Category: Function: Annotation (p value)	Gene	Name	Description
Embryonic Development: Disease: Disease of Embryonic Cell Lines (7.20E-14)	AES	amino-terminal enhancer of split	This protein is similar in sequence to a protein involved in neurogenesis during embryonic development.
	AFG3L2	AFG3 ATPase family gene 3-like 2 (yeast)	This gene encodes a protein localized in mitochondria and closely related to paraplegin, which is responsible for an autosomal recessive form of hereditary spastic paraplegia.
	AHCTF1	AT hook containing transcription factor 1	
	AKAP13	A kinase (PRKA) anchor protein 13	This protein family is a group of structurally diverse proteins, which have the common function of binding to the regulatory subunit of protein kinase A (PKA) and confining the holoenzyme to discrete locations within the cell.
	ALKBH3	alkB, alkylation repair homolog 3 (E. coli)	The Escherichia coli AlkB protein protects against the cytotoxicity of methylating agents by repair of the specific DNA lesions generated in single-stranded DNA.
	AP1G2	adaptor-related protein complex 1, gamma 2 subunit	This protein along with the complex is thought to function at some trafficking step in the complex pathways between the trans-Golgi network and the cell surface.
	AQR	aquarius homolog (mouse)	
	ARID1A	AT rich interactive domain 1A (SWI-like)	This gene encodes a member of the SWI/SNF family, whose members have helicase and ATPase activities and are thought to regulate transcription of certain genes by altering the chromatin structure around those genes.
	C19ORF50	chromosome 19 open reading frame 50	
	CCAR1	cell division cycle and apoptosis regulator 1	
	CD44	CD44 molecule (Indian blood group)	This protein participates in a wide variety of cellular functions including lymphocyte activation, recirculation and homing, hematopoiesis, and tumor metastasis.
	CD164	CD164 molecule, sialomucin	Sialomucins play 2 key but opposing roles as cytoprotective or antiadhesive agents, and as adhesion receptors. CD164 is a type I integral transmembrane sialomucin that functions as an adhesion receptor.
	CEP68	centrosomal protein 68kDa	
	COL5A1	collagen, type V, alpha 1	Type V collagen appears to regulate the assembly of heterotypic fibers composed of both type I and type V collagen.
	CYBB	cytochrome b-245, beta polypeptide	Cytochrome b (-245) has been proposed as a primary component of the microbicidal oxidase system of phagocytes.

DAG1	dystroglycan 1 (dystrophin-associated glycoprotein 1)	Dystroglycan is a laminin binding component of the dystrophin-glycoprotein complex which provides a linkage between the subsarcolemmal cytoskeleton and the extracellular matrix.
DAZAP2	DAZ associated protein 2	This protein may function in various processes including spermatogenesis, cell signaling and transcription regulation, formation of stress granules during translation arrest, RNA splicing, and pathogenesis of multiple myeloma.
DCP2	DCP2 decapping enzyme homolog (S. cerevisiae)	DCP2 is a key component of an mRNA-decapping complex required for removal of the 5-prime cap from mRNA prior to its degradation from the 5-prime end.
DDX23	DEAD (Asp-Glu-Ala-Asp) box polypeptide 23	This protein is implicated in a number of cellular processes involving alteration of RNA secondary structure, such as translation initiation, nuclear and mitochondrial splicing, and ribosome and spliceosome assembly, and is believed to be involved in embryogenesis, spermatogenesis, and cellular growth and division.
DNM2	dynamin 2	Dynamins have been implicated in cell processes such as endocytosis and cell motility, and in alterations of the membrane that accompany certain activities such as bone resorption by osteoclasts.
EGFR	epidermal growth factor receptor (erythroblastic leukemia viral (v-erb-b) oncogene homolog, avian)	Binding of this receptor to a ligand induces dimerization and tyrosine autophosphorylation and leads to cell proliferation.
EP300	E1A binding protein p300	This protein functions as histone acetyltransferase that regulates transcription via chromatin remodeling and is important in the processes of cell proliferation and differentiation.
ERCC5	excision repair cross-complementing rodent repair deficiency, complementation group 5	Excision repair cross-complementing rodent repair deficiency, complementation group 5 (xeroderma pigmentosum, complementation group G) is involved in excision repair of UV-induced DNA damage.
FAM172A	family with sequence similarity 172, member A	
FOXJ2	forkhead box J2	
FXR1	fragile X mental retardation, autosomal homolog 1	These proteins shuttle between the nucleus and cytoplasm and associate with polyribosomes, predominantly with the 60S ribosomal subunit.
GTF2H2	general transcription factor IIH, polypeptide 2, 44kDa	This gene encodes the 44 kDa subunit of RNA polymerase II transcription initiation factor IIH which is involved in basal transcription and nucleotide excision repair.
HDAC1	histone deacetylase 1	Histone acetylation and deacetylation, catalyzed by multisubunit complexes, play a key role in the regulation of eukaryotic gene expression and in cell growth and apoptosis.
HMGB1	high-mobility group box 1	
HNRNPH1	heterogeneous nuclear ribonucleoprotein H1 (H)	These proteins are associated with pre-mRNAs in the nucleus and appear to influence pre-mRNA processing and other aspects of mRNA metabolism and transport.
HNRPDL	heterogeneous nuclear ribonucleoprotein D-like	These proteins are associated with pre-mRNAs in the nucleus and appear to influence pre-mRNA processing and other aspects of mRNA metabolism and transport.

Embryonic Development: Infectious Disorder: Infectious Disorder of Embryonic Cell Lines (3.86E-13)	AES	amino-terminal enhancer of split	This protein is similar in sequence to a protein involved in neurogenesis during embryonic development.
	AFG3L2	AFG3 ATPase family gene 3-like 2 (yeast)	This gene encodes a protein localized in mitochondria and closely related to paraplegin, which is responsible for an autosomal recessive form of hereditary spastic paraplegia.
	AHCTF1	AT hook containing transcription factor 1	
	AKAP13	A kinase (PRKA) anchor protein 13	This protein family is a group of structurally diverse proteins, which have the common function of binding to the regulatory subunit of protein kinase A (PKA) and confining the holoenzyme to discrete locations within the cell.
	ALKBH3	alkB, alkylation repair homolog 3 (E. coli)	The Escherichia coli AlkB protein protects against the cytotoxicity of methylating agents by repair of the specific DNA lesions generated in single-stranded DNA.
	AP1G2	adaptor-related protein complex 1, gamma 2 subunit	This protein along with the complex is thought to function at some trafficking step in the complex pathways between the trans-Golgi network and the cell surface.
	AQR	aquarius homolog (mouse)	
	ARID1A	AT rich interactive domain 1A (SWI-like)	This protein is thought to regulate transcription of certain genes by altering the chromatin structure around those genes.
	C19ORF50	chromosome 19 open reading frame 50	
	CCAR1	cell division cycle and apoptosis regulator 1	
	CD164	CD164 molecule, sialomucin	Sialomucins play 2 key but opposing roles as cytoprotective or antiadhesive agents, and as adhesion receptors. CD164 is a type I integral transmembrane sialomucin that functions as an adhesion receptor.
	CEP68	centrosomal protein 68kDa	
	COL5A1	collagen, type V, alpha 1	Type V collagen appears to regulate the assembly of heterotypic fibers composed of both type I and type V collagen.
	CYBB	cytochrome b-245, beta polypeptide	Cytochrome b (-245) has been proposed as a primary component of the microbicidal oxidase system of phagocytes.
	DAG1	dystroglycan 1 (dystrophin-associated glycoprotein 1)	Dystroglycan is a laminin binding component of the dystrophin-glycoprotein complex which provides a linkage between the subsarcolemmal cytoskeleton and the extracellular matrix.
	DAZAP2	DAZ associated protein 2	This protein may function in various processes including spermatogenesis, cell signaling and transcription regulation, formation of stress granules during translation arrest, RNA splicing, and pathogenesis of multiple myeloma.

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	HMGB1	high-mobility group box 1	
	HNRNPH1	heterogeneous nuclear ribonucleoprotein H1 (H)	These proteins are associated with pre-mRNAs in the nucleus and appear to influence pre-mRNA processing and other aspects of mRNA metabolism and transport.
	HNRPDL	heterogeneous nuclear ribonucleoprotein D-like	These proteins are associated with pre-mRNAs in the nucleus and appear to influence pre-mRNA processing and other aspects of mRNA metabolism and transport.
	KARS	lysyl-tRNA synthetase	Aminoacyl-tRNA synthetases are a class of enzymes that charge tRNAs with their cognate amino acids.
Embryonic Development: Vascularization: Vascularization of Extraembryonic Tissue (5.06E-04)	ARNT	aryl hydrocarbon receptor nuclear translocator	This protein forms a complex with the ligand-bound Ah receptor, and is required for receptor function.
	BRAF	v-raf murine sarcoma viral oncogene homolog B1	This protein plays a role in regulating the MAP kinase/ERKs signaling pathway, which affects cell division, differentiation, and secretion.

	CEACAM1	carcinoembryonic antigen-related cell adhesion molecule 1 (biliary glycoprotein)	Multiple cellular activities have been attributed to this protein, including roles in the differentiation and arrangement of tissue three-dimensional structure, angiogenesis, apoptosis, tumor suppression, metastasis, and the modulation of innate and adaptive immune responses.
	ICAM1	intercellular adhesion molecule 1	This gene encodes a cell surface glycoprotein which is typically expressed on endothelial cells and cells of the immune system.
	ITGB8	integrin, beta 8	Integrin complexes mediate cell-cell and cell-extracellular matrix interactions and this complex plays a role in human airway epithelial proliferation.
	MAP3K3	mitogen-activated protein kinase kinase kinase 3	This protein directly regulates the stress-activated protein kinase (SAPK) and extracellular signal-regulated protein kinase (ERK) pathways by activating SEK and MEK1/2 respectively.
	NRP2	neuropilin 2	The encoded transmembrane protein binds to SEMA3C protein and SEMA3F protein, and interacts with vascular endothelial growth factor (VEGF). This protein may play a role in cardiovascular development, axon guidance, and tumorigenesis.
Embryonic Development: Cell Death: Cell Death of Embryonic Cell Lines (9.34E-04)	AKT1	v-akt murine thymoma viral oncogene homolog 1	In the developing nervous system AKT is a critical mediator of growth factor-induced neuronal survival. Survival factors can suppress apoptosis.
	BAG4	BCL2-associated athanogene 4	This protein regulates downstream cell death signaling. The regulatory role of this protein in cell death was demonstrated in epithelial cells which undergo apoptosis while integrin mediated matrix contacts are lost.
	BAX	BCL2-associated X protein	This protein forms a heterodimer with BCL2, and functions as an apoptotic activator.
	BID	BH3 interacting domain death agonist	This gene encodes a death agonist that heterodimerizes with either agonist BAX or antagonist BCL2.
	CASP2	caspase 2, apoptosis-related cysteine peptidase	Sequential activation of caspases plays a central role in the execution-phase of cell apoptosis.
	CASP7	caspase 7, apoptosis-related cysteine peptidase	Sequential activation of caspases plays a central role in the execution-phase of cell apoptosis.
	CD44	CD44 molecule (Indian blood group)	This protein participates in a wide variety of cellular functions including lymphocyte activation, recirculation and homing, hematopoiesis, and tumor metastasis.
	CDC42	cell division cycle 42 (GTP binding protein, 25kDa)	This protein regulates signaling pathways that control diverse cellular functions including cell morphology, migration, endocytosis and cell cycle progression.
	CFLAR	CASP8 and FADD-like apoptosis regulator	
	DAXX	death-domain associated protein	In the nucleus, this protein functions as a potent transcription repressor that binds to sumoylated transcription factors, and may function to regulate apoptosis.
	DCTN2	dynactin 2 (p50)	This protein is involved in a diverse array of cellular functions, including ER-to-Golgi transport, the centripetal movement of lysosomes and endosomes, spindle formation, chromosome movement, nuclear positioning, and axonogenesis.

ECOP	EGFR-coamplified and overexpressed protein	
FADD	Fas (TNFRSF6)-associated via death domain	The protein encoded by this gene is an adaptor molecule that interacts with various cell surface receptors and mediates cell apoptotic signals.
FAS	Fas (TNF receptor superfamily, member 6)	This protein has been shown to play a central role in the physiological regulation of programmed cell death, and has been implicated in the pathogenesis of various malignancies and diseases of the immune system. This receptor is found to be involved in transducing the proliferating signals in normal diploid fibroblast and T cells.
IFNAR1	interferon (alpha, beta and omega) receptor 1	Binding and activation of this receptor stimulates Janus protein kinases, it also functions as an antiviral factor.
IRF1	interferon regulatory factor 1	IRF1 is a transcription activator of genes induced by interferons alpha, beta, and gamma. It also plays roles in regulating apoptosis and tumor-suppression.
LYN	v-yes-1 Yamaguchi sarcoma viral related oncogene homolog	
MAP3K5	mitogen-activated protein kinase kinase kinase 5	Mitogen-activated protein kinase (MAPK) signaling cascades include MAPK or extracellular signal-regulated kinase (ERK), MAPK kinase (MKK or MEK), and MAPK kinase kinase (MAPKKK or MEKK). MAPKK kinase/MEKK phosphorylates and activates its downstream protein kinase, MAPK kinase/MEK, which in turn activates MAPK.
MCL1	myeloid cell leukemia sequence 1 (BCL2-related)	The longer gene product (isoform 1) enhances cell survival by inhibiting apoptosis while the alternatively spliced shorter gene product (isoform 2) promotes apoptosis and is death-inducing.
NFKB1	nuclear factor of kappa light polypeptide gene enhancer in B-cells 1	NFKB is a transcription regulator that is activated by various intra- and extra-cellular stimuli such as cytokines, oxidant-free radicals, ultraviolet irradiation, and bacterial or viral products.
PAK2	p21 protein (Cdc42/Rac)-activated kinase 2	This protein is activated by proteolytic cleavage during caspase-mediated apoptosis, and may play a role in regulating the apoptotic events in the dying cell.
PEA15	phosphoprotein enriched in astrocytes 15	PEA15 is a death effector domain (DED)-containing protein predominantly expressed in the central nervous system, particularly in astrocytes.
PIAS1	protein inhibitor of activated STAT, 1	This protein functions in testis as a nuclear receptor transcriptional coregulator and may have a role in AR initiation and maintenance of spermatogenesis.
PPP1R15A	protein phosphatase 1, regulatory (inhibitor) subunit 15A	This gene is a member of a group of genes whose transcript levels are increased following stressful growth arrest conditions and treatment with DNA-damaging agents.
PRKAA1	protein kinase, AMP-activated, alpha 1 catalytic subunit	This protein protects cells from stresses that cause ATP depletion by switching off ATP-consuming biosynthetic pathways.
PRMT2	protein arginine methyltransferase 2	
RASSF1	Ras association (RalGDS/AF-6) domain family member 1	This protein was shown to inhibit the accumulation of cyclin D1, and thus induce cell cycle arrest.

	RIPK1	receptor (TNFRSF)-interacting serine-threonine kinase 1	
	SPP1	secreted phosphoprotein 1	
	STK4	serine/threonine kinase 4	The particular phosphorylation catalyzed by this protein has been correlated with apoptosis, and it's possible that this protein induces the chromatin condensation observed in this process.
	TFRC	transferrin receptor (p90, CD71)	
	TLR1	toll-like receptor 1	Toll-like receptors recognize pathogen-associated molecular patterns (PAMPs) that are expressed on infectious agents, and mediate the production of cytokines necessary for the development of effective immunity.
	TLR2	toll-like receptor 2	This protein encoded by this gene is a member of the Toll-like receptor (TLR) family which plays a fundamental role in pathogen recognition and activation of innate immunity. It mediates host response to Gram-positive bacteria.
Embryonic Development: Apoptosis: Apoptosis of Embryonic Cell Lines (1.17E-03)	AKT1	v-akt murine thymoma viral oncogene homolog 1	In the developing nervous system AKT is a critical mediator of growth factor-induced neuronal survival. Survival factors can suppress apoptosis.
	BAX	BCL2-associated X protein	This protein forms a heterodimer with BCL2, and functions as an apoptotic activator.
	BID	BH3 interacting domain death agonist	This gene encodes a death agonist that heterodimerizes with either agonist BAX or antagonist BCL2.
	CASP2	caspase 2, apoptosis-related cysteine peptidase	Sequential activation of caspases plays a central role in the execution-phase of cell apoptosis.
	CD44	CD44 molecule (Indian blood group)	This protein participates in a wide variety of cellular functions including lymphocyte activation, recirculation and homing, hematopoiesis, and tumor metastasis.
	CFLAR	CASP8 and FADD-like apoptosis regulator	
	DAXX	death-domain associated protein	In the nucleus, this protein functions as a potent transcription repressor that binds to sumoylated transcription factors, and may function to regulate apoptosis.
	ECOP	EGFR-coamplified and overexpressed protein	
	FADD	Fas (TNFRSF6)-associated via death domain	The protein encoded by this gene is an adaptor molecule that interacts with various cell surface receptors and mediates cell apoptotic signals.
	FAS	Fas (TNF receptor superfamily, member 6)	This protein has been shown to play a central role in the physiological regulation of programmed cell death, and has been implicated in the pathogenesis of various malignancies and diseases of the immune system. This receptor is found to be involved in transducing the proliferating signals in normal diploid fibroblast and T cells.
	IRF1	interferon regulatory factor 1	IRF1 is a transcription activator of genes induced by interferons alpha, beta, and gamma. It also plays roles in regulating apoptosis and tumor-suppressoion.

