

Supplemental Table 1: Selection of 164 genes for the validation study

Genes (164)	Full gene name approved by the HGNC; synonym	Pathways (non exhaustive)
<i>ABI1</i>	abl-interactor 1	Transduction of signals from Ras to Rac-cytoskeleton
<i>ABTB1</i>	ankyrin repeat and BTB (POZ) domain containing 1	PTEN signaling pathway
<i>AKT2</i>	protein kinase Akt-2	Akt pathway
<i>ANXA6</i>	annexin A6	Calcium-dependent membrane and phospholipid binding proteins
<i>APAF1</i>	apoptotic peptidase activating factor 1	Apoptosis
<i>APC</i>	Adenomatous Polyposis Coli	Antagonist of the Wnt signaling pathway
<i>ARNT</i>	aryl hydrocarbon receptor nuclear translocator; HIF-1beta	Transcriptional regulator of the adaptive response to hypoxia
<i>ARNTL</i>	aryl hydrocarbon receptor nuclear translocator-like	Partner of CLOCK
<i>ARRB1</i>	Arrestin beta-1	Regulating agonist-mediated G-protein coupled receptor signaling
<i>ASPH</i>	aspartate beta-hydroxylase	Role in calcium homeostasis
<i>ATG16L1</i>	autophagy related 16-like 1, ATG16L	Autophagy
<i>ATG4C</i>	autophagy related 4C, cysteine peptidase	Autophagy
<i>ATG5</i>	autophagy related 5	Autophagy
<i>ATXN3</i>	ataxin 3	Deubiquitinating enzyme
<i>AXIN1</i>	axin1	Wnt signaling
<i>BAG6</i>	BCL2-associated athanogene 6	Apoptosis
<i>BCAS1</i>	breast carcinoma-amplified sequence 1	Candidate oncogene
<i>BCL11B</i>	B-cell CLL/lymphoma 11B (zinc finger protein)	P53-signaling pathway
<i>BCL2L1</i>	BCL2-like 1 (bcl-XL)	Apoptosis
<i>BCL2L12</i>	BCL2-like 12 (Proline Rich)	Apoptosis
<i>BCL2L15</i>	BCL2-like 15; C1orf178	Apoptosis
<i>BCL2L2-PABPN1</i>	read-through transcription between BCL2L2 and PABPN1 genes	Apoptosis
<i>BCLAF1</i>	BCL2-associated transcription factor 1	Apoptosis
<i>BNIP1</i>	BCL2/adenovirus E1B 19kD interacting protein like	Apoptosis
<i>BRCA1</i>	breast cancer 1, early onset	Tumor suppressor
<i>BRCC3</i>	BRCA1/BRCA2-containing complex, subunit 3	Subunit of the BRCA1-BRCA2-containing complex, E3 ubiquitin ligase
<i>BRPF1</i>	bromodomain and PHD finger containing, 1; Peregrin	Regulation of RUNX1 and RUNX2 transcription
<i>BSG</i>	basigin (Ok blood group); CD147	Stimulation of matrix metalloproteinases (MMPS) production
<i>BTC</i>	betacellulin	Binds EGF receptor family members
<i>C1D</i>	C1D Nuclear Receptor Corepressor	Apoptosis, p53 pathway
<i>C6orf25</i>	chromosome 6 open reading frame 25	Immunoglobulin (Ig) superfamily
<i>CAPRIN2</i>	caprin family member 2; C1QDC1	May be involved in apoptosis
<i>CASC4</i>	cancer susceptibility candidate 4	Cell proliferation and survival pathways
<i>CASP10</i>	caspase 10, apoptosis-related cysteine peptidase	Apoptosis
<i>CASP7</i>	caspase 7, apoptosis-related cysteine peptidase	Apoptosis
<i>CASP8</i>	caspase 8, apoptosis-related cysteine peptidase	Apoptosis
<i>CASP9</i>	caspase 9, apoptosis-related cysteine peptidase	Apoptosis
<i>CAST</i>	calpastatin	Inhibition of calpain (calcium-dependent cysteine protease)
<i>CBFB</i>	core-binding factor, beta subunit	Co-activator of Runx2
<i>CD47</i>	CD47 molecule	Integrin-associated signal transducer
<i>CD79B</i>	CD79b molecule, immunoglobulin-associated beta	Cytoplasmic tail containing an ITAM motif
<i>CLEC7A</i>	C-type lectin domain family 7, member A	TLR2-mediated activation of NF-kappa-B
<i>CPPED1</i>	calcineurin-like phosphoesterase domain containing 1; FLJ11151	Adipose tissue biology
<i>CSNK1D</i>	casein kinase 1, delta	Wnt signaling
