duplicated B	158586	https://www.ncbi.nlm.nih.gov/gene/?term=158586
ZNF652	ZNF652	zinc finger protein 652	22834	https://www.ncbi.nlm.nih.gov/gene/?term=22834
EPS8L3	EPS8L3	EPS8 like 3	79574	https://www.ncbi.nlm.nih.gov/gene/?term=79574
ZFP2	ZFP2	ZFP2 zinc finger protein	80108	https://www.ncbi.nlm.nih.gov/gene/?term=80108
ARMCX6	ARMCX6	armadillo repeat containing X-linked 6	54470	https://www.ncbi.nlm.nih.gov/gene/?term=54470
EFCAB2	EFCAB2	EF-hand calcium binding domain 2	84288	https://www.ncbi.nlm.nih.gov/gene/?term=84288
GLYATL3	GLYATL3	glycine-N-acyltransferase like 3	389396	https://www.ncbi.nlm.nih.gov/gene/?term=389396
GIGYF2	GIGYF2	GRB10 interacting GYF protein 2	26058	https://www.ncbi.nlm.nih.gov/gene/?term=26058
RNASE13	RNASE13	ribonuclease A family member 13 (inactive)	440163	https://www.ncbi.nlm.nih.gov/gene/?term=440163
LNP1	LNP1	leukemia NUP98 fusion partner 1	348801	https://www.ncbi.nlm.nih.gov/gene/?term=348801
ACKR1	ACKR1	atypical chemokine receptor 1 (Duffy blood group)	2532	https://www.ncbi.nlm.nih.gov/gene/?term=2532
CHUK	CHUK	conserved helix-loop-helix ubiquitous kinase	1147	https://www.ncbi.nlm.nih.gov/gene/?term=1147
SIPA1	SIPA1	signal-induced proliferation-associated 1	6494	https://www.ncbi.nlm.nih.gov/gene/?term=6494
SYNJ2BP	SYNJ2BP	synaptojanin 2 binding protein	55333	https://www.ncbi.nlm.nih.gov/gene/?term=55333
ADAT3	ADAT3	adenosine deaminase, tRNA specific 3	113179	https://www.ncbi.nlm.nih.gov/gene/?term=113179

DDX47	DDX47	DEAD-box helicase 47	51202	https://www.ncbi.nlm.nih.gov/gene/?term=51202
MBLAC1	MBLAC1	metallo-beta-lactamase domain containing 1	255374	https://www.ncbi.nlm.nih.gov/gene/?term=255374
FOXI3	FOXI3	forkhead box I3	344167	https://www.ncbi.nlm.nih.gov/gene/?term=344167
NOTO	NOTO	notochord homeobox	344022	https://www.ncbi.nlm.nih.gov/gene/?term=344022
GPR33	GPR33	G protein-coupled receptor 33 (gene/pseudogene)	2856	https://www.ncbi.nlm.nih.gov/gene/?term=2856
LRRC69	LRRC69	leucine rich repeat containing 69	100130742	https://www.ncbi.nlm.nih.gov/gene/?term=100130742
ACSM4	ACSM4	acyl-CoA synthetase medium chain family member 4	341392	https://www.ncbi.nlm.nih.gov/gene/?term=341392
GRXCR1	GRXCR1	glutaredoxin and cysteine rich domain containing 1	389207	https://www.ncbi.nlm.nih.gov/gene/?term=389207
FASTKD5	FASTKD5	FAST kinase domains 5	60493	https://www.ncbi.nlm.nih.gov/gene/?term=60493
SKOR2	SKOR2	SKI family transcriptional corepressor 2	652991	https://www.ncbi.nlm.nih.gov/gene/?term=652991
CEBPZOS	CEBPZOS	CEBPZ opposite strand	100505876	https://www.ncbi.nlm.nih.gov/gene/?term=100505876
VAMP2	VAMP2	vesicle associated membrane protein 2	6844	https://www.ncbi.nlm.nih.gov/gene/?term=6844
PRR29	PRR29	proline rich 29	92340	https://www.ncbi.nlm.nih.gov/gene/?term=92340
SLC26A6	SLC26A6	solute carrier family 26 member 6	65010	https://www.ncbi.nlm.nih.gov/gene/?term=65010
TEX50	TEX50	testis expressed 50	730159	https://www.ncbi.nlm.nih.gov/gene/?term=730159
MCIDAS	MCIDAS	multiciliate differentiation and DNA synthesis associated cell cycle protein	345643	https://www.ncbi.nlm.nih.gov/gene/?term=345643
PSMB8	PSMB8	proteasome subunit beta 8	5696	https://www.ncbi.nlm.nih.gov/gene/?term=5696
TMEM250	TMEM250	transmembrane protein 250	90120	https://www.ncbi.nlm.nih.gov/gene/?term=90120
STPG4	STPG4	sperm-tail PG-rich repeat containing 4	285051	https://www.ncbi.nlm.nih.gov/gene/?term=285051
RPP21	RPP21	ribonuclease P/MRP subunit p21	79897	https://www.ncbi.nlm.nih.gov/gene/?term=79897
ARPC4	ARPC4	actin related protein 2/3 complex subunit 4	10093	https://www.ncbi.nlm.nih.gov/gene/?term=10093
C8orf58	C8orf58	chromosome 8 open reading frame 58	541565	https://www.ncbi.nlm.nih.gov/gene/?term=541565