LYN	v-yes-1 Yamaguchi sarcoma viral related oncogene homolog	
MAP3K5	mitogen-activated protein kinase kinase kinase 5	Mitogen-activated protein kinase (MAPK) signaling cascades include MAPK or extracellular signal-regulated kinase (ERK), MAPK kinase (MKK or MEK), and MAPK kinase kinase (MAPKKK or MEKK). MAPKK kinase/MEKK phosphorylates and activates its downstream protein kinase, MAPK kinase/MEK, which in turn activates MAPK.
MCL1	myeloid cell leukemia sequence 1 (BCL2-related)	The longer gene product (isoform 1) enhances cell survival by inhibiting apoptosis while the alternatively spliced shorter gene product (isoform 2) promotes apoptosis and is death-inducing.
PAK2	p21 protein (Cdc42/Rac)-activated kinase 2	This protein is activated by proteolytic cleavage during caspase-mediated apoptosis, and may play a role in regulating the apoptotic events in the dying cell.
PEA15	phosphoprotein enriched in astrocytes 15	PEA15 is a death effector domain (DED)-containing protein predominantly expressed in the central nervous system, particularly in astrocytes.
PIAS1	protein inhibitor of activated STAT, 1	This protein functions in testis as a nuclear receptor transcriptional coregulator and may have a role in AR initiation and maintenance of spermatogenesis.
PPP1R15A	protein phosphatase 1, regulatory (inhibitor) subunit 15A	This gene is a member of a group of genes whose transcript levels are increased following stressful growth arrest conditions and treatment with DNA-damaging agents.
PRKAA1	protein kinase, AMP-activated, alpha 1 catalytic subunit	This protein protects cells from stresses that cause ATP depletion by switching off ATP-consuming biosynthetic pathways.
PRMT2	protein arginine methyltransferase 2	
RIPK1	receptor (TNFRSF)-interacting serine-threonine kinase 1	
SPP1	secreted phosphoprotein 1	
STK4	serine/threonine kinase 4	The particular phosphorylation catalyzed by this protein has been correlated with apoptosis, and it's possible that this protein induces the chromatin condensation observed in this process.
TFRC	transferrin receptor (p90, CD71)	
TLR1	toll-like receptor 1	Toll-like receptors recognize pathogen-associated molecular patterns (PAMPs) that are expressed on infectious agents, and mediate the production of cytokines necessary for the development of effective immunity.
TLR2	toll-like receptor 2	This protein encoded by this gene is a member of the Toll-like receptor (TLR) family which plays a fundamental role in pathogen recognition and activation of innate immunity. It mediates host response to Gram-positive bacteria.
TP53	tumor protein p53	This gene encodes tumor protein p53, which responds to diverse cellular stresses to regulate target genes that induce cell cycle arrest, apoptosis, senescence, DNA repair, or changes in metabolism.
TP53INP1	tumor protein p53 inducible nuclear protein 1	
TXNDC1	thioredoxin-related transmembrane protein 1	TXNDC1 is a thioredoxin (TXN; see MIM 187700)-related protein with disulfide reductase activity.

	UXT	ubiquitously-expressed transcript	This gene plays a role in facilitating receptor-induced transcriptional activation. It is also likely to be involved in tumorigenesis as it is abundantly expressed in tumor tissues.
Hematological System Development and Function and Hematopoiesis: Hematopoiesis: Hematopoiesis (1.30E-07)	ADAM17	ADAM metallopeptidase domain 17	This protein functions as a tumor necrosis factor-alpha converting enzyme; binds mitotic arrest deficient 2 protein, and also plays a prominent role in the activation of the Notch signaling pathway.
	ADAR	adenosine deaminase, RNA-specific	This gene encodes the enzyme responsible for RNA editing by site-specific deamination of adenosines.
	AKT1	v-akt murine thymoma viral oncogene homolog 1	In the developing nervous system AKT is a critical mediator of growth factor-induced neuronal survival. Survival factors can suppress apoptosis.
	AKT2	v-akt murine thymoma viral oncogene homolog 2	This gene is a putative oncogene encoding a subfamily of serine/threonine kinases containing SH2-like (Src homology 2-like) domains.The encoded protein is a general protein kinase capable of phophorylating several known proteins.
	AP3B1	adaptor-related protein complex 3, beta 1 subunit	This gene encodes a protein that may play a role in organelle biogenesis associated with melanosomes, platelet dense granules, and lysosomes.
	AP3D1	adaptor-related protein complex 3, delta 1 subunit	The AP3D1 subunit is implicated in intracellular biogenesis and trafficking of pigment granules and platelet dense granules and neurotransmitter vesicles.
	APAF1	apoptotic peptidase activating factor 1	This gene encodes a cytoplasmic protein that initiates apoptosis.
	B2M	beta-2-microglobulin	Beta-2-microglobulin is a serum protein found in association with the major histocompatibility complex (MHC) class I heavy chain on the surface of nearly all nucleated cells.
	BAX	BCL2-associated X protein	This protein forms a heterodimer with BCL2, and functions as an apoptotic activator.
	BSG	basigin (Ok blood group)	This protein is a plasma membrane protein that is important in spermatogenesis, embryo implantation, neural network formation, and tumor progression.
	CCL3	chemokine (C-C motif) ligand 3	Macrophage inflammatory protein-1 is a so-called monokine that is involved in the acute inflammatory state in the recruitment and activation of polymorphonuclear leukocytes.
	CCL4	chemokine (C-C motif) ligand 4	
	CCND1	cyclin D1	This cyclin is required for cell cycle G1/S transition. It interacts with tumor suppressor protein Rb and the expression of this gene is regulated positively by Rb.
	CD44	CD44 molecule (Indian blood group)	This protein participates in a wide variety of cellular functions including lymphocyte activation, recirculation and homing, hematopoiesis, and tumor metastasis.
	CD69	CD69 molecule	Expression of this protein is induced upon activation of T lymphocytes, and may play a role in proliferation. It may act to transmit signals in natural killer cells and platelets.
	CD81	CD81 molecule	This protein appears to promote muscle cell fusion and support myotube maintenance, and may be involved in signal transduction.

CD83	CD83 molecule	
CDC2L5	cell division cycle 2-like 5 (cholinesterase-related cell division controller)	The proteins of this family are well known for their essential roles as master switches in cell cycle control. They may also be involved in neurocytoskeleton dynamics. The exact function of this protein has not yet been determined.
CDKN2A	cyclin-dependent kinase inhibitor 2A (melanoma, p16, inhibits CDK4)	This ARF product functions as a stabilizer of the tumor suppressor protein p53 as it can interact with, and sequester, MDM1, a protein responsible for the degradation of p53. It has a common functionality in cell cycle G1 control.
CEBPD	CCAAT/enhancer binding protein (C/EBP), delta	This protein is important in the regulation of genes involved in immune and inflammatory responses, and may be involved in the regulation of genes associated with activation and/or differentiation of macrophages.
CHD4	chromodomain helicase DNA binding protein 4	This protein is the main component of the nucleosome remodeling and deacetylase complex and plays an important role in epigenetic transcriptional repression.
CREB1	cAMP responsive element binding protein 1	This protein induces transcription of genes in response to hormonal stimulation of the cAMP pathway.
CTBP1	C-terminal binding protein 1	This proteins can interact with a polycomb group protein complex which participates in regulation of gene expression during development.
CXCR4	chemokine (C-X-C motif) receptor 4	This protein acts with the CD4 protein to support HIV entry into cells and is also highly expressed in breast cancer cells.
DCLRE1C	DNA cross-link repair 1C (PSO2 homolog, S. cerevisiae)	This nuclear protein is involved in V(D)J recombination and DNA repair.
DICER1	dicer 1, ribonuclease type III	This ribonuclease is required by the RNA interference and small temporal RNA pathways to produce the active small RNA component that represses gene expression.
EGFR	epidermal growth factor receptor (erythroblastic leukemia viral (v-erb-b) oncogene homolog, avian)	Binding of this receptor to a ligand induces dimerization and tyrosine autophosphorylation and leads to cell proliferation.
EGR1	early growth response 1	This protein is a transcriptional regulator required for differentitation and mitogenesis.
ETV6	ets variant 6	This gene encodes an ETS family transcription factor that it is required for hematopoiesis and maintenance of the developing vascular network.
FADD	Fas (TNFRSF6)-associated via death domain	The protein encoded by this gene is an adaptor molecule that interacts with various cell surface receptors and mediates cell apoptotic signals.
FAS	Fas (TNF receptor superfamily, member 6)	This protein has been shown to play a central role in the physiological regulation of programmed cell death, and has been implicated in the pathogenesis of various malignancies and diseases of the immune system. This receptor is found to be involved in transducing the proliferating signals in normal diploid fibroblast and T cells.
FCGR2A	Fc fragment of IgG, low affinity IIa, receptor (CD32)	This protein is a cell surface receptor found on phagocytic cells such as macrophages and neutrophils, and is involved in the process of phagocytosis and clearing of immune complexes.
FOS	v-fos FBJ murine osteosarcoma viral oncogene homolog	The FOS proteins have been implicated as regulators of cell proliferation, differentiation, transformation, and apoptotic cell death.

FUS	fusion (involved in t(12;16) in malignant liposarcoma)	
GRB2	growth factor receptor-bound protein 2	The protein may be involved in the signal transduction pathway.
HDAC5	histone deacetylase 5	This protein possesses histone deacetylase activity and represses transcription when tethered to a promoter.
HDAC7	histone deacetylase 7	This gene is orthologous to mouse HDAC7 gene whose protein promotes repression mediated via the transcriptional corepressor SMRT.
HSP90AA1	heat shock protein 90kDa alpha (cytosolic), class A member 1	HSP90 proteins are molecular chaperones that have key roles in signal transduction, protein folding, protein degradation, and morphologic evolution.
HSP90B1	heat shock protein 90kDa beta (Grp94), member 1	HSP90 proteins play roles in folding newly synthesized proteins or stabilizing and refolding denatured proteins after stress.
HSPD1	heat shock 60kDa protein 1 (chaperonin)	This protein may function as a signaling molecule in the innate immune system. It is essential for the folding and assembly of newly imported proteins in the mitochondria.
ICAM1	intercellular adhesion molecule 1	This gene encodes a cell surface glycoprotein which is typically expressed on endothelial cells and cells of the immune system.
ICOSLG	inducible T-cell co-stimulator ligand	
IFNAR1	interferon (alpha, beta and omega) receptor 1	Binding and activation of this receptor stimulates Janus protein kinases, it also functions as an antiviral factor.
IFNGR1	interferon gamma receptor 1	This gene encodes the ligand-binding chain (alpha) of the gamma interferon receptor.
IGF2	insulin-like growth factor 2 (somatomedin A)	This gene encodes a member of the insulin family of polypeptide growth factors that is involved in development and growth.
IGF2R	insulin-like growth factor 2 receptor	This receptor functions in the intracellular trafficking of lysosomal enzymes, the activation of transforming growth factor beta, and the degradation of IGF2.
IL2RG	interleukin 2 receptor, gamma (severe combined immunodeficiency)	The interleukin 2 (IL2) receptor gamma chain (IL2RG), an important signalling component of many interleukin receptors (IL2,IL4,IL7,IL9, and IL15).
IL4R	interleukin 4 receptor	This protein can bind interleukin 4 to promote differentiation of Th2 cells, can be produced by an alternate splice variant or by proteolysis of the membrane-bound protein, and can inhibit IL4-mediated cell proliferation and IL5 upregulation by T-cells.
IL6R	interleukin 6 receptor	Interleukin 6 (IL6) is a potent pleiotropic cytokine that regulates cell growth and differentiation and plays an important role in immune response.
IL7R	interleukin 7 receptor	This protein has been shown to play a critical role in the V(D)J recombination during lymphocyte development, and to control the accessibility of the TCR gamma locus by STAT5 and histone acetylation.
IRF1	interferon regulatory factor 1	IRF1 is a transcription activator of genes induced by interferons alpha, beta, and gamma. It also plays roles in regulating apoptosis and tumor-suppressoion.
IRF2	interferon regulatory factor 2	IRF2 competitively inhibits the IRF1-mediated transcriptional activation of interferons alpha and beta, and presumably other genes that employ IRF1 for transcription activation. However, IRF2 also functions as a transcriptional activator of histone H4.

ITGB2	integrin, beta 2 (complement component 3 receptor 3 and 4 subunit)	Integrins are known to participate in cell adhesion as well as cell-surface mediated signalling.
JAK1	Janus kinase 1	JAK1 is involved in the interferon-alpha/beta and -gamma signal transduction pathways. These kinases couple cytokine ligand binding to tyrosine phosphorylation of various known signaling proteins and of a unique family of transcription factors termed the signal transducers and activators of transcription, or STATs.
JMJD6	jumonji domain containing 6	JmjC domain-containing proteins are predicted to function as protein hydroxylases or histone demethylases.
JUN	jun oncogene	This protein interacts directly with specific target DNA sequences to regulate gene expression.
LAMP1	lysosomal-associated membrane protein 1	This glycoprotein provides selectins with carbohydrate ligands, and may play a role in tumor cell metastasis.
LCN2	lipocalin 2	
LYN	v-yes-1 Yamaguchi sarcoma viral related oncogene homolog	
MAFB	v-maf musculoaponeurotic fibrosarcoma oncogene homolog B (avian)	This protein plays an important role in the regulation of lineage-specific hematopoiesis. It represses ETS1-mediated transcription of erythroid-specific genes in myeloid cells.
MAP3K7	mitogen-activated protein kinase kinase kinase 7	This kinase mediates the signaling transduction induced by TGF beta and morphogenetic protein (BMP), and controls a variety of cell functions including transcription regulation and apoptosis.This kinase can play a role in the cell response to environmental stresses.
MAPK14	mitogen-activated protein kinase 14	This kinase may be involved in stress related transcription and cell cycle regulation, as well as in genotoxic stress response.
MCL1	myeloid cell leukemia sequence 1 (BCL2-related)	The longer gene product (isoform 1) enhances cell survival by inhibiting apoptosis while the alternatively spliced shorter gene product (isoform 2) promotes apoptosis and is death-inducing.
MDM2	Mdm2 p53 binding protein homolog (mouse)	This protein is a nuclear phosphoprotein that binds and inhibits transactivation by tumor protein p53, as part of an autoregulatory negative feedback loop. It also affects the cell cycle, apoptosis, and tumorigenesis through interactions with other proteins, including retinoblastoma 1 and ribosomal protein L5.
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MED1	mediator complex subunit 1	The protein encoded by this gene is a subunit of the CRSP (cofactor required for SP1 activation) complex, which, along with TFIID, is required for efficient activation by SP1. It also regulates p53-dependent apoptosis and it is essential for adipogenesis.
MEIS1	Meis homeobox 1	Homeobox genes, of which the most well-characterized category is represented by the HOX genes, play a crucial role in normal development. In addition, several homeoproteins are involved in neoplasia.
MLL	myeloid/lymphoid or mixed-lineage leukemia (trithorax homolog, Drosophila)	The MLL gene encodes a DNA-binding protein that methylates histone H3 (see MIM 601128) lys4 (H3K4) and positively regulates expression of target genes, including multiple HOX genes (see MIM 142980).