<i>CSNK1G3</i>	casein kinase 1, gamma 3	Wnt signaling
<i>DACT1</i>	dishevelled-binding antagonist of beta-catenin 1	Wnt signaling
<i>DAP3</i>	death associated protein 3	Interferon-gamma-induced apoptosis
<i>DIABLO</i>	diablo, IAP-binding mitochondrial protein	Apoptosis
<i>DISC1</i>	disrupted in schizophrenia 1 protein	Modulator of the AKT-mTOR signaling
<i>DLEC1</i>	Deleted In Lung And Esophageal Cancer 1	Tumor suppressor
<i>DSTYK</i>	dual serine/threonine and tyrosine protein kinase; R1PK5	Apoptosis
<i>DUSP6</i>	Dual Specificity Phosphatase 6	Inactivation of MAP kinases, specificity for the ERK family
<i>DVL1</i>	dishevelled segment polarity protein 1	Wnt signaling
<i>ECM1</i>	extracellular matrix protein 1	negative regulator of bone mineralization, and MMP9 proteolytic activity
<i>ERBB2IP</i>	erb2 interacting protein	Ras signaling pathway
<i>ERC1</i>	ELKS/RAB6-interacting/CAST family member 1; RAB6IP2	Regulatory subunit of the IKK complex
<i>EVC</i>	Ellis van Creveld syndrome	Positive mediator of Hedgehog signaling
<i>EXTL2</i>	exostosin-like glycosyltransferase 2	Glycosyltransferase required for the biosynthesis of heparan-sulfate
<i>EYA4</i>	eyes absent homolog 4 (Drosophila)	Transcriptional activator through tyrosine phosphatase activity
<i>FAM189B</i>	Family With Sequence Similarity 189, Member B; C1orf2	Partner of a WW domain-containing protein involved in apoptosis
<i>FAS</i>	Fas cell surface death receptor; CD95	Apoptosis
<i>FASTK</i>	Fas-activated serine/threonine kinase; ENSG00000164896	Apoptosis
<i>FBF1</i>	Fas (TNFRSF6) binding factor 1	Apoptosis
<i>FGFR1OP</i>	Fibroblast growth factor receptor 1 oncogene partner	Proliferation
<i>G3BP</i>	GTPase activating protein (SH3 domain) binding protein 1	Nuclear RNA-binding protein and element of the Ras pathway
<i>GAB1</i>	GRB2-associated binding protein 1	EGF receptor signaling
<i>GLYR1</i>	glyoxylate reductase 1 homolog (Arabidopsis); N-PAC	Oxidoreductase activity, regulation of p38 MAP kinase activity
<i>GPS1</i>	G Protein Pathway Suppressor 1	Essential component of the COP9 signalosome complex
<i>HGF</i>	hepatocyte growth factor (hepapoietin A; scatter factor)	HGF
<i>HILPDA</i>	hypoxia inducible lipid droplet-associated; HIG2	Increases cellular lipid accumulation, and expression of IL6, MIF, VEGF
<i>HMGXB4</i>	HMG box domain containing 4; HMG2L1	Wnt signaling
<i>HPS1</i>	Hermansky-Pudlak syndrome 1	Component of multiple organelles, intracellular protein sorting
<i>HRAS</i>	Harvey rat sarcoma viral oncogene homolog	Ras oncogene family
<i>IFNAR2</i>	interferon (alpha, beta and omega) receptor 2	IFN-mediated STAT1, STAT2 and STAT3 activation
<i>IL17RC</i>	interleukin 17 receptor C	IL17 signaling
<i>IL17RE</i>	interleukin 17 receptor E	IL17 signaling
<i>ILF3</i>	interleukin enhancer binding factor 3, 90kDa	Subunit of NFAT
<i>IRAK1</i>	interleukin-1 receptor-associated kinase 1	NF-kB signaling
<i>IRF7</i>	interferon regulatory factor 7	Interferon signaling
<i>JKAMP</i>	JNK1/MAPK8-associated membrane protein; C14orf100	Regulator of MAPK8 activity
<i>KAT6A</i>	K(lysine) acetyltransferase 6A; MYST3	Histone acetyltransferases, coactivator for RUNX1 and RUNX2
<i>KIAA0101</i>	KIAA0101	Proliferation; PCNA-Associated Factor
<i>KITLG</i>	Kit ligand- SCF	Ligand for the receptor-type protein-tyrosine kinase KIT
<i>KL</i>	Klotho	Calcium phosphate homeostasis, anti-aging hormone
<i>L3MBTL1</i>	L(3)Mbt-Like 1 (Drosophila)	Overexpression induces multinucleated cells