NFS1	NFS1	NFS1, cysteine desulfurase	9054	https://www.ncbi.nlm.nih.gov/gene/?term=9054
LY75-CD302	LY75-CD302	LY75-CD302 readthrough	100526664	https://www.ncbi.nlm.nih.gov/gene/?term=100526664
TMEM200B	TMEM200B	transmembrane protein 200B	399474	https://www.ncbi.nlm.nih.gov/gene/?term=399474
TRIL	TRIL	TLR4 interactor with leucine rich repeats	9865	https://www.ncbi.nlm.nih.gov/gene/?term=9865
ATP23	ATP23	ATP23 metalloproteinase and ATP synthase assembly factor homolog	91419	https://www.ncbi.nlm.nih.gov/gene/?term=91419
DPEP2NB	DPEP2NB	DPEP2 neighbor	100131303	https://www.ncbi.nlm.nih.gov/gene/?term=100131303
RNF115	RNF115	ring finger protein 115	27246	https://www.ncbi.nlm.nih.gov/gene/?term=27246
MEI4	MEI4	meiotic double-stranded break formation protein 4	101928601	https://www.ncbi.nlm.nih.gov/gene/?term=101928601
DCP1A	DCP1A	decapping mRNA 1A	55802	https://www.ncbi.nlm.nih.gov/gene/?term=55802
SCRIB	SCRIB	scribble planar cell polarity protein	23513	https://www.ncbi.nlm.nih.gov/gene/?term=23513
PROP1	PROP1	PROP paired-like homeobox 1	5626	https://www.ncbi.nlm.nih.gov/gene/?term=5626
DERL3	DERL3	derlin 3	91319	https://www.ncbi.nlm.nih.gov/gene/?term=91319
SDCCAG8	SDCCAG8	serologically defined colon cancer antigen 8	10806	https://www.ncbi.nlm.nih.gov/gene/?term=10806
APBA2	APBA2	amyloid beta precursor protein binding family A member 2	321	https://www.ncbi.nlm.nih.gov/gene/?term=321
DACH1	DACH1	dachshund family transcription factor 1	1602	https://www.ncbi.nlm.nih.gov/gene/?term=1602
HEATR9	HEATR9	HEAT repeat containing 9	256957	https://www.ncbi.nlm.nih.gov/gene/?term=256957
SALL3	SALL3	spalt like transcription factor 3	27164	https://www.ncbi.nlm.nih.gov/gene/?term=27164
ARHGEF26	ARHGEF26	Rho guanine nucleotide exchange factor 26	26084	https://www.ncbi.nlm.nih.gov/gene/?term=26084
SCG5	SCG5	secretogranin V	6447	https://www.ncbi.nlm.nih.gov/gene/?term=6447
GSTT1	GSTT1	glutathione S-transferase theta 1	2952	https://www.ncbi.nlm.nih.gov/gene/?term=2952
CISD3	CISD3	CDGSH iron sulfur domain 3	284106	https://www.ncbi.nlm.nih.gov/gene/?term=284106
PPP4R4	PPP4R4	protein phosphatase 4 regulatory subunit 4	57718	https://www.ncbi.nlm.nih.gov/gene/?term=57718
MYO19	MYO19	myosin XIX	80179	https://www.ncbi.nlm.nih.gov/gene/?term=80179