MLLT1	myeloid/lymphoid or mixed-lineage leukemia (trithorax homolog, Drosophila); translocated to, 1	
MLLT10	myeloid/lymphoid or mixed-lineage leukemia (trithorax homolog, Drosophila); translocated to, 10	
NBN	nibrin	This gene product is thought to be involved in DNA double-strand break repair and DNA damage-induced checkpoint activation.
NCAPH2	non-SMC condensin II complex, subunit H2	Condensin complexes I and II play essential roles in mitotic chromosome assembly and segregation.
NCOA6	nuclear receptor coactivator 6	This protein is a transcriptional coactivator that can interact with nuclear hormone receptors to enhance their transcriptional activator functions. It is involved in the hormone-dependent coactivation of several receptors. It may also act as a general coactivator.
NFKB1	nuclear factor of kappa light polypeptide gene enhancer in B-cells 1	NFKB is a transcription regulator that is activated by various intra- and extra-cellular stimuli such as cytokines, oxidant-free radicals, ultraviolet irradiation, and bacterial or viral products.
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PDPK1	3-phosphoinositide dependent protein kinase-1	
PICALM	phosphatidylinositol binding clathrin assembly protein	
PIK3R1	phosphoinositide-3-kinase, regulatory subunit 1 (alpha)	Phosphatidylinositol 3-kinase plays an important role in the metabolic actions of insulin.
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PTPN2	protein tyrosine phosphatase, non-receptor type 2	This protein regulates a variety of cellular processes including cell growth, differentiation, mitotic cycle, and oncogenic transformation.
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RBM15	RNA binding motif protein 15	Members of the SPEN (Split-end) family of proteins, including RBM15, have repressor function in several signaling pathways and may bind to RNA through interaction with spliceosome components.
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SMARCA5	SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily a, member 5	This protein is a component of the chromatin remodeling and spacing factor RSF, a facilitator of the transcription of class II genes by RNA polymerase II.
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TP53	tumor protein p53	This gene encodes tumor protein p53, which responds to diverse cellular stresses to regulate target genes that induce cell cycle arrest, apoptosis, senescence, DNA repair, or changes in metabolism.
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TTC7A	tetratricopeptide repeat domain 7A	TPR domain-containing proteins, such as TTC7A, have diverse functions in cell cycle control, protein transport, phosphate turnover, and protein trafficking or secretion, and they can act as chaperones or scaffolding proteins.
TWSG1	twisted gastrulation homolog 1 (Drosophila)	
UBE2N	ubiquitin-conjugating enzyme E2N (UBC13 homolog, yeast)	The modification of proteins with ubiquitin is an important cellular mechanism for targeting abnormal or short-lived proteins for degradation.
VAV3	vav 3 guanine nucleotide exchange factor	This protein associates maximally with the nucleotide-free states of these GTPases.
XRCC5	X-ray repair complementing defective repair in Chinese hamster cells 5 (double-strand-break rejoining)	This gene functionally complements Chinese hamster xrs-6, a mutant defective in DNA double-strand break repair and in ability to undergo V(D)J recombination.

Hematological System Development and Function: Hematological Process: Hematological Process (2.41E-06)	ADAM17	ADAM metallopeptidase domain 17	This protein functions as a tumor necrosis factor-alpha converting enzyme; binds mitotic arrest deficient 2 protein, and also plays a prominent role in the activation of the Notch signaling pathway.
	ADAR	adenosine deaminase, RNA-specific	This gene encodes the enzyme responsible for RNA editing by site-specific deamination of adenosines.
	AKT1	v-akt murine thymoma viral oncogene homolog 1	In the developing nervous system AKT is a critical mediator of growth factor-induced neuronal survival. Survival factors can suppress apoptosis.
	AKT2	v-akt murine thymoma viral oncogene homolog 2	This gene is a putative oncogene encoding a subfamily of serine/threonine kinases containing SH2-like (Src homology 2-like) domains.The encoded protein is a general protein kinase capable of phophorylating several known proteins.
	ANXA7	annexin A7	Structural analysis of the protein suggests that Annexin VII is a membrane binding protein with diverse properties, including voltage-sensitive calcium channel activity, ion selectivity and membrane fusion.
	AP3B1	adaptor-related protein complex 3, beta 1 subunit	This gene encodes a protein that may play a role in organelle biogenesis associated with melanosomes, platelet dense granules, and lysosomes.
	AP3D1	adaptor-related protein complex 3, delta 1 subunit	The AP3D1 subunit is implicated in intracellular biogenesis and trafficking of pigment granules and platelet dense granules and neurotransmitter vesicles.
	APAF1	apoptotic peptidase activating factor 1	This gene encodes a cytoplasmic protein that initiates apoptosis.
	B2M	beta-2-microglobulin	Beta-2-microglobulin is a serum protein found in association with the major histocompatibility complex (MHC) class I heavy chain on the surface of nearly all nucleated cells.
	BAX	BCL2-associated X protein	This protein forms a heterodimer with BCL2, and functions as an apoptotic activator.
	BLOC1S3	biogenesis of lysosomal organelles complex-1, subunit 3	This complex is necessary for the biogenesis of specialized organelles of the endosomal-lysosomal system, including platelet dense granules and melanosomes.
	BSG	basigin (Ok blood group)	This protein is a plasma membrane protein that is important in spermatogenesis, embryo implantation, neural network formation, and tumor progression.
	CCL3	chemokine (C-C motif) ligand 3	Macrophage inflammatory protein-1 is a so-called monokine that is involved in the acute inflammatory state in the recruitment and activation of polymorphonuclear leukocytes.
	CCL4	chemokine (C-C motif) ligand 4	
	CCND1	cyclin D1	This cyclin is required for cell cycle G1/S transition. It interacts with tumor suppressor protein Rb and the expression of this gene is regulated positively by Rb.
	CD44	CD44 molecule (Indian blood group)	This protein participates in a wide variety of cellular functions including lymphocyte activation, recirculation and homing, hematopoiesis, and tumor metastasis.

CD69	CD69 molecule	Expression of this protein is induced upon activation of T lymphocytes, and may play a role in proliferation. It may act to transmit signals in natural killer cells and platelets.
CD81	CD81 molecule	This protein appears to promote muscle cell fusion and support myotube maintenance, and may be involved in signal transduction.
CD83	CD83 molecule	
CDC2L5	cell division cycle 2-like 5 (cholinesterase-related cell division controller)	The proteins of this family are well known for their essential roles as master switches in cell cycle control. They may also be involved in neurocytoskeleton dynamics. The exact function of this protein has not yet been determined.
CDKN2A	cyclin-dependent kinase inhibitor 2A (melanoma, p16, inhibits CDK4)	This ARF product functions as a stabilizer of the tumor suppressor protein p53 as it can interact with, and sequester, MDM1, a protein responsible for the degradation of p53. It has a common functionality in cell cycle G1 control.
CEBPD	CCAAT/enhancer binding protein (C/EBP), delta	This protein is important in the regulation of genes involved in immune and inflammatory responses, and may be involved in the regulation of genes associated with activation and/or differentiation of macrophages.
CHD4	chromodomain helicase DNA binding protein 4	This protein is the main component of the nucleosome remodeling and deacetylase complex and plays an important role in epigenetic transcriptional repression.
CREB1	cAMP responsive element binding protein 1	This protein induces transcription of genes in response to hormonal stimulation of the cAMP pathway.
CTBP1	C-terminal binding protein 1	This proteins can interact with a polycomb group protein complex which participates in regulation of gene expression during development.
CXCR4	chemokine (C-X-C motif) receptor 4	This protein acts with the CD4 protein to support HIV entry into cells and is also highly expressed in breast cancer cells.
DCLRE1C	DNA cross-link repair 1C (PSO2 homolog, S. cerevisiae)	This nuclear protein is involved in V(D)J recombination and DNA repair.
DICER1	dicer 1, ribonuclease type III	This ribonuclease is required by the RNA interference and small temporal RNA pathways to produce the active small RNA component that represses gene expression.
DUSP1	dual specificity phosphatase 1	DUSP1 may play an important role in the human cellular response to environmental stress as well as in the negative regulation of cellular proliferation.
EDN1	endothelin 1	
EGFR	epidermal growth factor receptor (erythroblastic leukemia viral (v-erb-b) oncogene homolog, avian)	Binding of this receptor to a ligand induces dimerization and tyrosine autophosphorylation and leads to cell proliferation.
EGR1	early growth response 1	This protein is a transcriptional regulator required for differentitation and mitogenesis.
ETV6	ets variant 6	This gene encodes an ETS family transcription factor that it is required for hematopoiesis and maintenance of the developing vascular network.
FADD	Fas (TNFRSF6)-associated via death domain	The protein encoded by this gene is an adaptor molecule that interacts with various cell surface receptors and mediates cell apoptotic signals.
FAS	Fas (TNF receptor superfamily, member 6)	This protein has been shown to play a central role in the physiological regulation of programmed cell death, and has been implicated in the pathogenesis of various malignancies and diseases of the immune system. This receptor is found to be involved in transducing the proliferating signals in normal diploid fibroblast and T cells.

FCGR2A	Fc fragment of IgG, low affinity IIa, receptor (CD32)	This protein is a cell surface receptor found on phagocytic cells such as macrophages and neutrophils, and is involved in the process of phagocytosis and clearing of immune complexes.
FOS	v-fos FBJ murine osteosarcoma viral oncogene homolog	The FOS proteins have been implicated as regulators of cell proliferation, differentiation, transformation, and apoptotic cell death.
FUS	fusion (involved in t(12;16) in malignant liposarcoma)	
GGCX	gamma-glutamyl carboxylase	This protein is involved in coagulation and is essential for hemostasis.
GNAQ	guanine nucleotide binding protein (G protein), q polypeptide	G-alpha-q is the alpha subunit of one of the heterotrimeric GTP-binding proteins that mediates stimulation of phospholipase C-beta (MIM 600230).
GRB2	growth factor receptor-bound protein 2	The protein may be involved in the signal transduction pathway.
HDAC5	histone deacetylase 5	This protein possesses histone deacetylase activity and represses transcription when tethered to a promoter.
HDAC7	histone deacetylase 7	This gene is orthologous to mouse HDAC7 gene whose protein promotes repression mediated via the transcriptional corepressor SMRT.
HSP90AA1	heat shock protein 90kDa alpha (cytosolic), class A member 1	HSP90 proteins are molecular chaperones that have key roles in signal transduction, protein folding, protein degradation, and morphologic evolution.
HSP90B1	heat shock protein 90kDa beta (Grp94), member 1	HSP90 proteins play roles in folding newly synthesized proteins or stabilizing and refolding denatured proteins after stress.
HSPD1	heat shock 60kDa protein 1 (chaperonin)	This protein may function as a signaling molecule in the innate immune system. It is essential for the folding and assembly of newly imported proteins in the mitochondria.
ICAM1	intercellular adhesion molecule 1	This gene encodes a cell surface glycoprotein which is typically expressed on endothelial cells and cells of the immune system.
ICOSLG	inducible T-cell co-stimulator ligand	
IFNAR1	interferon (alpha, beta and omega) receptor 1	Binding and activation of this receptor stimulates Janus protein kinases, it also functions as an antiviral factor.
IFNGR1	interferon gamma receptor 1	This gene encodes the ligand-binding chain (alpha) of the gamma interferon receptor.
IGF2	insulin-like growth factor 2 (somatomedin A)	This gene encodes a member of the insulin family of polypeptide growth factors that is involved in development and growth.
IGF2R	insulin-like growth factor 2 receptor	This receptor functions in the intracellular trafficking of lysosomal enzymes, the activation of transforming growth factor beta, and the degradation of IGF2.
IL8	interleukin 8	This chemokine, one of the major mediators of the inflammatory response, functions as a chemoattractant, and is also a potent angiogenic factor.

IL2RG	interleukin 2 receptor, gamma (severe combined immunodeficiency)	The interleukin 2 (IL2) receptor gamma chain (IL2RG), an important signalling component of many interleukin receptors (IL2,IL4,IL7,IL9, and IL15).
IL4R	interleukin 4 receptor	This protein can bind interleukin 4 to promote differentiation of Th2 cells, can be produced by an alternate splice variant or by proteolysis of the membrane-bound protein, and can inhibit IL4-mediated cell proliferation and IL5 upregulation by T-cells.
IL6R	interleukin 6 receptor	Interleukin 6 (IL6) is a potent pleiotropic cytokine that regulates cell growth and differentiation and plays an important role in immune response.
IL7R	interleukin 7 receptor	This protein has been shown to play a critical role in the V(D)J recombination during lymphocyte development, and to control the accessibility of the TCR gamma locus by STAT5 and histone acetylation.
IRF1	interferon regulatory factor 1	IRF1 is a transcription activator of genes induced by interferons alpha, beta, and gamma. It also plays roles in regulating apoptosis and tumor-suppressoion.
IRF2	interferon regulatory factor 2	IRF2 competitively inhibits the IRF1-mediated transcriptional activation of interferons alpha and beta, and presumably other genes that employ IRF1 for transcription activation. However, IRF2 also functions as a transcriptional activator of histone H4.
ITGA2	integrin, alpha 2 (CD49B, alpha 2 subunit of VLA-2 receptor)	Integrin alpha chain family members are found on a wide variety of cell types including, T cells, fibroblasts and platelets. Integrins are involved in cell adhesion and also participate in cell-surface mediated signalling.
ITGB2	integrin, beta 2 (complement component 3 receptor 3 and 4 subunit)	Integrins are known to participate in cell adhesion as well as cell-surface mediated signalling.
JAK1	Janus kinase 1	JAK1 is involved in the interferon-alpha/beta and -gamma signal transduction pathways. These kinases couple cytokine ligand binding to tyrosine phosphorylation of various known signaling proteins and of a unique family of transcription factors termed the signal transducers and activators of transcription, or STATs.
JMJD6	jumonji domain containing 6	JmjC domain-containing proteins are predicted to function as protein hydroxylases or histone demethylases.
JUN	jun oncogene	This protein interacts directly with specific target DNA sequences to regulate gene expression.
LAMP1	lysosomal-associated membrane protein 1	This glycoprotein provides selectins with carbohydrate ligands, and may play a role in tumor cell metastasis.
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	TTC7A	tetratricopeptide repeat domain 7A	TPR domain-containing proteins, such as TTC7A, have diverse functions in cell cycle control, protein transport, phosphate turnover, and protein trafficking or secretion, and they can act as chaperones or scaffolding proteins.
	TWSG1	twisted gastrulation homolog 1 (Drosophila)	
	UBE2N	ubiquitin-conjugating enzyme E2N (UBC13 homolog, yeast)	The modification of proteins with ubiquitin is an important cellular mechanism for targeting abnormal or short-lived proteins for degradation.
	VAV3	vav 3 guanine nucleotide exchange factor	This protein associates maximally with the nucleotide-free states of these GTPases.
	XRCC5	X-ray repair complementing defective repair in Chinese hamster cells 5 (double-strand-break rejoining)	This gene functionally complements Chinese hamster xrs-6, a mutant defective in DNA double-strand break repair and in ability to undergo V(D)J recombination.
Hematological System Development and Function: Quantity: Quantity of Lymphocytes (5.41E-06), Quantity of B Lymphocytes (8.92E-04), Quantity of T Lymphocytes (2.17E-03)	AFF1	AF4/FMR2 family, member 1	

AHR	aryl hydrocarbon receptor	This protein regulates biological responses to planar aromatic hydrocarbons and xenobiotic-metabolizing enzymes such as cytochrome P450.
AKT1	v-akt murine thymoma viral oncogene homolog 1	In the developing nervous system AKT is a critical mediator of growth factor-induced neuronal survival. Survival factors can suppress apoptosis.
B2M	beta-2-microglobulin	Beta-2-microglobulin is a serum protein found in association with the major histocompatibility complex (MHC) class I heavy chain on the surface of nearly all nucleated cells.
C5AR1	complement component 5a receptor 1	
CARM1	coactivator-associated arginine methyltransferase 1	CARM1 is involved in the process of protein arginine methylation which has been implicated in signal transduction, metabolism of nascent pre-RNA, and transcriptional activation.
CD69	CD69 molecule	Expression of this protein is induced upon activation of T lymphocytes, and may play a role in proliferation. It may act to transmit signals in natural killer cells and platelets.
CD81	CD81 molecule	This protein appears to promote muscle cell fusion and support myotube maintenance, and may be involved in signal transduction.
CD83	CD83 molecule	
CDKN1A	cyclin-dependent kinase inhibitor 1A (p21, Cip1)	This protein functions as a regulator of cell cycle progression at G1. It also plays a regulatory role in S phase DNA replication and DNA damage repair, and may be instrumental in the execution of apoptosis following caspase activation.
CDKN2A	cyclin-dependent kinase inhibitor 2A (melanoma, p16, inhibits CDK4)	This ARF product functions as a stabilizer of the tumor suppressor protein p53 as it can interact with, and sequester, MDM1, a protein responsible for the degradation of p53. It has a common functionality in cell cycle G1 control.
CEBPB	CCAAT/enhancer binding protein (C/EBP), beta	This protein is important in the regulation of genes involved in immune and inflammatory responses. It can also bind the promoter and upstream element and stimulate the expression of the collagen type I gene.
CFLAR	CASP8 and FADD-like apoptosis regulator	
CHUK	conserved helix-loop-helix ubiquitous kinase	This protein phosphorylates sites that trigger the degradation of the inhibitor via the ubiquination pathway, thereby activating the transcription factor.
CREB1	cAMP responsive element binding protein 1	This protein induces transcription of genes in response to hormonal stimulation of the cAMP pathway.
CREBBP	CREB binding protein	This protein binds to cAMP-response element binding protein (CREB), and plays critical roles in embryonic development, growth control, and homeostasis by coupling chromatin remodeling to transcription factor recognition.
CTSS	cathepsin S	This protein may participate in the degradation of antigenic proteins to peptides for presentation on MHC class II molecules. It can also function as an elastase over a broad pH range in alveolar macrophages.
CXCR4	chemokine (C-X-C motif) receptor 4	This protein acts with the CD4 protein to support HIV entry into cells and is also highly expressed in breast cancer cells.
CYLD	cylindromatosis (turban tumor syndrome)	This protein functions as a deubiquitinating enzyme.
CYTIP	cytohesin 1 interacting protein	This protein modulates the activation of ARF genes by CYTH1. It interacts with CYTH1 and SNX27 proteins and may act to sequester CYTH1 protein in the cytoplasm.