<i>L3MBTL3</i>	L(3)Mbt-Like 3 (Drosophila)	Polycomb group protein, repression of transcription
<i>LAT2</i>	linker for activation of T cells family, member 2	Adaptor between ITAM-receptor activation and downstream signaling
<i>LDHC</i>	lactate dehydrogenase C	Final step of anaerobic glycolysis
<i>LGALS8</i>	lectin, galactoside-binding, soluble, 8; galectin 8	Adhesion, apoptosis, autophagy
<i>LGALS9</i>	lectin, galactoside-binding, soluble, 9; galectin 9	Adhesion, apoptosis
<i>LILRB5</i>	leukocyte Ig-like receptor, subfamily B (with TM and ITIM domains), member 5	Immunoglobulin-like receptor (LIR) family
<i>MADD</i>	MAP kinase-activating death domain protein	Apoptosis
<i>MAGED4B</i>	Melanoma Antigen Family D, 4B	Ubiquitination
<i>MALT1</i>	mucosa associated lymphoid tissue lymphoma translocation gene 1	NF-kB signaling, TRAF6 partner
<i>MAP3K3</i>	mitogen-activated protein kinase kinase kinase 3	NF-kB and ERK signaling
<i>MAPK7</i>	mitogen-activated protein kinase 7	ERK signaling
<i>MEF2C</i>	myocyte-specific enhancer factor 2C	Survival and proliferation
<i>MEN1</i>	multiple endocrine neoplasia I	Transcriptional regulator, TGFb signaling, NFkB signaling
<i>METTL13</i>	methyltransferase like 13; KIAA0859	Apoptosis
<i>MGRN1</i>	mahogunin ring finger 1, E3 ubiquitin protein ligase	Ubiquitination
<i>MIER1</i>	mesoderm induction early response 1, transcriptional regulator	Transcription repressor
<i>MITF</i>	Microphthalmia-Associated Transcription Factor	Differentiating factor (including osteoclasts)
<i>MLPH</i>	melanophilin	Rab effector protein
<i>MPZL1</i>	myelin protein zero-like 1	Signaling induced by ConA, which includes Src family kinases
<i>MST4</i>	Serine/Threonine Protein Kinase MST4; MASK	Apoptosis
<i>MTDH</i>	metadherin	NF-kB signaling
<i>MTUS1</i>	microtubule associated tumor suppressor 1	Inhibition of ERK2 activation and cell proliferation
<i>NBR1</i>	Neighbor Of BRCA1 Gene 1	Selective autophagy
<i>NFATC2</i>	nuclear factor of activated T-cells, cytoplasmic, calcineurin-dependent 2	NFAT signaling
<i>NLRP1</i>	NLR Family, Pyrin Domain Containing 1; NALP1	Apoptosis
<i>NLRP12</i>	NLR Family, Pyrin Domain Containing 12; NALP12	NF-kB signaling, apoptosis
<i>NLRP3</i>	NLR Family, Pyrin Domain Containing 3; CIAS1	Upstream activator of NFkB signaling
<i>OAS1</i>	2'-5'-oligoadenylate synthetase 1, 40/46kDa	Interferon-induced antiviral enzyme, apoptosis, gene regulation
<i>OASL</i>	2'-5'-oligoadenylate synthetase-like	antiviral activity
<i>OPA1</i>	optic atrophy 1 (autosomal dominant)	Dynamin-related GTPase, mitochondrial fusion and apoptosis
<i>OPTN</i>	optineurin	Autophagy, membrane trafficking
<i>OS9</i>	Osteosarcoma Amplified 9, Endoplasmic Reticulum Lectin	Endoplasmic reticulum control, shuttle to the ubiquitination machinery
<i>PARL</i>	presenilin associated, rhomboid-like	Apoptosis
<i>PDCD4</i>	programmed cell death 4 (neoplastic transformation inhibitor)	Apoptosis
<i>PDPK1</i>	3-phosphoinositide dependent protein kinase-1	NF-kB and Akt signaling
<i>PIDD</i>	p53-induced protein with a death domain; LRDD	NF-kB signaling, apoptosis
<i>PILRA</i>	paired immunoglobulin-like type 2 receptor alpha	cellular signaling inhibitory receptor
<i>PILRB</i>	paired immunoglobulin-like type 2 receptor beta	cellular signaling activating receptor that associates with ITAM- adapters
<i>PORCN</i>	Porcupine Homolog (Drosophila)	Wnt signaling