OR2S2	OR2S2	olfactory receptor family 2 subfamily S member 2 (gene/pseudogene)	56656	https://www.ncbi.nlm.nih.gov/gene/?term=56656
MATR3	MATR3	matrin 3	9782	https://www.ncbi.nlm.nih.gov/gene/?term=9782
CORO7	CORO7	coronin 7	79585	https://www.ncbi.nlm.nih.gov/gene/?term=79585
ZNF445	ZNF445	zinc finger protein 445	353274	https://www.ncbi.nlm.nih.gov/gene/?term=353274
EXOC3L2	EXOC3L2	exocyst complex component 3 like 2	90332	https://www.ncbi.nlm.nih.gov/gene/?term=90332
LYNX1-SLURP2	LYNX1-SLURP2	LYNX1-SLURP2 readthrough	111188157	https://www.ncbi.nlm.nih.gov/gene/?term=111188157
SPEM1	SPEM1	spermatid maturation 1	374768	https://www.ncbi.nlm.nih.gov/gene/?term=374768
CARMIL3	CARMIL3	capping protein regulator and myosin 1 linker 3	90668	https://www.ncbi.nlm.nih.gov/gene/?term=90668
SMIM41	SMIM41	small integral membrane protein 41	113523638	https://www.ncbi.nlm.nih.gov/gene/?term=113523638
AGPAT5	AGPAT5	1-acylglycerol-3-phosphate O-acyltransferase 5	55326	https://www.ncbi.nlm.nih.gov/gene/?term=55326
REC8	REC8	REC8 meiotic recombination protein	9985	https://www.ncbi.nlm.nih.gov/gene/?term=9985
RNF31	RNF31	ring finger protein 31	55072	https://www.ncbi.nlm.nih.gov/gene/?term=55072
TMEM249	TMEM249	transmembrane protein 249	340393	https://www.ncbi.nlm.nih.gov/gene/?term=340393
NFATC4	NFATC4	nuclear factor of activated T cells 4	4776	https://www.ncbi.nlm.nih.gov/gene/?term=4776
AGBL2	AGBL2	ATP/GTP binding protein like 2	79841	https://www.ncbi.nlm.nih.gov/gene/?term=79841
SEMA7A	SEMA7A	semaphorin 7A (John Milton Hagen blood group)	8482	https://www.ncbi.nlm.nih.gov/gene/?term=8482
NANOS3	NANOS3	nanos C2HC-type zinc finger 3	342977	https://www.ncbi.nlm.nih.gov/gene/?term=342977
ISLR	ISLR	immunoglobulin superfamily containing leucine rich repeat	3671	https://www.ncbi.nlm.nih.gov/gene/?term=3671
TMEM95	TMEM95	transmembrane protein 95	339168	https://www.ncbi.nlm.nih.gov/gene/?term=339168
C1R	C1R	complement C1r	715	https://www.ncbi.nlm.nih.gov/gene/?term=715

Supplemental File 11: Genes without unique ID

Gene name

ACP3

SARS1

HROB

MTSS2

MARCHF7

MT-ND4

KIFBP

B3GALT9

GFUS

PERCC1

Supplemental file 12: Link to an interactive .html file showing all the data

The following link includes the enriched Panther terms, the enrichment P-values (hypergeometric test), Q-values (FDR) for the test, the Panther term set size, and the enrichment ratio.

