

**Supplementary Table S11.** List of the 239 high confidence essential gene candidates

Gene	Refseq ID	Description
ABCB7	NM_004299	ATP-binding cassette, sub-family B (MDR/TAP), member 7
ABCD3	NM_002858	ATP-binding cassette, sub-family D (ALD), member 3
ABLIM1	NM_002313	actin binding LIM protein 1
ACTL6A	NM_177989	actin-like 6A
ADIPOR1	NM_015999	adiponectin receptor 1
AGPAT1	NM_006411	1-acylglycerol-3-phosphate O-acyltransferase 1
ALDH16A1	NM_153329	aldehyde dehydrogenase 16 family, member A1
AP1M1	NM_032493	adaptor-related protein complex 1, mu 1 subunit
AP1S3	NM_178814	adaptor-related protein complex 1, sigma 3 subunit
AP2A1	NM_014203	adaptor-related protein complex 2, alpha 1 subunit
AP3B1	NM_003664	adaptor-related protein complex 3, beta 1 subunit
AP3M2	NM_006803	adaptor-related protein complex 3, mu 2 subunit
API5	NM_006595	apoptosis inhibitor 5
APOO	NM_024122	apolipoprotein O
ARCN1	NM_001655	archain 1 (ARCN1), mRNA
ARD1A	NM_003491	ARD1 homolog A, N-acetyltransferase
ARFIP2	NM_012402	ADP-ribosylation factor interacting protein 2
B3GAT3	NM_012200	beta-1,3-glucuronyltransferase 3
BCAT2	NM_001190	branched chain aminotransferase 2
C12ORF24	NM_013300	chromosome 12 open reading frame 24
C14ORF108	NM_018229	chromosome 14 open reading frame 108
C6ORF192	NM_052831	chromosome 6 open reading frame 192
CASC3	NM_007359	cancer susceptibility candidate 3
CAT	NM_001752	catalase
CBX5	NM_012117	chromobox homolog 5
CC2D1A	NM_017721	coiled-coil and C2 domain containing 1A
CCDC28A	NM_015439	coiled-coil domain containing 28A
CCDC5	NM_138443	coiled-coil domain containing 5
CCT6A	NM_001762	chaperonin containing TCP1, subunit 6A (zeta 1)
CD2BP2	NM_006110	CD2 (cytoplasmic tail) binding protein 2
CD44	NM_000610	CD44 molecule (Indian blood group)
CD81	NM_004356	CD81 molecule
CDK10	NM_003674	cyclin-dependent kinase 10
CEACAM6	NM_002483	carcinoembryonic antigen-related cell adhesion molecule 6
CENPA	NM_001809	centromere protein A
CKAP5	NM_014756	cytoskeleton associated protein 5
COG2	NM_007357	component of oligomeric golgi complex 2
COPA	NM_004371	coatamer protein complex, subunit alpha
COPB2	NM_004766	coatamer protein complex, subunit beta 2 (beta prime)
COPE	NM_007263	coatamer protein complex, subunit epsilon
COPS6	NM_006833	COP9 constitutive photomorphogenic homolog subunit 6
COPZ2	NM_016429	coatamer protein complex, subunit zeta 2
COQ2	NM_015697	coenzyme Q2 homolog, prenyltransferase
COQ6	NM_182476	coenzyme Q6 homolog, monooxygenase
CSNK1E	NM_001894	casein kinase 1, epsilon
CTHRC1	NM_138455	collagen triple helix repeat containing 1
CTNS	NM_004937	cystinosis, nephropathic
CXADR	NM_001338	coxsackie virus and adenovirus receptor
CYBA	NM_000101	cytochrome b-245, alpha polypeptide
CYCS	NM_018947	cytochrome c, somatic
CYP1A2	NM_000761	cytochrome P450, family 1, subfamily A, polypeptide 2
CYP1B1	NM_000104	cytochrome P450, family 1, subfamily B, polypeptide 1
CYP26A1	NM_000783	cytochrome P450, family 26, subfamily A, polypeptide 1
CYTH2	NM_017457	cytohesin 2
DCTN1	NM_004082	dynactin 1
DEGS1	NM_003676	degenerative spermatocyte homolog 1, lipid desaturase
DHX34	NM_014681	DEAH (Asp-Glu-Ala-His) box polypeptide 34