DDR1	discoidin domain receptor tyrosine kinase 1	The protein encoded by this gene is a RTK that is widely expressed in normal and transformed epithelial cells and is activated by various types of collagen.
DICER1	dicer 1, ribonuclease type III	This ribonuclease is required by the RNA interference and small temporal RNA pathways to produce the active small RNA component that represses gene expression.
EGR1	early growth response 1	This protein is a transcriptional regulator required for differentitation and mitogenesis.
ERBB2	v-erb-b2 erythroblastic leukemia viral oncogene homolog 2, neuro/glioblastoma derived oncogene homolog (avian)	This protein binds to other ligand-bound EGF receptor family members to form a heterodimer, stabilizing ligand binding and enhancing kinase-mediated activation of downstream signalling pathways, such as those involving mitogen-activated protein kinase and phosphatidylinositol-3 kinase.
ETV6	ets variant 6	This gene encodes an ETS family transcription factor that it is required for hematopoiesis and maintenance of the developing vascular network.
FADD	Fas (TNFRSF6)-associated via death domain	The protein encoded by this gene is an adaptor molecule that interacts with various cell surface receptors and mediates cell apoptotic signals.
FAS	Fas (TNF receptor superfamily, member 6)	This protein has been shown to play a central role in the physiological regulation of programmed cell death, and has been implicated in the pathogenesis of various malignancies and diseases of the immune system. This receptor is found to be involved in transducing the proliferating signals in normal diploid fibroblast and T cells.
FCGR2A	Fc fragment of IgG, low affinity IIa, receptor (CD32)	This protein is a cell surface receptor found on phagocytic cells such as macrophages and neutrophils, and is involved in the process of phagocytosis and clearing of immune complexes.
GCNT1	glucosaminyl (N-acetyl) transferase 1, core 2 (beta-1,6-N-acetylglucosaminyltransferase)	This protein is essential to the formation of Gal beta 1-3(GlcNAc beta 1-6)GalNAc structures and the core 2 O-glycan branch.
GSTP1	glutathione S-transferase pi 1	This GST family member functions in xenobiotic metabolism and play a role in susceptibility to cancer, and other diseases.
HEXB	hexosaminidase B (beta polypeptide)	Hexosaminidase B catalyzes the degradation of the ganglioside GM2, and other molecules containing terminal N-acetyl hexosamines.
HSP90B1	heat shock protein 90kDa beta (Grp94), member 1	HSP90 proteins play roles in folding newly synthesized proteins or stabilizing and refolding denatured proteins after stress.
ICAM1	intercellular adhesion molecule 1	This gene encodes a cell surface glycoprotein which is typically expressed on endothelial cells and cells of the immune system.
ICOSLG	inducible T-cell co-stimulator ligand	
IFNAR1	interferon (alpha, beta and omega) receptor 1	Binding and activation of this receptor stimulates Janus protein kinases, it also functions as an antiviral factor.
IFNGR1	interferon gamma receptor 1	This gene encodes the ligand-binding chain (alpha) of the gamma interferon receptor.

IGF2	insulin-like growth factor 2 (somatomedin A)	This gene encodes a member of the insulin family of polypeptide growth factors that is involved in development and growth.
IGF2R	insulin-like growth factor 2 receptor	This receptor functions in the intracellular trafficking of lysosomal enzymes, the activation of transforming growth factor beta, and the degradation of IGF2.
IL2RG	interleukin 2 receptor, gamma (severe combined immunodeficiency)	The interleukin 2 (IL2) receptor gamma chain (IL2RG), an important signalling component of many interleukin receptors (IL2,IL4,IL7,IL9, and IL15).
IL7R	interleukin 7 receptor	This protein has been shown to play a critical role in the V(D)J recombination during lymphocyte development, and to control the accessibility of the TCR gamma locus by STAT5 and histone acetylation.
IRF1	interferon regulatory factor 1	IRF1 is a transcription activator of genes induced by interferons alpha, beta, and gamma. It also plays roles in regulating apoptosis and tumor-suppressoion.
ISG15	ISG15 ubiquitin-like modifier	G1P2 is a ubiquitin-like protein that becomes conjugated to many cellular proteins upon activation by interferon-alpha (IFNA; MIM 147660) and -beta (IFNB; MIM 147640).
ITGAM	integrin, alpha M (complement component 3 receptor 3 subunit)	The alpha M beta 2 integrin is important in the adherence of neutrophils and monocytes to stimulated endothelium, and also in the phagocytosis of complement coated particles.
ITGB2	integrin, beta 2 (complement component 3 receptor 3 and 4 subunit)	Integrins are known to participate in cell adhesion as well as cell-surface mediated signalling.
KLF4	Kruppel-like factor 4 (gut)	
LDLR	low density lipoprotein receptor	Low density lipoprotein (LDL) is taken into the cell ending up in lysosomes where it is degraded and the cholesterol is made available for repression of microsomal enzyme HMG CoA reductase, the rate-limiting step in cholesterol synthesis.
LGALS8	lectin, galactoside-binding, soluble, 8	This gene is widely expressed in tumoral tissues and seems to be involved in integrin-like cell interactions.
LSP1	lymphocyte-specific protein 1	The protein may regulate neutrophil motility, adhesion to fibrinogen matrix proteins, and transendothelial migration.
LYN	v-yes-1 Yamaguchi sarcoma viral related oncogene homolog	
MAP3K7	mitogen-activated protein kinase kinase kinase 7	This kinase mediates the signaling transduction induced by TGF beta and morphogenetic protein (BMP), and controls a variety of cell functions including transcription regulation and apoptosis.This kinase can play a role in the cell response to environmental stresses.
MDM2	Mdm2 p53 binding protein homolog (mouse)	This protein is a nuclear phosphoprotein that binds and inhibits transactivation by tumor protein p53, as part of an autoregulatory negative feedback loop. It also affects the cell cycle, apoptosis, and tumorigenesis through interactions with other proteins, including retinoblastoma 1 and ribosomal protein L5.
MPZ	myelin protein zero	This gene encodes a major structural protein of peripheral myelin.
NFKB1	nuclear factor of kappa light polypeptide gene enhancer in B-cells 1	NFKB is a transcription regulator that is activated by various intra- and extra-cellular stimuli such as cytokines, oxidant-free radicals, ultraviolet irradiation, and bacterial or viral products.

NFKB2	nuclear factor of kappa light polypeptide gene enhancer in B-cells 2 (p49/p100)	NFKB has been detected in numerous cell types that express cytokines, chemokines, growth factors, cell adhesion molecules, and some acute phase proteins in health and in various disease states. NFKB is activated by a wide variety of stimuli.
NP	nucleoside phosphorylase	This protein is an enzyme which reversibly catalyzes the phosphorolysis of purine nucleosides.
NR4A1	nuclear receptor subfamily 4, group A, member 1	This protein acts as a nuclear transcription factor. Translocation of the protein from the nucleus to mitochondria induces apoptosis.
PIK3AP1	phosphoinositide-3-kinase adaptor protein 1	
PIK3R1	phosphoinositide-3-kinase, regulatory subunit 1 (alpha)	Phosphatidylinositol 3-kinase plays an important role in the metabolic actions of insulin.
PRNP	prion protein	This protein is a membrane glycosylphosphatidylinositol-anchored glycoprotein that tends to aggregate into rod-like structures.
PTPN2	protein tyrosine phosphatase, non-receptor type 2	This protein regulates a variety of cellular processes including cell growth, differentiation, mitotic cycle, and oncogenic transformation.
PTPN6	protein tyrosine phosphatase, non-receptor type 6	This protein is expressed primarily in hematopoietic cells, and functions as an important regulator of multiple signaling pathways in hematopoietic cells. It dephosphorylates a wide spectrum of phospho-proteins involved in hematopoietic cell signaling.
RBL2	retinoblastoma-like 2 (p130)	
RBM15	RNA binding motif protein 15	Members of the SPEN (Split-end) family of proteins, including RBM15, have repressor function in several signaling pathways and may bind to RNA through interaction with spliceosome components.
RHOH	ras homolog gene family, member H	This protein is transcribed only in hemopoietic cells.
RUNX1	runt-related transcription factor 1	This protein is thought to be involved in the development of normal hematopoiesis.
SEMA4D	sema domain, immunoglobulin domain (Ig), transmembrane domain (TM) and short cytoplasmic domain, (semaphorin) 4D	
SRF	serum response factor (c-fos serum response element-binding transcription factor)	This protein stimulates both cell proliferation and differentiation. It participates in cell cycle regulation, apoptosis, cell growth, and cell differentiation.
STAM2	signal transducing adaptor molecule (SH3 domain and ITAM motif) 2	This protein is thought to exhibit compensatory effects on the signaling pathway downstream of JAK kinases upon cytokine stimulation.

	STAT1	signal transducer and activator of transcription 1, 91kDa	This protein mediates the expression of a variety of genes, which is thought to be important for cell viability in response to different cell stimuli and pathogens.
	STAT3	signal transducer and activator of transcription 3 (acute-phase response factor)	This protein mediates the expression of a variety of genes in response to cell stimuli, and thus plays a key role in many cellular processes such as cell growth and apoptosis.
	STAT5B	signal transducer and activator of transcription 5B	This protein mediates the signal transduction triggered by various cell ligands, such as IL2, IL4, CSF1, and different growth hormones. It is involved in TCR signaling, apoptosis, adult mammary gland development, and sexual dimorphism of liver gene expression.
	STK17B	serine/threonine kinase 17b	
	TAP1	transporter 1, ATP-binding cassette, sub-family B (MDR/TAP)	This protein is involved in the pumping of degraded cytosolic peptides across the endoplasmic reticulum into the membrane-bound compartment where class I molecules assemble.
	TGFBR2	transforming growth factor, beta receptor II (70/80kDa)	This receptor regulates the transcription of a subset of genes related to cell proliferation.
	TLR2	toll-like receptor 2	This protein encoded by this gene is a member of the Toll-like receptor (TLR) family which plays a fundamental role in pathogen recognition and activation of innate immunity. It mediates host response to Gram-positive bacteria.
	TP53	tumor protein p53	This gene encodes tumor protein p53, which responds to diverse cellular stresses to regulate target genes that induce cell cycle arrest, apoptosis, senescence, DNA repair, or changes in metabolism.
	TXNIP	thioredoxin interacting protein	
Hematological System Development and Function: Quantity: Quantity of Blood Cells (1.90E-05)	AFF1	AF4/FMR2 family, member 1	
	AHR	aryl hydrocarbon receptor	This protein regulates biological responses to planar aromatic hydrocarbons and xenobiotic-metabolizing enzymes such as cytochrome P450.
	AKT1	v-akt murine thymoma viral oncogene homolog 1	In the developing nervous system AKT is a critical mediator of growth factor-induced neuronal survival. Survival factors can suppress apoptosis.
	ATF4	activating transcription factor 4 (tax-responsive enhancer element B67)	This transcription factor was isolated and characterized as the cAMP-response element binding protein 2 (CREB-2).
	B2M	beta-2-microglobulin	Beta-2-microglobulin is a serum protein found in association with the major histocompatibility complex (MHC) class I heavy chain on the surface of nearly all nucleated cells.

BAK1	BCL2-antagonist/killer 1	This protein functions to induce apoptosis, by accelerating the opening of the mitochondrial voltage-dependent anion channel, leading to a loss in membrane potential and the release of cytochrome c.
BAX	BCL2-associated X protein	This protein forms a heterodimer with BCL2, and functions as an apoptotic activator.
C5AR1	complement component 5a receptor 1	
CAPNS1	calpain, small subunit 1	This gene encodes a small subunit common to both calpain I and II and is associated with myotonic dystrophy.
CARM1	coactivator-associated arginine methyltransferase 1	CARM1 is involved in the process of protein arginine methylation which has been implicated in signal transduction, metabolism of nascent pre-RNA, and transcriptional activation.
CCL3	chemokine (C-C motif) ligand 3	Macrophage inflammatory protein-1 is a so-called monokine that is involved in the acute inflammatory state in the recruitment and activation of polymorphonuclear leukocytes.
CD69	CD69 molecule	Expression of this protein is induced upon activation of T lymphocytes, and may play a role in proliferation. It may act to transmit signals in natural killer cells and platelets.
CD81	CD81 molecule	This protein appears to promote muscle cell fusion and support myotube maintenance, and may be involved in signal transduction.
CD83	CD83 molecule	
CDKN1A	cyclin-dependent kinase inhibitor 1A (p21, Cip1)	This protein functions as a regulator of cell cycle progression at G1. It also plays a regulatory role in S phase DNA replication and DNA damage repair, and may be instrumental in the execution of apoptosis following caspase activation.
CDKN2A	cyclin-dependent kinase inhibitor 2A (melanoma, p16, inhibits CDK4)	This ARF product functions as a stabilizer of the tumor suppressor protein p53 as it can interact with, and sequester, MDM1, a protein responsible for the degradation of p53. It has a common functionality in cell cycle G1 control.
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CFLAR	CASP8 and FADD-like apoptosis regulator	
CHUK	conserved helix-loop-helix ubiquitous kinase	This protein phosphorylates sites that trigger the degradation of the inhibitor via the ubiquination pathway, thereby activating the transcription factor.
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CXCR4	chemokine (C-X-C motif) receptor 4	This protein acts with the CD4 protein to support HIV entry into cells and is also highly expressed in breast cancer cells.
CYLD	cylindromatosis (turban tumor syndrome)	This protein functions as a deubiquitinating enzyme.
CYTIP	cytohesin 1 interacting protein	This protein modulates the activation of ARF genes by CYTH1. It interacts with CYTH1 and SNX27 proteins and may act to sequester CYTH1 protein in the cytoplasm.

DDR1	discoidin domain receptor tyrosine kinase 1	The protein encoded by this gene is a RTK that is widely expressed in normal and transformed epithelial cells and is activated by various types of collagen.
DICER1	dicer 1, ribonuclease type III	This ribonuclease is required by the RNA interference and small temporal RNA pathways to produce the active small RNA component that represses gene expression.
EGR1	early growth response 1	This protein is a transcriptional regulator required for differentitation and mitogenesis.
EIF2AK1	eukaryotic translation initiation factor 2-alpha kinase 1	The protein encoded by this gene acts at the level of translation initiation to downregulate protein synthesis in response to stress.
ERBB2	v-erb-b2 erythroblastic leukemia viral oncogene homolog 2, neuro/glioblastoma derived oncogene homolog (avian)	This protein binds to other ligand-bound EGF receptor family members to form a heterodimer, stabilizing ligand binding and enhancing kinase-mediated activation of downstream signalling pathways, such as those involving mitogen-activated protein kinase and phosphatidylinositol-3 kinase.
ETV6	ets variant 6	This gene encodes an ETS family transcription factor that it is required for hematopoiesis and maintenance of the developing vascular network.
FADD	Fas (TNFRSF6)-associated via death domain	The protein encoded by this gene is an adaptor molecule that interacts with various cell surface receptors and mediates cell apoptotic signals.
FAS	Fas (TNF receptor superfamily, member 6)	This protein has been shown to play a central role in the physiological regulation of programmed cell death, and has been implicated in the pathogenesis of various malignancies and diseases of the immune system. This receptor is found to be involved in transducing the proliferating signals in normal diploid fibroblast and T cells.
FCGR2A	Fc fragment of IgG, low affinity IIa, receptor (CD32)	This protein is a cell surface receptor found on phagocytic cells such as macrophages and neutrophils, and is involved in the process of phagocytosis and clearing of immune complexes.
GCNT1	glucosaminyl (N-acetyl) transferase 1, core 2 (beta-1,6-N-acetylglucosaminyltransferase)	This protein is essential to the formation of Gal beta 1-3(GlcNAc beta 1-6)GalNAc structures and the core 2 O-glycan branch.
GSTP1	glutathione S-transferase pi 1	This GST family member functions in xenobiotic metabolism and play a role in susceptibility to cancer, and other diseases.
HEXB	hexosaminidase B (beta polypeptide)	Hexosaminidase B catalyzes the degradation of the ganglioside GM2, and other molecules containing terminal N-acetyl hexosamines.
HSP90B1	heat shock protein 90kDa beta (Grp94), member 1	HSP90 proteins play roles in folding newly synthesized proteins or stabilizing and refolding denatured proteins after stress.
ICAM1	intercellular adhesion molecule 1	This gene encodes a cell surface glycoprotein which is typically expressed on endothelial cells and cells of the immune system.
ICOSLG	inducible T-cell co-stimulator ligand	
IFNAR1	interferon (alpha, beta and omega) receptor 1	Binding and activation of this receptor stimulates Janus protein kinases, it also functions as an antiviral factor.