Download at: <https://osf.io/download/nfvmx/>

Supplemental file 13: Fig. S1

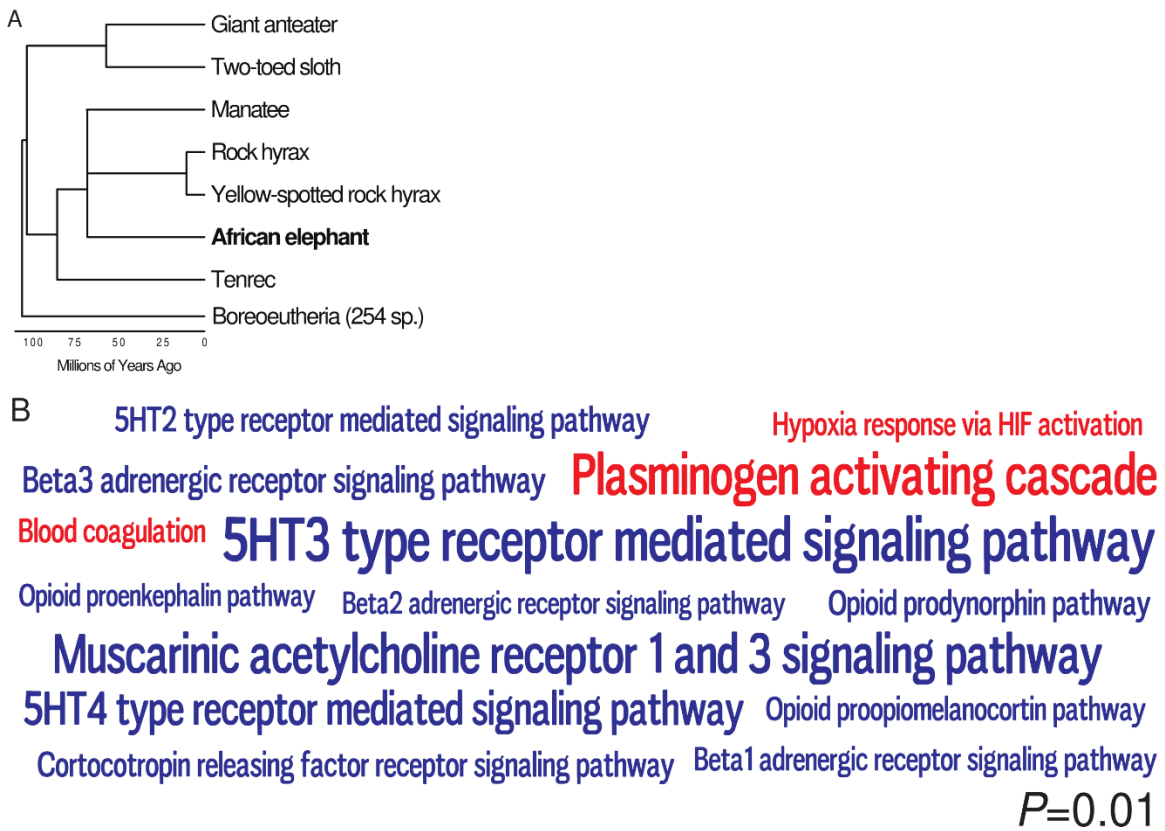


Fig. S1. Positive selection on genes associated with self-domestication in African elephants. (A) Phylogeny of Afrotherian species included in tests for positive selection acting on elephant protein-coding genes. Note that the phylogenetic relationships between elephant, hyrax, and manatee lineages are uncertain, and these species were included as an unresolved polytomy in selection tests. Phylogenetic relationships are shown with branches proportional to divergence times. The other 254 species not shown are within the Boreoeutheria, the sister lineage to Afrotheria. (B) Word Cloud showing Panther pathways in which genes with positive selection in elephants are enriched. Terms are drawn proportional to $-\log_{10}$ P-value (see Inset scale) and colored blue if related to domestication.