DLEU1	NM_005887	deleted in lymphocytic leukemia 1
DLGAP5	NM_014750	discs, large (Drosophila) homolog-associated protein 5
DUS2L	NM_017803	dihydrouridine synthase 2-like, SMM1 homolog

EBNA1BP2	NM_006824	EBNA1 binding protein 2
EFHD1	NM_025202	EF-hand domain family, member D1
EFNA3	NM_004952	ephrin-A3
EFNA4	NM_005227	ephrin-A4
EHHADH	NM_001966	enoyl-Coenzyme A, hydratase/3-hydroxyacyl Coenzyme A dehydrogenase
EIF1AX	NM_001412	eukaryotic translation initiation factor 1A
EIF4A3	NM_014740	eukaryotic translation initiation factor 4A
EIF4E	NM_001968	eukaryotic translation initiation factor 4E
EIF5B	NM_015904	eukaryotic translation initiation factor 5B
ERBB2IP	NM_018695	erbb2 interacting protein
ERGIC1	NM_020462	endoplasmic reticulum-golgi intermediate compartment 1
ETFA	NM_000126	electron-transfer-flavoprotein, alpha polypeptide
EXOC5	NM_006544	exocyst complex component 5
EXOC6	NM_019053	exocyst complex component 6
FADS1	NM_013402	fatty acid desaturase 1
FADS2	NM_004265	fatty acid desaturase 2
FAHD1	NM_031208	fumarylacetoacetate hydrolase domain containing 1
FEZ2	NM_005102	fasciculation and elongation protein zeta 2
FKBP3	NM_002013	FK506 binding protein 3
FLNB	NM_001457	filamin B, beta
FLNC	NM_001458	filamin C, gamma
GFOD2	NM_030819	glucose-fructose oxidoreductase domain containing 2
GGA3	NM_014001	golgi associated, gamma adaptin ear containing
GJA3	NM_021954	gap junction protein, alpha 3, 46kDa
GLRX	NM_002064	glutaredoxin
GLRX2	NM_016066	glutaredoxin 2
GLRX3	NM_006541	glutaredoxin 3
GRB14	NM_004490	growth factor receptor-bound protein 14
H2AFZ	NM_002106	H2A histone family, member Z
H3F3B	NM_005324	H3 histone, family 3B
HDAC1	NM_004964	histone deacetylase 1
HFE	NM_000410	hemochromatosis
HINT2	NM_032593	histidine triad nucleotide binding protein 2
HLA-DPA1	NM_033554	major histocompatibility complex, class II, DP alpha 1
HNRNPM	NM_005968	heterogeneous nuclear ribonucleoprotein M
HSDL2	NM_032303	hydroxysteroid dehydrogenase like 2
IFT57	NM_018010	Intraflagellar transport 57 homolog
IGFBP6	NM_002178	Insulin-like growth factor binding protein 6
IL13RA1	NM_001560	Interleukin 13 receptor, alpha 1
ITPR3	NM_002224	Inositol 1,4,5-triphosphate receptor, type 3
KDELR1	NM_006801	KDEL (Lys-Asp-Glu-Leu) endoplasmic reticulum protein retention receptor 1
KDELR2	NM_006854	KDEL (Lys-Asp-Glu-Leu) endoplasmic reticulum protein retention receptor 2
KDELR3	NM_006855	KDEL (Lys-Asp-Glu-Leu) endoplasmic reticulum protein retention receptor 3
KIAA0090	NM_015047	KIAA0090
KLHL2	NM_007246	kelch-like 2, Mayven
KPNA1	NM_002264	karyopherin alpha 1 (importin alpha 5)
KRAS	NM_004985	v-Ki-ras2 Kirsten rat sarcoma viral oncogene homolog
KRR1	NM_007043	Small subunit (SSU) processome component, homolog
KTN1	NM_182926	kinectin 1
L2HGDH	NM_024884	L-2-hydroxyglutarate dehydrogenase
LAYN	NM_178834	layilin
LMBR1L	NM_018113	limb region 1 homolog (mouse)-like
LMNB2	NM_032737	lamin B2
LOC389465	NM_003142	Sjogren syndrome antigen B
LOC399942	NM_006082	tubulin, alpha 1b (TUBA1B), mRNA
LRCH4	NM_002319	leucine-rich repeats and calponin homology (CH) domain containing 4
LSM4	NM_012321	LSM4 homolog, U6 small nuclear RNA associated