IFNGR1	interferon gamma receptor 1	This gene encodes the ligand-binding chain (alpha) of the gamma interferon receptor.
IGF2	insulin-like growth factor 2 (somatomedin A)	This gene encodes a member of the insulin family of polypeptide growth factors that is involved in development and growth.
IGF2R	insulin-like growth factor 2 receptor	This receptor functions in the intracellular trafficking of lysosomal enzymes, the activation of transforming growth factor beta, and the degradation of IGF2.
IL8	interleukin 8	This chemokine, one of the major mediators of the inflammatory response, functions as a chemoattractant, and is also a potent angiogenic factor.
IL2RG	interleukin 2 receptor, gamma (severe combined immunodeficiency)	The interleukin 2 (IL2) receptor gamma chain (IL2RG), an important signalling component of many interleukin receptors (IL2,IL4,IL7,IL9, and IL15).
IL4R	interleukin 4 receptor	This protein can bind interleukin 4 to promote differentiation of Th2 cells, can be produced by an alternate splice variant or by proteolysis of the membrane-bound protein, and can inhibit IL4-mediated cell proliferation and IL5 upregulation by T-cells.
IL7R	interleukin 7 receptor	This protein has been shown to play a critical role in the V(D)J recombination during lymphocyte development, and to control the accessibility of the TCR gamma locus by STAT5 and histone acetylation.
IRF1	interferon regulatory factor 1	IRF1 is a transcription activator of genes induced by interferons alpha, beta, and gamma. It also plays roles in regulating apoptosis and tumor-suppressoion.
IRF2	interferon regulatory factor 2	IRF2 competitively inhibits the IRF1-mediated transcriptional activation of interferons alpha and beta, and presumably other genes that employ IRF1 for transcription activation. However, IRF2 also functions as a transcriptional activator of histone H4.
ISG15	ISG15 ubiquitin-like modifier	G1P2 is a ubiquitin-like protein that becomes conjugated to many cellular proteins upon activation by interferon-alpha (IFNA; MIM 147660) and -beta (IFNB; MIM 147640).
ITGAM	integrin, alpha M (complement component 3 receptor 3 subunit)	The alpha M beta 2 integrin is important in the adherence of neutrophils and monocytes to stimulated endothelium, and also in the phagocytosis of complement coated particles.
ITGB2	integrin, beta 2 (complement component 3 receptor 3 and 4 subunit)	Integrins are known to participate in cell adhesion as well as cell-surface mediated signalling.
KLF4	Kruppel-like factor 4 (gut)	
LDLR	low density lipoprotein receptor	Low density lipoprotein (LDL) is taken into the cell ending up in lysosomes where it is degraded and the cholesterol is made available for repression of microsomal enzyme HMG CoA reductase, the rate-limiting step in cholesterol synthesis.
LGALS3	lectin, galactoside-binding, soluble, 3	
LGALS8	lectin, galactoside-binding, soluble, 8	This gene is widely expressed in tumoral tissues and seems to be involved in integrin-like cell interactions.
LSP1	lymphocyte-specific protein 1	The protein may regulate neutrophil motility, adhesion to fibrinogen matrix proteins, and transendothelial migration.
LYN	v-yes-1 Yamaguchi sarcoma viral related oncogene homolog	

LYST	lysosomal trafficking regulator	This protein regulates intracellular protein trafficking to and from the lysosome.
MAP3K7	mitogen-activated protein kinase kinase kinase 7	This kinase mediates the signaling transduction induced by TGF beta and morphogenetic protein (BMP), and controls a variety of cell functions including transcription regulation and apoptosis.This kinase can play a role in the cell response to environmental stresses.
MAPK14	mitogen-activated protein kinase 14	This kinase may be involved in stress related transcription and cell cycle regulation, as well as in genotoxic stress response.
MAPKAPK2	mitogen-activated protein kinase-activated protein kinase 2	This kinase is known to be involved in many cellular processes including stress and inflammatory responses, nuclear export, gene expression regulation and cell proliferation.
MDM2	Mdm2 p53 binding protein homolog (mouse)	This protein is a nuclear phosphoprotein that binds and inhibits transactivation by tumor protein p53, as part of an autoregulatory negative feedback loop. It also affects the cell cycle, apoptosis, and tumorigenesis through interactions with other proteins, including retinoblastoma 1 and ribosomal protein L5.
MED1	mediator complex subunit 1	The protein encoded by this gene is a subunit of the CRSP (cofactor required for SP1 activation) complex, which, along with TFIID, is required for efficient activation by SP1. It also regulates p53-dependent apoptosis and it is essential for adipogenesis.
MEIS1	Meis homeobox 1	Homeobox genes, of which the most well-characterized category is represented by the HOX genes, play a crucial role in normal development. In addition, several homeoproteins are involved in neoplasia.
MPZ	myelin protein zero	This gene encodes a major structural protein of peripheral myelin.
NFKB1	nuclear factor of kappa light polypeptide gene enhancer in B-cells 1	NFKB is a transcription regulator that is activated by various intra- and extra-cellular stimuli such as cytokines, oxidant-free radicals, ultraviolet irradiation, and bacterial or viral products.
NFKB2	nuclear factor of kappa light polypeptide gene enhancer in B-cells 2 (p49/p100)	NFKB has been detected in numerous cell types that express cytokines, chemokines, growth factors, cell adhesion molecules, and some acute phase proteins in health and in various disease states. NFKB is activated by a wide variety of stimuli.
NP	nucleoside phosphorylase	This protein is an enzyme which reversibly catalyzes the phosphorolysis of purine nucleosides.
NPM1	nucleophosmin (nucleolar phosphoprotein B23, numatrin)	NPM1 is implicated in multiple functions, including ribosomal protein assembly and transport, control of centrosome duplication, and regulation of the tumor suppressor ARF (MIM 600160).
NR4A1	nuclear receptor subfamily 4, group A, member 1	This protein acts as a nuclear transcription factor. Translocation of the protein from the nucleus to mitochondria induces apoptosis.
PDE4B	phosphodiesterase 4B, cAMP-specific (phosphodiesterase E4 dunce homolog, Drosophila)	This protein specifically hydrolyzes cAMP.
PIK3AP1	phosphoinositide-3-kinase adaptor protein 1	

PIK3R1	phosphoinositide-3-kinase, regulatory subunit 1 (alpha)	Phosphatidylinositol 3-kinase plays an important role in the metabolic actions of insulin.
PLSCR1	phospholipid scramblase 1	
PML	promyelocytic leukemia	This phosphoprotein localizes to nuclear bodies where it functions as a transcription factor and tumor suppressor. Its expression is cell-cycle related and it regulates the p53 response to oncogenic signals.
POU2F1	POU class 2 homeobox 1	
PRKCE	protein kinase C, epsilon	This kinase is involved in neuron channel activation, apoptosis, cardioprotection from ischemia, heat shock response, and insulin exocytosis. It may also be important for LPS-mediated signaling in activated macrophages and may play a role in controlling anxiety-like behavior.
PRNP	prion protein	This protein is a membrane glycosylphosphatidylinositol-anchored glycoprotein that tends to aggregate into rod-like structures.
PTPN2	protein tyrosine phosphatase, non-receptor type 2	This protein regulates a variety of cellular processes including cell growth, differentiation, mitotic cycle, and oncogenic transformation.
PTPN6	protein tyrosine phosphatase, non-receptor type 6	This protein is expressed primarily in hematopoietic cells, and functions as an important regulator of multiple signaling pathways in hematopoietic cells. It dephosphorylates a wide spectrum of phospho-proteins involved in hematopoietic cell signaling.
RBL2	retinoblastoma-like 2 (p130)	
RBM15	RNA binding motif protein 15	Members of the SPEN (Split-end) family of proteins, including RBM15, have repressor function in several signaling pathways and may bind to RNA through interaction with spliceosome components.
RHOH	ras homolog gene family, member H	This protein is transcribed only in hemopoietic cells.
RUNX1	runt-related transcription factor 1	This protein is thought to be involved in the development of normal hematopoiesis.
SEMA4D	sema domain, immunoglobulin domain (Ig), transmembrane domain (TM) and short cytoplasmic domain, (semaphorin) 4D	
SERPINA1	serpin peptidase inhibitor, clade A (alpha-1 antiproteinase, antitrypsin), member 1	This protein is a serine protease inhibitor whose targets include elastase, plasmin, thrombin, trypsin, chymotrypsin, and plasminogen activator.
SHC1	SHC (Src homology 2 domain containing) transforming protein 1	
SOD1	superoxide dismutase 1, soluble	This protein binds copper and zinc ions and is one of two isozymes responsible for destroying free superoxide radicals in the body.

SPP1	secreted phosphoprotein 1	
SPRED2	sprouty-related, EVH1 domain containing 2	SPRED2 is a member of the Sprouty (see SPRY1; MIM 602465)/SPRED family of proteins that regulate growth factor-induced activation of the MAP kinase cascade (see MAPK1; MIM 176948).
SRF	serum response factor (c-fos serum response element-binding transcription factor)	This protein stimulates both cell proliferation and differentiation. It participates in cell cycle regulation, apoptosis, cell growth, and cell differentiation.
STAM2	signal transducing adaptor molecule (SH3 domain and ITAM motif) 2	This protein is thought to exhibit compensatory effects on the signaling pathway downstream of JAK kinases upon cytokine stimulation.
STAT1	signal transducer and activator of transcription 1, 91kDa	This protein mediates the expression of a variety of genes, which is thought to be important for cell viability in response to different cell stimuli and pathogens.
STAT3	signal transducer and activator of transcription 3 (acute-phase response factor)	This protein mediates the expression of a variety of genes in response to cell stimuli, and thus plays a key role in many cellular processes such as cell growth and apoptosis.
STAT6	signal transducer and activator of transcription 6, interleukin-4 induced	This protein plays a central role in exerting IL4 mediated biological responses. It is found to induce the expression of BCL2L1/BCL-X(L), which is responsible for the anti-apoptotic activity of IL4. It also plays a role in differentiation of T helper 2 (Th2) cells, expression of cell surface markers, and class switch of immunoglobulins.
STAT5B	signal transducer and activator of transcription 5B	This protein mediates the signal transduction triggered by various cell ligands, such as IL2, IL4, CSF1, and different growth hormones. It is involved in TCR signaling, apoptosis, adult mammary gland development, and sexual dimorphism of liver gene expression.
STK17B	serine/threonine kinase 17b	
STRA13	stimulated by retinoic acid 13 homolog (mouse)	
TAP1	transporter 1, ATP-binding cassette, sub-family B (MDR/TAP)	This protein is involved in the pumping of degraded cytosolic peptides across the endoplasmic reticulum into the membrane-bound compartment where class I molecules assemble.
TGFBR2	transforming growth factor, beta receptor II (70/80kDa)	This receptor regulates the transcription of a subset of genes related to cell proliferation.
THBS1	thrombospondin 1	This protein is an adhesive glycoprotein that mediates cell-to-cell and cell-to-matrix interactions. It plays roles in platelet aggregation, angiogenesis, and tumorigenesis.
TLR2	toll-like receptor 2	This protein encoded by this gene is a member of the Toll-like receptor (TLR) family which plays a fundamental role in pathogen recognition and activation of innate immunity. It mediates host response to Gram-positive bacteria.
TP53	tumor protein p53	This gene encodes tumor protein p53, which responds to diverse cellular stresses to regulate target genes that induce cell cycle arrest, apoptosis, senescence, DNA repair, or changes in metabolism.
TXNIP	thioredoxin interacting protein	

Hematological System Development and Function: Quantity: Quantity of Leukocytes (1.86E-04), Quantity of Mononuclear Leukocytes (1.00E-05)	AFF1	AF4/FMR2 family, member 1	
	AHR	aryl hydrocarbon receptor	This protein regulates biological responses to planar aromatic hydrocarbons and xenobiotic-metabolizing enzymes such as cytochrome P450.
	AKT1	v-akt murine thymoma viral oncogene homolog 1	In the developing nervous system AKT is a critical mediator of growth factor-induced neuronal survival. Survival factors can suppress apoptosis.
	B2M	beta-2-microglobulin	Beta-2-microglobulin is a serum protein found in association with the major histocompatibility complex (MHC) class I heavy chain on the surface of nearly all nucleated cells.
	C5AR1	complement component 5a receptor 1	
	CARM1	coactivator-associated arginine methyltransferase 1	CARM1 is involved in the process of protein arginine methylation which has been implicated in signal transduction, metabolism of nascent pre-RNA, and transcriptional activation.
	CCL3	chemokine (C-C motif) ligand 3	Macrophage inflammatory protein-1 is a so-called monokine that is involved in the acute inflammatory state in the recruitment and activation of polymorphonuclear leukocytes.
	CD69	CD69 molecule	Expression of this protein is induced upon activation of T lymphocytes, and may play a role in proliferation. It may act to transmit signals in natural killer cells and platelets.
	CD81	CD81 molecule	This protein appears to promote muscle cell fusion and support myotube maintenance, and may be involved in signal transduction.
	CD83	CD83 molecule	
	CDKN1A	cyclin-dependent kinase inhibitor 1A (p21, Cip1)	This protein functions as a regulator of cell cycle progression at G1. It also plays a regulatory role in S phase DNA replication and DNA damage repair, and may be instrumental in the execution of apoptosis following caspase activation.
	CDKN2A	cyclin-dependent kinase inhibitor 2A (melanoma, p16, inhibits CDK4)	This ARF product functions as a stabilizer of the tumor suppressor protein p53 as it can interact with, and sequester, MDM1, a protein responsible for the degradation of p53. It has a common functionality in cell cycle G1 control.
	CEBPB	CCAAT/enhancer binding protein (C/EBP), beta	This protein is important in the regulation of genes involved in immune and inflammatory responses. It can also bind the promoter and upstream element and stimulate the expression of the collagen type I gene.
	CFLAR	CASP8 and FADD-like apoptosis regulator	
	CHUK	conserved helix-loop-helix ubiquitous kinase	This protein phosphorylates sites that trigger the degradation of the inhibitor via the ubiquination pathway, thereby activating the transcription factor.

CREB1	cAMP responsive element binding protein 1	This protein induces transcription of genes in response to hormonal stimulation of the cAMP pathway.
CREBBP	CREB binding protein	This protein binds to cAMP-response element binding protein (CREB), and plays critical roles in embryonic development, growth control, and homeostasis by coupling chromatin remodeling to transcription factor recognition.
CTSS	cathepsin S	This protein may participate in the degradation of antigenic proteins to peptides for presentation on MHC class II molecules. It can also function as an elastase over a broad pH range in alveolar macrophages.
CXCR4	chemokine (C-X-C motif) receptor 4	This protein acts with the CD4 protein to support HIV entry into cells and is also highly expressed in breast cancer cells.
CYLD	cylindromatosis (turban tumor syndrome)	This protein functions as a deubiquitinating enzyme.
CYTIP	cytohesin 1 interacting protein	This protein modulates the activation of ARF genes by CYTH1. It interacts with CYTH1 and SNX27 proteins and may act to sequester CYTH1 protein in the cytoplasm.
DDR1	discoidin domain receptor tyrosine kinase 1	The protein encoded by this gene is a RTK that is widely expressed in normal and transformed epithelial cells and is activated by various types of collagen.
DICER1	dicer 1, ribonuclease type III	This ribonuclease is required by the RNA interference and small temporal RNA pathways to produce the active small RNA component that represses gene expression.
EGR1	early growth response 1	This protein is a transcriptional regulator required for differentitation and mitogenesis.
ERBB2	v-erb-b2 erythroblastic leukemia viral oncogene homolog 2, neuro/glioblastoma derived oncogene homolog (avian)	This protein binds to other ligand-bound EGF receptor family members to form a heterodimer, stabilizing ligand binding and enhancing kinase-mediated activation of downstream signalling pathways, such as those involving mitogen-activated protein kinase and phosphatidylinositol-3 kinase.
ETV6	ets variant 6	This gene encodes an ETS family transcription factor that it is required for hematopoiesis and maintenance of the developing vascular network.
FADD	Fas (TNFRSF6)-associated via death domain	The protein encoded by this gene is an adaptor molecule that interacts with various cell surface receptors and mediates cell apoptotic signals.
FAS	Fas (TNF receptor superfamily, member 6)	This protein has been shown to play a central role in the physiological regulation of programmed cell death, and has been implicated in the pathogenesis of various malignancies and diseases of the immune system. This receptor is found to be involved in transducing the proliferating signals in normal diploid fibroblast and T cells.
FCGR2A	Fc fragment of IgG, low affinity IIa, receptor (CD32)	This protein is a cell surface receptor found on phagocytic cells such as macrophages and neutrophils, and is involved in the process of phagocytosis and clearing of immune complexes.
GCNT1	glucosaminyl (N-acetyl) transferase 1, core 2 (beta-1,6-N-acetylglucosaminyltransferase)	This protein is essential to the formation of Gal beta 1-3(GlcNAc beta 1-6)GalNAc structures and the core 2 O-glycan branch.
GSTP1	glutathione S-transferase pi 1	This GST family member functions in xenobiotic metabolism and play a role in susceptibility to cancer, and other diseases.