<i>PPARG</i>	peroxisome proliferator-activated receptor gamma	Peroxisomal beta-oxidation pathway, NF-kB signaling
<i>PRMT2</i>	protein arginine methyltransferase 2	NF-kB signaling, apoptosis
<i>PTPN13</i>	protein tyrosine phosphatase, non-receptor type 13 (APO-1/CD95 (Fas)-associated phosphatase)	Apoptosis
<i>PYCARD</i>	PYD and CARD domain containing	Apoptosis
<i>RAB3IP</i>	Rab3A-interacting protein	activate RAB8A and RAB8B
<i>RBCK1</i>	RanBP-type and C3HC4-type zinc finger containing 1	Ubiquitin-protein ligase, interaction with TRAF6
<i>RCAN1</i>	Regulator Of Calcineurin 1; DSCR1	Inhibits calcineurin-dependent transcriptional responses
<i>RHOT1</i>	Ras Homolog Family Member T1	mitochondrial trafficking, apoptosis
<i>RNF138</i>	ring finger protein 138, E3 ubiquitin protein ligase	E3 ubiquitin-protein ligase
<i>RREB1</i>	Ras Responsive Element Binding Protein 1	Ras/Raf-mediated cell differentiation by enhancing calcitonin expression
<i>RUNX2</i>	runt-related transcription factor 2	Transcription factor involved in osteoblastic differentiation
<i>SIRT2</i>	Sirtuin 2- silent information regulator 2	Apoptosis, aging
<i>SLA2</i>	Src-like adapter protein-2	Downregulation of T / B responses, inhibition of calcium mobilization
<i>SNAP25</i>	synaptosomal-associated protein, 25kDa	Vesicle docking and membrane fusion
<i>SPINT1</i>	Serine Peptidase Inhibitor, Kunitz Type 1	Inhibitor of HGF activator
<i>SPP1</i>	Secreted Phosphoprotein 1	Osteopontin
<i>STAT3</i>	signal transducer and activator of transcription 3 (acute-phase response factor)	Signal transducer and transcription activator
<i>SUCO</i>	SUN Domain Containing Ossification Factor; C1orf9	Regulation of type I collagen synthesis
<i>TBC1D25</i>	TBC1 Domain Family, Member 25; OATL1	Autophagy
<i>TCF4</i>	transcription factor 4	Transcription activator
<i>TCF7L2</i>	transcription factor 7-like 2 (T-cell specific, HMG-box)	Wnt signaling
<i>TCOF1</i>	Treacher Collins-Franceschetti Syndrome 1	Nucleolar-cytoplasmic transport
<i>TCTN3</i>	tectonic family member 3; C10orf61	apoptosis regulation, Hedgehog signal transduction
<i>TFEC</i>	Transcription Factor EC	Transcriptional transactivator, interaction with MITF in target activation
<i>THAP1</i>	THAP Domain Containing, Apoptosis Associated Protein 1	Apoptosis
<i>THYN1</i>	Thymocyte nuclear protein 1	Apoptosis
<i>TM2D2</i>	TM2 Domain Containing 2	Apoptosis
<i>TNFRSF10B</i>	tumor necrosis factor receptor superfamily, member 10b; TRAIL-R2	Apoptosis
<i>TPD52L1</i>	tumor protein D52-like 1	Apoptosis
<i>TPD52L2</i>	Tumor protein D52-like 2	Apoptosis
<i>TRAF3</i>	TNF receptor-associated factor 3	NF-kB signaling
<i>TRPC4AP</i>	transient receptor potential cation channel, subfamily C, member 4 associated protein	Ubiquitination, NF-kB signaling
<i>TSSC4</i>	tumor suppressing subtransferable candidate 4	tumor-suppressor
<i>UBE2D3</i>	Ubiquitin-Conjugating Enzyme E2D 3	Ubiquitination
<i>UBE2V1</i>	Ubiquitin-Conjugating Enzyme E2 Variant 1	Ubiquitination, NF-kB signaling
<i>USP4</i>	ubiquitin specific peptidase 4 (proto-oncogene)	Ubiquitination, NF-kB signaling
<i>VHL</i>	Von Hippel-Lindau Tumor Suppressor, E3 Ubiquitin Protein Ligase	Ubiquitination
<i>WARS</i>	tryptophanyl-tRNA synthetase	Regulation of ERK, Akt, and eNOS activation pathways
<i>ZDHHC13</i>	zinc finger, DHHC-type containing 13	Ion transmembrane transport, NF-kB signaling
<i>ZDHHC16</i>	zinc finger, DHHC-type containing 16	Apoptosis