LSM5	NM_012322	LSM5 homolog, U6 small nuclear RNA associated
LYAR	NM_017816	Ly1 antibody reactive homolo
LYRM4	NM_020408	LYR motif containing 4
LYRM7	NM_181705	Lyrm7 homolog
MAGOHB	NM_018048	mago-nashi homolog B
MAGT1	NM_032121	magnesium transporter 1

MAPRE1	NM_012325	microtubule-associated protein, RP/EB family, member 1
MARVELD2	NM_144724	MARVEL domain containing 2
ME1	NM_002395	malic enzyme 1, NADP(+)-dependent, cytosolic
MED30	NM_080651	mediator complex subunit 30
METRN	NM_024042	meteorin, glial cell differentiation regulator
MGC4172	NM_024308	short-chain dehydrogenase/reductase
MICB	NM_005931	MHC class I polypeptide-related sequence B
MIER3	NM_152622	mesoderm induction early response 1, family member 3
MRPL12	NM_002949	mitochondrial ribosomal protein L12
MRPL37	NM_016491	mitochondrial ribosomal protein L37
MRPS16	NM_016065	mitochondrial ribosomal protein S16
MSRB3	NM_198080	methionine sulfoxide reductase B3
MTO1	NM_012123	mitochondrial translation optimization 1 homolog
MTUS1	NM_001001924	mitochondrial tumor suppressor 1
NCOA7	NM_181782	nuclear receptor coactivator 7
NCOR2	NM_006312	nuclear receptor co-repressor 2
NDUFA12	NM_018838	NADH dehydrogenase 1 alpha subcomplex
NDUFAF2	NM_174889	NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, assembly factor 2
NDUFS1	NM_005006	NADH dehydrogenase (ubiquinone) Fe-S protein 1
NOG	NM_005450	noggin
NOLA2	NM_017838	nucleolar protein family A, member 2
NPM1	NM_002520	nucleophosmin
NRP2	NM_003872	neuropilin 2
NUP85	NM_024844	nucleoporin 85kDa
NUP93	NM_014669	nucleoporin 93kDa
OGFOD2	NM_024623	2-oxoglutarate and iron-dependent oxygenase domain containing 2
PAFAH1B1	NM_000430	platelet-activating factor acetylhydrolase, isoform Ib, alpha subunit 45kDa
PAN2	NM_014871	PAN2 polyA specific ribonuclease subunit homolog
PAQR5	NM_017705	progesterin and adipoQ receptor family member V
PDCL	NM_005388	phosducin-like
PDGFD	NM_025208	platelet derived growth factor D
PHB2	NM_007273	prohibitin 2
PIB5PA	NM_001002837	phosphatidylinositol (4,5) bisphosphate 5-phosphatase
PLK1	NM_005030	polo-like kinase 1
PLOD1	NM_000302	procollagen-lysine 1, 2-oxoglutarate 5-dioxygenase 1
PLOD3	NM_001084	procollagen-lysine, 2-oxoglutarate 5-dioxygenase 3
PLXND1	NM_015103	plexin D1
POM121	NM_172020	POM121 membrane glycoprotein
PPP2R2D	NM_001003656	protein phosphatase 2, regulatory subunit B, delta isoform
PPRC1	NM_015062	peroxisome proliferator-activated receptor gamma, coactivator-related 1
PRDX2	NM_005809	peroxiredoxin 2
PRKD3	NM_005813	protein kinase D3 (PRKD3), mRNA
PRPF18	NM_003675	PRP18 pre-mRNA processing factor 18 homolog
PSMD1	NM_002807	proteasome 26S subunit
PTDSR	NM_015167	phosphatidylserine receptor
PVRL1	NM_002855	poliovirus receptor-related 1
PVRL2	NM_002856	poliovirus receptor-related 2
QSOX2	NM_181701	quiescin Q6 sulfhydryl oxidase 2
QTRT1	NM_031209	queuine tRNA-ribosyltransferase 1
RAN	NM_006325	RAN, member RAS oncogene family
RFESD	NM_173362	Rieske (Fe-S) domain containing
RFFL	NM_057178	ring finger and FYVE-like domain containing 1
ROR2	NM_004560	receptor tyrosine kinase-like orphan receptor 2
RPL3	NM_000967	ribosomal protein L3