HEXB	hexosaminidase B (beta polypeptide)	Hexosaminidase B catalyzes the degradation of the ganglioside GM2, and other molecules containing terminal N-acetyl hexosamines.
HSP90B1	heat shock protein 90kDa beta (Grp94), member 1	HSP90 proteins play roles in folding newly synthesized proteins or stabilizing and refolding denatured proteins after stress.
ICAM1	intercellular adhesion molecule 1	This gene encodes a cell surface glycoprotein which is typically expressed on endothelial cells and cells of the immune system.
ICOSLG	inducible T-cell co-stimulator ligand	
IFNAR1	interferon (alpha, beta and omega) receptor 1	Binding and activation of this receptor stimulates Janus protein kinases, it also functions as an antiviral factor.
IFNGR1	interferon gamma receptor 1	This gene encodes the ligand-binding chain (alpha) of the gamma interferon receptor.
IGF2	insulin-like growth factor 2 (somatomedin A)	This gene encodes a member of the insulin family of polypeptide growth factors that is involved in development and growth.
IGF2R	insulin-like growth factor 2 receptor	This receptor functions in the intracellular trafficking of lysosomal enzymes, the activation of transforming growth factor beta, and the degradation of IGF2.
IL8	interleukin 8	This chemokine, one of the major mediators of the inflammatory response, functions as a chemoattractant, and is also a potent angiogenic factor.
IL2RG	interleukin 2 receptor, gamma (severe combined immunodeficiency)	The interleukin 2 (IL2) receptor gamma chain (IL2RG), an important signalling component of many interleukin receptors (IL2,IL4,IL7,IL9, and IL15).
IL7R	interleukin 7 receptor	This protein has been shown to play a critical role in the V(D)J recombination during lymphocyte development, and to control the accessibility of the TCR gamma locus by STAT5 and histone acetylation.
IRF1	interferon regulatory factor 1	IRF1 is a transcription activator of genes induced by interferons alpha, beta, and gamma. It also plays roles in regulating apoptosis and tumor-suppressoion.
IRF2	interferon regulatory factor 2	IRF2 competitively inhibits the IRF1-mediated transcriptional activation of interferons alpha and beta, and presumably other genes that employ IRF1 for transcription activation. However, IRF2 also functions as a transcriptional activator of histone H4.
ISG15	ISG15 ubiquitin-like modifier	G1P2 is a ubiquitin-like protein that becomes conjugated to many cellular proteins upon activation by interferon-alpha (IFNA; MIM 147660) and -beta (IFNB; MIM 147640).
ITGAM	integrin, alpha M (complement component 3 receptor 3 subunit)	The alpha M beta 2 integrin is important in the adherence of neutrophils and monocytes to stimulated endothelium, and also in the phagocytosis of complement coated particles.
ITGB2	integrin, beta 2 (complement component 3 receptor 3 and 4 subunit)	Integrins are known to participate in cell adhesion as well as cell-surface mediated signalling.
KLF4	Kruppel-like factor 4 (gut)	
LDLR	low density lipoprotein receptor	Low density lipoprotein (LDL) is taken into the cell ending up in lysosomes where it is degraded and the cholesterol is made available for repression of microsomal enzyme HMG CoA reductase, the rate-limiting step in cholesterol synthesis.
LGALS3	lectin, galactoside-binding, soluble, 3	

LGALS8	lectin, galactoside-binding, soluble, 8	This gene is widely expressed in tumoral tissues and seems to be involved in integrin-like cell interactions.
LSP1	lymphocyte-specific protein 1	The protein may regulate neutrophil motility, adhesion to fibrinogen matrix proteins, and transendothelial migration.
LYN	v-yes-1 Yamaguchi sarcoma viral related oncogene homolog	
LYST	lysosomal trafficking regulator	This protein regulates intracellular protein trafficking to and from the lysosome.
MAP3K7	mitogen-activated protein kinase kinase kinase 7	This kinase mediates the signaling transduction induced by TGF beta and morphogenetic protein (BMP), and controls a variety of cell functions including transcription regulation and apoptosis.This kinase can play a role in the cell response to environmental stresses.
MAPKAPK2	mitogen-activated protein kinase-activated protein kinase 2	This kinase is known to be involved in many cellular processes including stress and inflammatory responses, nuclear export, gene expression regulation and cell proliferation.
MDM2	Mdm2 p53 binding protein homolog (mouse)	This protein is a nuclear phosphoprotein that binds and inhibits transactivation by tumor protein p53, as part of an autoregulatory negative feedback loop. It also affects the cell cycle, apoptosis, and tumorigenesis through interactions with other proteins, including retinoblastoma 1 and ribosomal protein L5.
MEIS1	Meis homeobox 1	Homeobox genes, of which the most well-characterized category is represented by the HOX genes, play a crucial role in normal development. In addition, several homeoproteins are involved in neoplasia.
MPZ	myelin protein zero	This gene encodes a major structural protein of peripheral myelin.
NFKB1	nuclear factor of kappa light polypeptide gene enhancer in B-cells 1	NFKB is a transcription regulator that is activated by various intra- and extra-cellular stimuli such as cytokines, oxidant-free radicals, ultraviolet irradiation, and bacterial or viral products.
NFKB2	nuclear factor of kappa light polypeptide gene enhancer in B-cells 2 (p49/p100)	NFKB has been detected in numerous cell types that express cytokines, chemokines, growth factors, cell adhesion molecules, and some acute phase proteins in health and in various disease states. NFKB is activated by a wide variety of stimuli.
NP	nucleoside phosphorylase	This protein is an enzyme which reversibly catalyzes the phosphorolysis of purine nucleosides.
NPM1	nucleophosmin (nucleolar phosphoprotein B23, numatrin)	NPM1 is implicated in multiple functions, including ribosomal protein assembly and transport, control of centrosome duplication, and regulation of the tumor suppressor ARF (MIM 600160).
NR4A1	nuclear receptor subfamily 4, group A, member 1	This protein acts as a nuclear transcription factor. Translocation of the protein from the nucleus to mitochondria induces apoptosis.
PDE4B	phosphodiesterase 4B, cAMP-specific (phosphodiesterase E4 dunce homolog, Drosophila)	This protein specifically hydrolyzes cAMP.
PIK3AP1	phosphoinositide-3-kinase adaptor protein 1	

PIK3R1	phosphoinositide-3-kinase, regulatory subunit 1 (alpha)	Phosphatidylinositol 3-kinase plays an important role in the metabolic actions of insulin.
PLSCR1	phospholipid scramblase 1	
PML	promyelocytic leukemia	This phosphoprotein localizes to nuclear bodies where it functions as a transcription factor and tumor suppressor. Its expression is cell-cycle related and it regulates the p53 response to oncogenic signals.
PRKCE	protein kinase C, epsilon	This kinase is involved in neuron channel activation, apoptosis, cardioprotection from ischemia, heat shock response, and insulin exocytosis. It may also be important for LPS-mediated signaling in activated macrophages and may play a role in controlling anxiety-like behavior.
PRNP	prion protein	This protein is a membrane glycosylphosphatidylinositol-anchored glycoprotein that tends to aggregate into rod-like structures.
PTPN2	protein tyrosine phosphatase, non-receptor type 2	This protein regulates a variety of cellular processes including cell growth, differentiation, mitotic cycle, and oncogenic transformation.
PTPN6	protein tyrosine phosphatase, non-receptor type 6	This protein is expressed primarily in hematopoietic cells, and functions as an important regulator of multiple signaling pathways in hematopoietic cells. It dephosphorylates a wide spectrum of phospho-proteins involved in hematopoietic cell signaling.
RBL2	retinoblastoma-like 2 (p130)	
RBM15	RNA binding motif protein 15	Members of the SPEN (Split-end) family of proteins, including RBM15, have repressor function in several signaling pathways and may bind to RNA through interaction with spliceosome components.
RHOH	ras homolog gene family, member H	This protein is transcribed only in hemopoietic cells.
RUNX1	runt-related transcription factor 1	This protein is thought to be involved in the development of normal hematopoiesis.
SEMA4D	sema domain, immunoglobulin domain (Ig), transmembrane domain (TM) and short cytoplasmic domain, (semaphorin) 4D	
SERPINA1	serpin peptidase inhibitor, clade A (alpha-1 antiproteinase, antitrypsin), member 1	This protein is a serine protease inhibitor whose targets include elastase, plasmin, thrombin, trypsin, chymotrypsin, and plasminogen activator.
SHC1	SHC (Src homology 2 domain containing) transforming protein 1	
SOD1	superoxide dismutase 1, soluble	This protein binds copper and zinc ions and is one of two isozymes responsible for destroying free superoxide radicals in the body.

	SRF	serum response factor (c-fos serum response element-binding transcription factor)	This protein stimulates both cell proliferation and differentiation. It participates in cell cycle regulation, apoptosis, cell growth, and cell differentiation.
	STAM2	signal transducing adaptor molecule (SH3 domain and ITAM motif) 2	This protein is thought to exhibit compensatory effects on the signaling pathway downstream of JAK kinases upon cytokine stimulation.
	STAT1	signal transducer and activator of transcription 1, 91kDa	This protein mediates the expression of a variety of genes, which is thought to be important for cell viability in response to different cell stimuli and pathogens.
	STAT3	signal transducer and activator of transcription 3 (acute-phase response factor)	This protein mediates the expression of a variety of genes in response to cell stimuli, and thus plays a key role in many cellular processes such as cell growth and apoptosis.
	STAT6	signal transducer and activator of transcription 6, interleukin-4 induced	This protein plays a central role in exerting IL4 mediated biological responses. It is found to induce the expression of BCL2L1/BCL-X(L), which is responsible for the anti-apoptotic activity of IL4. It also plays a role in differentiation of T helper 2 (Th2) cells, expression of cell surface markers, and class switch of immunoglobulins.
	STAT5B	signal transducer and activator of transcription 5B	This protein mediates the signal transduction triggered by various cell ligands, such as IL2, IL4, CSF1, and different growth hormones. It is involved in TCR signaling, apoptosis, adult mammary gland development, and sexual dimorphism of liver gene expression.
	STK17B	serine/threonine kinase 17b	
	TAP1	transporter 1, ATP-binding cassette, sub-family B (MDR/TAP)	This protein is involved in the pumping of degraded cytosolic peptides across the endoplasmic reticulum into the membrane-bound compartment where class I molecules assemble.
	TGFBR2	transforming growth factor, beta receptor II (70/80kDa)	This receptor regulates the transcription of a subset of genes related to cell proliferation.
	TLR2	toll-like receptor 2	This protein encoded by this gene is a member of the Toll-like receptor (TLR) family which plays a fundamental role in pathogen recognition and activation of innate immunity. It mediates host response to Gram-positive bacteria.
	TP53	tumor protein p53	This gene encodes tumor protein p53, which responds to diverse cellular stresses to regulate target genes that induce cell cycle arrest, apoptosis, senescence, DNA repair, or changes in metabolism.
	TXNIP	thioredoxin interacting protein	
Hematological System Development and Function: Differentiation: Differentiation of Blood Cells (1.00E-05)	ADD1	adducin 1 (alpha)	Adducin binds with high affinity to Ca(2+)/calmodulin and is a substrate for protein kinases A and C.

AKT1	v-akt murine thymoma viral oncogene homolog 1	In the developing nervous system AKT is a critical mediator of growth factor-induced neuronal survival. Survival factors can suppress apoptosis.
AKT2	v-akt murine thymoma viral oncogene homolog 2	This gene is a putative oncogene encoding a subfamily of serine/threonine kinases containing SH2-like (Src homology 2-like) domains.The encoded protein is a general protein kinase capable of phophorylating several known proteins.
ALAS2	aminolevulinate, delta-, synthase 2	This protein catalyzes the first step in the heme biosynthetic pathway.
AP3B1	adaptor-related protein complex 3, beta 1 subunit	This gene encodes a protein that may play a role in organelle biogenesis associated with melanosomes, platelet dense granules, and lysosomes.
AP3D1	adaptor-related protein complex 3, delta 1 subunit	The AP3D1 subunit is implicated in intracellular biogenesis and trafficking of pigment granules and platelet dense granules and neurotransmitter vesicles.
APAF1	apoptotic peptidase activating factor 1	This gene encodes a cytoplasmic protein that initiates apoptosis.
BSG	basigin (Ok blood group)	This protein is a plasma membrane protein that is important in spermatogenesis, embryo implantation, neural network formation, and tumor progression.
CCL3	chemokine (C-C motif) ligand 3	Macrophage inflammatory protein-1 is a so-called monokine that is involved in the acute inflammatory state in the recruitment and activation of polymorphonuclear leukocytes.
CD300A	CD300a molecule	The CMRF35 antigen (CMRF35A; MIM 606786), which was identified by reactivity with a monoclonal antibody, is present on monocytes, neutrophils, and some T and B lymphocytes.
CDC42	cell division cycle 42 (GTP binding protein, 25kDa)	This protein regulates signaling pathways that control diverse cellular functions including cell morphology, migration, endocytosis and cell cycle progression.
CDKN2A	cyclin-dependent kinase inhibitor 2A (melanoma, p16, inhibits CDK4)	This ARF product functions as a stabilizer of the tumor suppressor protein p53 as it can interact with, and sequester, MDM1, a protein responsible for the degradation of p53. It has a common functionality in cell cycle G1 control.
CDKN2B	cyclin-dependent kinase inhibitor 2B (p15, inhibits CDK4)	This cyclin-dependent kinase functions as a cell growth regulator that controls cell cycle G1 progression.
CEBPD	CCAAT/enhancer binding protein (C/EBP), delta	This protein is important in the regulation of genes involved in immune and inflammatory responses, and may be involved in the regulation of genes associated with activation and/or differentiation of macrophages.
CTBP1	C-terminal binding protein 1	This proteins can interact with a polycomb group protein complex which participates in regulation of gene expression during development.
DCLRE1C	DNA cross-link repair 1C (PSO2 homolog, S. cerevisiae)	This nuclear protein is involved in V(D)J recombination and DNA repair.
DICER1	dicer 1, ribonuclease type III	This ribonuclease is required by the RNA interference and small temporal RNA pathways to produce the active small RNA component that represses gene expression.
EGFR	epidermal growth factor receptor (erythroblastic leukemia viral (v-erb-b) oncogene homolog, avian)	Binding of this receptor to a ligand induces dimerization and tyrosine autophosphorylation and leads to cell proliferation.
EGR1	early growth response 1	This protein is a transcriptional regulator required for differentitation and mitogenesis.

ETV6	ets variant 6	This gene encodes an ETS family transcription factor that it is required for hematopoiesis and maintenance of the developing vascular network.
FADD	Fas (TNFRSF6)-associated via death domain	The protein encoded by this gene is an adaptor molecule that interacts with various cell surface receptors and mediates cell apoptotic signals.
FAS	Fas (TNF receptor superfamily, member 6)	This protein has been shown to play a central role in the physiological regulation of programmed cell death, and has been implicated in the pathogenesis of various malignancies and diseases of the immune system. This receptor is found to be involved in transducing the proliferating signals in normal diploid fibroblast and T cells.
FOS	v-fos FBJ murine osteosarcoma viral oncogene homolog	The FOS proteins have been implicated as regulators of cell proliferation, differentiation, transformation, and apoptotic cell death.
GRB2	growth factor receptor-bound protein 2	The protein may be involved in the signal transduction pathway.
HDAC5	histone deacetylase 5	This protein possesses histone deacetylase activity and represses transcription when tethered to a promoter.
HDAC7	histone deacetylase 7	This gene is orthologous to mouse HDAC7 gene whose protein promotes repression mediated via the transcriptional corepressor SMRT.
HRH1	histamine receptor H1	This protein mediates the contraction of smooth muscles, the increase in capillary permeability due to contraction of terminal venules, the release of catecholamine from adrenal medulla, and neurotransmission in the central nervous system.
HSP90AA1	heat shock protein 90kDa alpha (cytosolic), class A member 1	HSP90 proteins are molecular chaperones that have key roles in signal transduction, protein folding, protein degradation, and morphologic evolution.
HSP90B1	heat shock protein 90kDa beta (Grp94), member 1	HSP90 proteins play roles in folding newly synthesized proteins or stabilizing and refolding denatured proteins after stress.
HSPD1	heat shock 60kDa protein 1 (chaperonin)	This protein may function as a signaling molecule in the innate immune system. It is essential for the folding and assembly of newly imported proteins in the mitochondria.
ICAM1	intercellular adhesion molecule 1	This gene encodes a cell surface glycoprotein which is typically expressed on endothelial cells and cells of the immune system.
ICOSLG	inducible T-cell co-stimulator ligand	
IFI16	interferon, gamma-inducible protein 16	This protein is involved in DNA binding, transcriptional regulation, and protein-protein interactions. It modulates p53 function, and inhibits cell growth in the Ras/Raf signaling pathway.
IGF2	insulin-like growth factor 2 (somatomedin A)	This gene encodes a member of the insulin family of polypeptide growth factors that is involved in development and growth.
IGF2R	insulin-like growth factor 2 receptor	This receptor functions in the intracellular trafficking of lysosomal enzymes, the activation of transforming growth factor beta, and the degradation of IGF2.
IL8	interleukin 8	This chemokine, one of the major mediators of the inflammatory response, functions as a chemoattractant, and is also a potent angiogenic factor.
IL2RG	interleukin 2 receptor, gamma (severe combined immunodeficiency)	The interleukin 2 (IL2) receptor gamma chain (IL2RG), an important signalling component of many interleukin receptors (IL2,IL4,IL7,IL9, and IL15).

IL4R	interleukin 4 receptor	This protein can bind interleukin 4 to promote differentiation of Th2 cells, can be produced by an alternate splice variant or by proteolysis of the membrane-bound protein, and can inhibit IL4-mediated cell proliferation and IL5 upregulation by T-cells.
IL7R	interleukin 7 receptor	This protein has been shown to play a critical role in the V(D)J recombination during lymphocyte development, and to control the accessibility of the TCR gamma locus by STAT5 and histone acetylation.
IRF1	interferon regulatory factor 1	IRF1 is a transcription activator of genes induced by interferons alpha, beta, and gamma. It also plays roles in regulating apoptosis and tumor-suppressoion.
IRF2	interferon regulatory factor 2	IRF2 competitively inhibits the IRF1-mediated transcriptional activation of interferons alpha and beta, and presumably other genes that employ IRF1 for transcription activation. However, IRF2 also functions as a transcriptional activator of histone H4.
ITGAM	integrin, alpha M (complement component 3 receptor 3 subunit)	The alpha M beta 2 integrin is important in the adherence of neutrophils and monocytes to stimulated endothelium, and also in the phagocytosis of complement coated particles.
ITGB2	integrin, beta 2 (complement component 3 receptor 3 and 4 subunit)	Integrins are known to participate in cell adhesion as well as cell-surface mediated signalling.
JMJD6	jumonji domain containing 6	JmjC domain-containing proteins are predicted to function as protein hydroxylases or histone demethylases.
JUN	jun oncogene	This protein interacts directly with specific target DNA sequences to regulate gene expression.
LAMP1	lysosomal-associated membrane protein 1	This glycoprotein provides selectins with carbohydrate ligands, and may play a role in tumor cell metastasis.
LCN2	lipocalin 2	
LYN	v-yes-1 Yamaguchi sarcoma viral related oncogene homolog	
MAFB	v-maf musculoaponeurotic fibrosarcoma oncogene homolog B (avian)	This protein plays an important role in the regulation of lineage-specific hematopoiesis. It represses ETS1-mediated transcription of erythroid-specific genes in myeloid cells.
MAPK14	mitogen-activated protein kinase 14	This kinase may be involved in stress related transcription and cell cycle regulation, as well as in genotoxic stress response.
MAX	MYC associated factor X	The homodimers and heterodimers this protein forms compete for a common DNA target site (the E box) and rearrangement among these dimer forms provides a complex system of transcriptional regulation.
MED1	mediator complex subunit 1	The protein encoded by this gene is a subunit of the CRSP (cofactor required for SP1 activation) complex, which, along with TFIID, is required for efficient activation by SP1. It also regulates p53-dependent apoptosis and it is essential for adipogenesis.
MEIS1	Meis homeobox 1	Homeobox genes, of which the most well-characterized category is represented by the HOX genes, play a crucial role in normal development. In addition, several homeoproteins are involved in neoplasia.
MLL	myeloid/lymphoid or mixed-lineage leukemia (trithorax homolog, Drosophila)	The MLL gene encodes a DNA-binding protein that methylates histone H3 (see MIM 601128) lys4 (H3K4) and positively regulates expression of target genes, including multiple HOX genes (see MIM 142980).

MLLT1	myeloid/lymphoid or mixed-lineage leukemia (trithorax homolog, Drosophila); translocated to, 1	
MLLT10	myeloid/lymphoid or mixed-lineage leukemia (trithorax homolog, Drosophila); translocated to, 10	
NCAPH2	non-SMC condensin II complex, subunit H2	Condensin complexes I and II play essential roles in mitotic chromosome assembly and segregation.
NCOA6	nuclear receptor coactivator 6	This protein is a transcriptional coactivator that can interact with nuclear hormone receptors to enhance their transcriptional activator functions. It is involved in the hormone-dependent coactivation of several receptors. It may also act as a general coactivator.
NFKB1	nuclear factor of kappa light polypeptide gene enhancer in B-cells 1	NFKB is a transcription regulator that is activated by various intra- and extra-cellular stimuli such as cytokines, oxidant-free radicals, ultraviolet irradiation, and bacterial or viral products.
NFKB2	nuclear factor of kappa light polypeptide gene enhancer in B-cells 2 (p49/p100)	NFKB has been detected in numerous cell types that express cytokines, chemokines, growth factors, cell adhesion molecules, and some acute phase proteins in health and in various disease states. NFKB is activated by a wide variety of stimuli.
NFYA	nuclear transcription factor Y, alpha	This protein is one subunit of a trimeric complex, forming a highly conserved transcription factor that binds to CCAAT motifs in the promoter regions in a variety of genes.
NP	nucleoside phosphorylase	This protein is an enzyme which reversibly catalyzes the phosphorolysis of purine nucleosides.
PDPK1	3-phosphoinositide dependent protein kinase-1	
PICALM	phosphatidylinositol binding clathrin assembly protein	
PIK3R1	phosphoinositide-3-kinase, regulatory subunit 1 (alpha)	Phosphatidylinositol 3-kinase plays an important role in the metabolic actions of insulin.
PLSCR1	phospholipid scramblase 1	
PML	promyelocytic leukemia	This phosphoprotein localizes to nuclear bodies where it functions as a transcription factor and tumor suppressor. Its expression is cell-cycle related and it regulates the p53 response to oncogenic signals.
PRKCQ	protein kinase C, theta	This protein is one of the PKC family members important for T-cell activation, and may link the T cell receptor (TCR) signaling complex to the activation of the transcription factors.
PTPN6	protein tyrosine phosphatase, non-receptor type 6	This protein is expressed primarily in hematopoietic cells, and functions as an important regulator of multiple signaling pathways in hematopoietic cells. It dephosphorylates a wide spectrum of phospho-proteins involved in hematopoietic cell signaling.

PTPN11	protein tyrosine phosphatase, non-receptor type 11	This PTP is widely expressed in most tissues and plays a regulatory role in various cell signaling events that are important for a diversity of cell functions, such as mitogenic activation, metabolic control, transcription regulation, and cell migration.
RBM15	RNA binding motif protein 15	Members of the SPEN (Split-end) family of proteins, including RBM15, have repressor function in several signaling pathways and may bind to RNA through interaction with spliceosome components.
RHOH	ras homolog gene family, member H	This protein is transcribed only in hemopoietic cells.
RIPK2	receptor-interacting serine-threonine kinase 2	This protein is a component of signaling complexes in both the innate and adaptive immune pathways, and is a potent activator of NF-kappaB and inducer of apoptosis in response to various stimuli.
RUNX1	runt-related transcription factor 1	This protein is thought to be involved in the development of normal hematopoiesis.
SART1	squamous cell carcinoma antigen recognized by T cells	This gene encodes two proteins, the SART1(800) protein expressed in the nucleus of the majority of proliferating cells, and the SART1(259) protein expressed in the cytosol of epithelial cancers, both thought to be involved in the regulation of proliferation.
SFXN1	sideroflexin 1	
SHC1	SHC (Src homology 2 domain containing) transforming protein 1	
SOX4	SRY (sex determining region Y)-box 4	This protein may function in the apoptosis pathway leading to cell death as well as to tumorigenesis and may mediate downstream effects of PTH and PTHrP in bone development.
SP3	Sp3 transcription factor	This protein contains a zinc finger DNA-binding domain and several transactivation domains, and has been reported to function as a bifunctional transcription factor that either stimulates or represses the transcription of numerous genes.
SPRED2	sprouty-related, EVH1 domain containing 2	SPRED2 is a member of the Sprouty (see SPRY1; MIM 602465)/SPRED family of proteins that regulate growth factor-induced activation of the MAP kinase cascade (see MAPK1; MIM 176948).
SRF	serum response factor (c-fos serum response element-binding transcription factor)	This protein stimulates both cell proliferation and differentiation. It participates in cell cycle regulation, apoptosis, cell growth, and cell differentiation.
STAT1	signal transducer and activator of transcription 1, 91kDa	This protein mediates the expression of a variety of genes, which is thought to be important for cell viability in response to different cell stimuli and pathogens.
STAT3	signal transducer and activator of transcription 3 (acute-phase response factor)	This protein mediates the expression of a variety of genes in response to cell stimuli, and thus plays a key role in many cellular processes such as cell growth and apoptosis.
STAT6	signal transducer and activator of transcription 6, interleukin-4 induced	This protein plays a central role in exerting IL4 mediated biological responses. It is found to induce the expression of BCL2L1/BCL-X(L), which is responsible for the anti-apoptotic activity of IL4. It also plays a role in differentiation of T helper 2 (Th2) cells, expression of cell surface markers, and class switch of immunoglobulins.
STAT5B	signal transducer and activator of transcription 5B	This protein mediates the signal transduction triggered by various cell ligands, such as IL2, IL4, CSF1, and different growth hormones. It is involved in TCR signaling, apoptosis, adult mammary gland development, and sexual dimorphism of liver gene expression.

	SYK	spleen tyrosine kinase	
	TGFBR2	transforming growth factor, beta receptor II (70/80kDa)	This receptor regulates the transcription of a subset of genes related to cell proliferation.
	THOC5	THO complex 5	
	TP53	tumor protein p53	This gene encodes tumor protein p53, which responds to diverse cellular stresses to regulate target genes that induce cell cycle arrest, apoptosis, senescence, DNA repair, or changes in metabolism.
	TSC2	tuberous sclerosis 2	This protein is a tumor suppressor and is able to stimulate specific GTPases.
	TWSG1	twisted gastrulation homolog 1 (Drosophila)	
	UBE2I	ubiquitin-conjugating enzyme E2I (UBC9 homolog, yeast)	The modification of proteins with ubiquitin is an important cellular mechanism for targeting abnormal or short-lived proteins for degradation. This gene encodes a member of the E2 ubiquitin-conjugating enzyme family.
	WASF2	WAS protein family, member 2	This multiprotein complex serves to tranduce signals that involve changes in cell shape, motility or function.
	XRCC5	X-ray repair complementing defective repair in Chinese hamster cells 5 (double-strand-break rejoining)	This gene functionally complements Chinese hamster xrs-6, a mutant defective in DNA double-strand break repair and in ability to undergo V(D)J recombination.
Hematological System Development and Function, Hematopoiesis: Differentiation: Differentiation of Leukocytes (1.10E-04)	AKT1	v-akt murine thymoma viral oncogene homolog 1	In the developing nervous system AKT is a critical mediator of growth factor-induced neuronal survival. Survival factors can suppress apoptosis.
	AKT2	v-akt murine thymoma viral oncogene homolog 2	This gene is a putative oncogene encoding a subfamily of serine/threonine kinases containing SH2-like (Src homology 2-like) domains.The encoded protein is a general protein kinase capable of phophorylating several known proteins.
	AP3B1	adaptor-related protein complex 3, beta 1 subunit	This gene encodes a protein that may play a role in organelle biogenesis associated with melanosomes, platelet dense granules, and lysosomes.
	AP3D1	adaptor-related protein complex 3, delta 1 subunit	The AP3D1 subunit is implicated in intracellular biogenesis and trafficking of pigment granules and platelet dense granules and neurotransmitter vesicles.
	APAF1	apoptotic peptidase activating factor 1	This gene encodes a cytoplasmic protein that initiates apoptosis.
	BSG	basigin (Ok blood group)	This protein is a plasma membrane protein that is important in spermatogenesis, embryo implantation, neural network formation, and tumor progression.
	CCL3	chemokine (C-C motif) ligand 3	Macrophage inflammatory protein-1 is a so-called monokine that is involved in the acute inflammatory state in the recruitment and activation of polymorphonuclear leukocytes.

CD300A	CD300a molecule	The CMRF35 antigen (CMRF35A; MIM 606786), which was identified by reactivity with a monoclonal antibody, is present on monocytes, neutrophils, and some T and B lymphocytes.
CDC42	cell division cycle 42 (GTP binding protein, 25kDa)	This protein regulates signaling pathways that control diverse cellular functions including cell morphology, migration, endocytosis and cell cycle progression.
CDKN2A	cyclin-dependent kinase inhibitor 2A (melanoma, p16, inhibits CDK4)	This ARF product functions as a stabilizer of the tumor suppressor protein p53 as it can interact with, and sequester, MDM1, a protein responsible for the degradation of p53. It has a common functionality in cell cycle G1 control.
CEBPD	CCAAT/enhancer binding protein (C/EBP), delta	This protein is important in the regulation of genes involved in immune and inflammatory responses, and may be involved in the regulation of genes associated with activation and/or differentiation of macrophages.
CTBP1	C-terminal binding protein 1	This proteins can interact with a polycomb group protein complex which participates in regulation of gene expression during development.
DCLRE1C	DNA cross-link repair 1C (PSO2 homolog, S. cerevisiae)	This nuclear protein is involved in V(D)J recombination and DNA repair.
DICER1	dicer 1, ribonuclease type III	This ribonuclease is required by the RNA interference and small temporal RNA pathways to produce the active small RNA component that represses gene expression.
EGR1	early growth response 1	This protein is a transcriptional regulator required for differentitation and mitogenesis.
FAS	Fas (TNF receptor superfamily, member 6)	This protein has been shown to play a central role in the physiological regulation of programmed cell death, and has been implicated in the pathogenesis of various malignancies and diseases of the immune system. This receptor is found to be involved in transducing the proliferating signals in normal diploid fibroblast and T cells.
FOS	v-fos FBJ murine osteosarcoma viral oncogene homolog	The FOS proteins have been implicated as regulators of cell proliferation, differentiation, transformation, and apoptotic cell death.
GRB2	growth factor receptor-bound protein 2	The protein may be involved in the signal transduction pathway.
HDAC5	histone deacetylase 5	This protein possesses histone deacetylase activity and represses transcription when tethered to a promoter.
HDAC7	histone deacetylase 7	This gene is orthologous to mouse HDAC7 gene whose protein promotes repression mediated via the transcriptional corepressor SMRT.
HRH1	histamine receptor H1	This protein mediates the contraction of smooth muscles, the increase in capillary permeability due to contraction of terminal venules, the release of catecholamine from adrenal medulla, and neurotransmission in the central nervous system.
HSP90AA1	heat shock protein 90kDa alpha (cytosolic), class A member 1	HSP90 proteins are molecular chaperones that have key roles in signal transduction, protein folding, protein degradation, and morphologic evolution.
HSP90B1	heat shock protein 90kDa beta (Grp94), member 1	HSP90 proteins play roles in folding newly synthesized proteins or stabilizing and refolding denatured proteins after stress.
HSPD1	heat shock 60kDa protein 1 (chaperonin)	This protein may function as a signaling molecule in the innate immune system. It is essential for the folding and assembly of newly imported proteins in the mitochondria.
ICAM1	intercellular adhesion molecule 1	This gene encodes a cell surface glycoprotein which is typically expressed on endothelial cells and cells of the immune system.
ICOSLG	inducible T-cell co-stimulator ligand	