RPL31	NM_000993	ribosomal protein L31
RPL6	NM_000970	ribosomal protein L6 (RPL6)
RPS18	NM_022551	ribosomal protein S18
RRAGD	NM_021244	Ras-related GTP binding D
SEC23A	NM_006364	Sec23 homolog A
SENP5	NM_152699	SUMO1/sentrin specific peptidase 5
SEPT3	NM_019106	septin 3
SEZ6L2	NM_012410	seizure related 6 homolog (mouse)-like 2
SFRP1	NM_003012	secreted frizzled-related protein 1

SFRS4	NM_005626	splicing factor, arginine/serine-rich 4
SGCB	NM_000232	sarcoglycan, beta
SMC1A	NM_006306	structural maintenance of chromosomes 1A
SMC2	NM_006444	structural maintenance of chromosomes 2
SNAPIN	NM_012437	SNAP-associated protein
SNRPB	NM_198216	small nuclear ribonucleoprotein polypeptides B and B1
SNRPE	NM_003094	small nuclear ribonucleoprotein polypeptide E
SNX15	NM_013306	sorting nexin 15
SNX2	NM_003100	sorting nexin 2
SSR2	NM_003145	signal sequence receptor, beta
ST6GALNAC6	NM_013443	ST6 (alpha-N-acetyl-neuraminyl-2,3-beta-galactosyl-1,3)-N-acetylgalactosaminide alpha-2,6-sialyltransferase 6
STX4	NM_004604	syntaxin 4
STX6	NM_005819	syntaxin 6
STXBP2	NM_006949	syntaxin binding protein 2
SUPV3L1	NM_003171	suppressor of var1, 3-like 1
SURF1	NM_003172	surfeit 1
SYTL2	NM_032379	synaptotagmin-like 2
TBC1D16	NM_019020	TBC1 domain family, member 16
TM9SF4	NM_014742	transmembrane 9 superfamily protein member 4
TMED1	NM_006858	transmembrane emp24 protein transport domain containing 1
TMED2	NM_006815	transmembrane emp24 domain trafficking protein 2
TMED3	NM_007364	transmembrane emp24 protein transport domain containing 3
TMED5	NM_016040	transmembrane emp24 protein transport domain containing 5
TMED7	NM_181836	transmembrane emp24 protein transport domain containing 7
TMEM1	NM_001001723	transmembrane protein 1
TNFRSF21	NM_014452	tumor necrosis factor receptor superfamily, member 21
TOMM22	NM_020243	translocase of outer mitochondrial membrane 22 homolog
TPR	NM_003292	translocated promoter region
TRAPPC1	NM_021210	trafficking protein particle complex 1
TRIB3	NM_021158	tribbles homolog 3
TRIM14	NM_014788	tripartite motif-containing 14
TSPO	NM_000714	translocator protein
TUBG1	NM_001070	tubulin, gamma 1
TXN	NM_003329	thioredoxin
TXNDC12	NM_015913	thioredoxin domain containing 12
TXNDC14	NM_015959	thioredoxin domain containing 14
TXNDC15	NM_024715	thioredoxin domain containing 15
TXNDC17	NM_032731	thioredoxin domain containing 17
TXNL4A	NM_006701	thioredoxin-like 4A
U2AF1	NM_006758	U2 small nuclear RNA auxiliary factor
UAP1	NM_003115	UDP-N-acetylglucosamine pyrophosphorylase 1
UCP2	NM_003355	uncoupling protein 2
UHRF1BP1	NM_017754	UHRF1 (ICBP90) binding protein 1
UIMC1	NM_016290	ubiquitin interaction motif containing 1
UQCRCQ	NM_014402	ubiquinol-cytochrome c reductase, complex III subunit VII
USO1	NM_003715	USO1 homolog, vesicle docking protein
VAMP7	NM_005638	vesicle-associated membrane protein 7
VPS26B	NM_052875	vacuolar protein sorting 26 homolog B
VPS28	NM_016208	vacuolar protein sorting 28 homolog
WDR54	NM_032118	WD repeat domain 54
WNT7B	NM_058238	wingless-type MMTV integration site family, member 7B
ZBED1	NM_004729	zinc finger, BED-type containing 1
ZP3	NM_007155	zona pellucida glycoprotein 3