IFI16	interferon, gamma-inducible protein 16	This protein is involved in DNA binding, transcriptional regulation, and protein-protein interactions. It modulates p53 function, and inhibits cell growth in the Ras/Raf signaling pathway.
IGF2	insulin-like growth factor 2 (somatomedin A)	This gene encodes a member of the insulin family of polypeptide growth factors that is involved in development and growth.
IGF2R	insulin-like growth factor 2 receptor	This receptor functions in the intracellular trafficking of lysosomal enzymes, the activation of transforming growth factor beta, and the degradation of IGF2.
IL8	interleukin 8	This chemokine, one of the major mediators of the inflammatory response, functions as a chemoattractant, and is also a potent angiogenic factor.
IL2RG	interleukin 2 receptor, gamma (severe combined immunodeficiency)	The interleukin 2 (IL2) receptor gamma chain (IL2RG), an important signalling component of many interleukin receptors (IL2,IL4,IL7,IL9, and IL15).
IL4R	interleukin 4 receptor	This protein can bind interleukin 4 to promote differentiation of Th2 cells, can be produced by an alternate splice variant or by proteolysis of the membrane-bound protein, and can inhibit IL4-mediated cell proliferation and IL5 upregulation by T-cells.
IL7R	interleukin 7 receptor	This protein has been shown to play a critical role in the V(D)J recombination during lymphocyte development, and to control the accessibility of the TCR gamma locus by STAT5 and histone acetylation.
IRF1	interferon regulatory factor 1	IRF1 is a transcription activator of genes induced by interferons alpha, beta, and gamma. It also plays roles in regulating apoptosis and tumor-suppressoion.
IRF2	interferon regulatory factor 2	IRF2 competitively inhibits the IRF1-mediated transcriptional activation of interferons alpha and beta, and presumably other genes that employ IRF1 for transcription activation. However, IRF2 also functions as a transcriptional activator of histone H4.
ITGAM	integrin, alpha M (complement component 3 receptor 3 subunit)	The alpha M beta 2 integrin is important in the adherence of neutrophils and monocytes to stimulated endothelium, and also in the phagocytosis of complement coated particles.
ITGB2	integrin, beta 2 (complement component 3 receptor 3 and 4 subunit)	Integrins are known to participate in cell adhesion as well as cell-surface mediated signalling.
JMJD6	jumonji domain containing 6	JmjC domain-containing proteins are predicted to function as protein hydroxylases or histone demethylases.
JUN	jun oncogene	This protein interacts directly with specific target DNA sequences to regulate gene expression.
LAMP1	lysosomal-associated membrane protein 1	This glycoprotein provides selectins with carbohydrate ligands, and may play a role in tumor cell metastasis.
LYN	v-yes-1 Yamaguchi sarcoma viral related oncogene homolog	
MAPK14	mitogen-activated protein kinase 14	This kinase may be involved in stress related transcription and cell cycle regulation, as well as in genotoxic stress response.
MEIS1	Meis homeobox 1	Homeobox genes, of which the most well-characterized category is represented by the HOX genes, play a crucial role in normal development. In addition, several homeoproteins are involved in neoplasia.
MLL	myeloid/lymphoid or mixed-lineage leukemia (trithorax homolog, Drosophila)	The MLL gene encodes a DNA-binding protein that methylates histone H3 (see MIM 601128) lys4 (H3K4) and positively regulates expression of target genes, including multiple HOX genes (see MIM 142980).

MLLT1	myeloid/lymphoid or mixed-lineage leukemia (trithorax homolog, Drosophila); translocated to, 1	
MLLT10	myeloid/lymphoid or mixed-lineage leukemia (trithorax homolog, Drosophila); translocated to, 10	
NCAPH2	non-SMC condensin II complex, subunit H2	Condensin complexes I and II play essential roles in mitotic chromosome assembly and segregation.
NCOA6	nuclear receptor coactivator 6	This protein is a transcriptional coactivator that can interact with nuclear hormone receptors to enhance their transcriptional activator functions. It is involved in the hormone-dependent coactivation of several receptors. It may also act as a general coactivator.
NFKB1	nuclear factor of kappa light polypeptide gene enhancer in B-cells 1	NFKB is a transcription regulator that is activated by various intra- and extra-cellular stimuli such as cytokines, oxidant-free radicals, ultraviolet irradiation, and bacterial or viral products.
NFKB2	nuclear factor of kappa light polypeptide gene enhancer in B-cells 2 (p49/p100)	NFKB has been detected in numerous cell types that express cytokines, chemokines, growth factors, cell adhesion molecules, and some acute phase proteins in health and in various disease states. NFKB is activated by a wide variety of stimuli.
NFYA	nuclear transcription factor Y, alpha	This protein is one subunit of a trimeric complex, forming a highly conserved transcription factor that binds to CCAAT motifs in the promoter regions in a variety of genes.
NP	nucleoside phosphorylase	This protein is an enzyme which reversibly catalyzes the phosphorolysis of purine nucleosides.
PDPK1	3-phosphoinositide dependent protein kinase-1	
PICALM	phosphatidylinositol binding clathrin assembly protein	
PIK3R1	phosphoinositide-3-kinase, regulatory subunit 1 (alpha)	Phosphatidylinositol 3-kinase plays an important role in the metabolic actions of insulin.
PLSCR1	phospholipid scramblase 1	
PML	promyelocytic leukemia	This phosphoprotein localizes to nuclear bodies where it functions as a transcription factor and tumor suppressor. Its expression is cell-cycle related and it regulates the p53 response to oncogenic signals.
PRKCQ	protein kinase C, theta	This protein is one of the PKC family members important for T-cell activation, and may link the T cell receptor (TCR) signaling complex to the activation of the transcription factors.
PTPN6	protein tyrosine phosphatase, non-receptor type 6	This protein is expressed primarily in hematopoietic cells, and functions as an important regulator of multiple signaling pathways in hematopoietic cells. It dephosphorylates a wide spectrum of phospho-proteins involved in hematopoietic cell signaling.

RBM15	RNA binding motif protein 15	Members of the SPEN (Split-end) family of proteins, including RBM15, have repressor function in several signaling pathways and may bind to RNA through interaction with spliceosome components.
RHOH	ras homolog gene family, member H	This protein is transcribed only in hemopoietic cells.
RIPK2	receptor-interacting serine-threonine kinase 2	This protein is a component of signaling complexes in both the innate and adaptive immune pathways, and is a potent activator of NF-kappaB and inducer of apoptosis in response to various stimuli.
RUNX1	runt-related transcription factor 1	This protein is thought to be involved in the development of normal hematopoiesis.
SART1	squamous cell carcinoma antigen recognized by T cells	This gene encodes two proteins, the SART1(800) protein expressed in the nucleus of the majority of proliferating cells, and the SART1(259) protein expressed in the cytosol of epithelial cancers, both thought to be involved in the regulation of proliferation.
SHC1	SHC (Src homology 2 domain containing) transforming protein 1	
SOX4	SRY (sex determining region Y)-box 4	This protein may function in the apoptosis pathway leading to cell death as well as to tumorigenesis and may mediate downstream effects of PTH and PTHrP in bone development.
SP3	Sp3 transcription factor	This protein contains a zinc finger DNA-binding domain and several transactivation domains, and has been reported to function as a bifunctional transcription factor that either stimulates or represses the transcription of numerous genes.
SRF	serum response factor (c-fos serum response element-binding transcription factor)	This protein stimulates both cell proliferation and differentiation. It participates in cell cycle regulation, apoptosis, cell growth, and cell differentiation.
STAT1	signal transducer and activator of transcription 1, 91kDa	This protein mediates the expression of a variety of genes, which is thought to be important for cell viability in response to different cell stimuli and pathogens.
STAT3	signal transducer and activator of transcription 3 (acute-phase response factor)	This protein mediates the expression of a variety of genes in response to cell stimuli, and thus plays a key role in many cellular processes such as cell growth and apoptosis.
STAT6	signal transducer and activator of transcription 6, interleukin-4 induced	This protein plays a central role in exerting IL4 mediated biological responses. It is found to induce the expression of BCL2L1/BCL-X(L), which is responsible for the anti-apoptotic activity of IL4. It also plays a role in differentiation of T helper 2 (Th2) cells, expression of cell surface markers, and class switch of immunoglobulins.
STAT5B	signal transducer and activator of transcription 5B	This protein mediates the signal transduction triggered by various cell ligands, such as IL2, IL4, CSF1, and different growth hormones. It is involved in TCR signaling, apoptosis, adult mammary gland development, and sexual dimorphism of liver gene expression.
SYK	spleen tyrosine kinase	
TGFBR2	transforming growth factor, beta receptor II (70/80kDa)	This receptor regulates the transcription of a subset of genes related to cell proliferation.
THOC5	THO complex 5	

	TP53	tumor protein p53	This gene encodes tumor protein p53, which responds to diverse cellular stresses to regulate target genes that induce cell cycle arrest, apoptosis, senescence, DNA repair, or changes in metabolism.
	TSC2	tuberous sclerosis 2	This protein is a tumor suppressor and is able to stimulate specific GTPases.
	TWSG1	twisted gastrulation homolog 1 (Drosophila)	
	XRCC5	X-ray repair complementing defective repair in Chinese hamster cells 5 (double-strand-break rejoining)	This gene functionally complements Chinese hamster xrs-6, a mutant defective in DNA double-strand break repair and in ability to undergo V(D)J recombination.
Hematological System Development and Function, Hematopoiesis: Differentiation of Lymphocytes (7.32E-04), Differentiation of T Lymphocytes (1.24E-04)	AKT1	v-akt murine thymoma viral oncogene homolog 1	In the developing nervous system AKT is a critical mediator of growth factor-induced neuronal survival. Survival factors can suppress apoptosis.
	AP3B1	adaptor-related protein complex 3, beta 1 subunit	This gene encodes a protein that may play a role in organelle biogenesis associated with melanosomes, platelet dense granules, and lysosomes.
	AP3D1	adaptor-related protein complex 3, delta 1 subunit	The AP3D1 subunit is implicated in intracellular biogenesis and trafficking of pigment granules and platelet dense granules and neurotransmitter vesicles.
	APAF1	apoptotic peptidase activating factor 1	This gene encodes a cytoplasmic protein that initiates apoptosis.
	BSG	basigin (Ok blood group)	This protein is a plasma membrane protein that is important in spermatogenesis, embryo implantation, neural network formation, and tumor progression.
	CCL3	chemokine (C-C motif) ligand 3	Macrophage inflammatory protein-1 is a so-called monokine that is involved in the acute inflammatory state in the recruitment and activation of polymorphonuclear leukocytes.
	CDKN2A	cyclin-dependent kinase inhibitor 2A (melanoma, p16, inhibits CDK4)	This ARF product functions as a stabilizer of the tumor suppressor protein p53 as it can interact with, and sequester, MDM1, a protein responsible for the degradation of p53. It has a common functionality in cell cycle G1 control.
	DCLRE1C	DNA cross-link repair 1C (PSO2 homolog, S. cerevisiae)	This nuclear protein is involved in V(D)J recombination and DNA repair.
	DICER1	dicer 1, ribonuclease type III	This ribonuclease is required by the RNA interference and small temporal RNA pathways to produce the active small RNA component that represses gene expression.
	EGR1	early growth response 1	This protein is a transcriptional regulator required for differentitation and mitogenesis.

FAS	Fas (TNF receptor superfamily, member 6)	This protein has been shown to play a central role in the physiological regulation of programmed cell death, and has been implicated in the pathogenesis of various malignancies and diseases of the immune system. This receptor is found to be involved in transducing the proliferating signals in normal diploid fibroblast and T cells.
FOS	v-fos FBJ murine osteosarcoma viral oncogene homolog	The FOS proteins have been implicated as regulators of cell proliferation, differentiation, transformation, and apoptotic cell death.
GRB2	growth factor receptor-bound protein 2	The protein may be involved in the signal transduction pathway.
HDAC5	histone deacetylase 5	This protein possesses histone deacetylase activity and represses transcription when tethered to a promoter.
HDAC7	histone deacetylase 7	This gene is orthologous to mouse HDAC7 gene whose protein promotes repression mediated via the transcriptional corepressor SMRT.
HSP90AA1	heat shock protein 90kDa alpha (cytosolic), class A member 1	HSP90 proteins are molecular chaperones that have key roles in signal transduction, protein folding, protein degradation, and morphologic evolution.
HSP90B1	heat shock protein 90kDa beta (Grp94), member 1	HSP90 proteins play roles in folding newly synthesized proteins or stabilizing and refolding denatured proteins after stress.
HSPD1	heat shock 60kDa protein 1 (chaperonin)	This protein may function as a signaling molecule in the innate immune system. It is essential for the folding and assembly of newly imported proteins in the mitochondria.
ICAM1	intercellular adhesion molecule 1	This gene encodes a cell surface glycoprotein which is typically expressed on endothelial cells and cells of the immune system.
ICOSLG	inducible T-cell co-stimulator ligand	
IGF2	insulin-like growth factor 2 (somatomedin A)	This gene encodes a member of the insulin family of polypeptide growth factors that is involved in development and growth.
IGF2R	insulin-like growth factor 2 receptor	This receptor functions in the intracellular trafficking of lysosomal enzymes, the activation of transforming growth factor beta, and the degradation of IGF2.
IL2RG	interleukin 2 receptor, gamma (severe combined immunodeficiency)	The interleukin 2 (IL2) receptor gamma chain (IL2RG), an important signalling component of many interleukin receptors (IL2,IL4,IL7,IL9, and IL15).
IL4R	interleukin 4 receptor	This protein can bind interleukin 4 to promote differentiation of Th2 cells, can be produced by an alternate splice variant or by proteolysis of the membrane-bound protein, and can inhibit IL4-mediated cell proliferation and IL5 upregulation by T-cells.
IL7R	interleukin 7 receptor	This protein has been shown to play a critical role in the V(D)J recombination during lymphocyte development, and to control the accessibility of the TCR gamma locus by STAT5 and histone acetylation.
IRF1	interferon regulatory factor 1	IRF1 is a transcription activator of genes induced by interferons alpha, beta, and gamma. It also plays roles in regulating apoptosis and tumor-suppressoion.
IRF2	interferon regulatory factor 2	IRF2 competitively inhibits the IRF1-mediated transcriptional activation of interferons alpha and beta, and presumably other genes that employ IRF1 for transcription activation. However, IRF2 also functions as a transcriptional activator of histone H4.
ITGB2	integrin, beta 2 (complement component 3 receptor 3 and 4 subunit)	Integrins are known to participate in cell adhesion as well as cell-surface mediated signalling.

JMJD6	jumonji domain containing 6	JmjC domain-containing proteins are predicted to function as protein hydroxylases or histone demethylases.
LAMP1	lysosomal-associated membrane protein 1	This glycoprotein provides selectins with carbohydrate ligands, and may play a role in tumor cell metastasis.
MAPK14	mitogen-activated protein kinase 14	This kinase may be involved in stress related transcription and cell cycle regulation, as well as in genotoxic stress response.
MLLT10	myeloid/lymphoid or mixed-lineage leukemia (trithorax homolog, Drosophila); translocated to, 10	
NCAPH2	non-SMC condensin II complex, subunit H2	Condensin complexes I and II play essential roles in mitotic chromosome assembly and segregation.
NFKB1	nuclear factor of kappa light polypeptide gene enhancer in B-cells 1	NFKB is a transcription regulator that is activated by various intra- and extra-cellular stimuli such as cytokines, oxidant-free radicals, ultraviolet irradiation, and bacterial or viral products.
NP	nucleoside phosphorylase	This protein is an enzyme which reversibly catalyzes the phosphorolysis of purine nucleosides.
PDPK1	3-phosphoinositide dependent protein kinase-1	
PICALM	phosphatidylinositol binding clathrin assembly protein	
PIK3R1	phosphoinositide-3-kinase, regulatory subunit 1 (alpha)	Phosphatidylinositol 3-kinase plays an important role in the metabolic actions of insulin.
PRKCQ	protein kinase C, theta	This protein is one of the PKC family members important for T-cell activation, and may link the T cell receptor (TCR) signaling complex to the activation of the transcription factors.
PTPN6	protein tyrosine phosphatase, non-receptor type 6	This protein is expressed primarily in hematopoietic cells, and functions as an important regulator of multiple signaling pathways in hematopoietic cells. It dephosphorylates a wide spectrum of phospho-proteins involved in hematopoietic cell signaling.
RBM15	RNA binding motif protein 15	Members of the SPEN (Split-end) family of proteins, including RBM15, have repressor function in several signaling pathways and may bind to RNA through interaction with spliceosome components.
RHOH	ras homolog gene family, member H	This protein is transcribed only in hemopoietic cells.
RIPK2	receptor-interacting serine-threonine kinase 2	This protein is a component of signaling complexes in both the innate and adaptive immune pathways, and is a potent activator of NF-kappaB and inducer of apoptosis in response to various stimuli.
RUNX1	runt-related transcription factor 1	This protein is thought to be involved in the development of normal hematopoiesis.
SART1	squamous cell carcinoma antigen recognized by T cells	This gene encodes two proteins, the SART1(800) protein expressed in the nucleus of the majority of proliferating cells, and the SART1(259) protein expressed in the cytosol of epithelial cancers, both thought to be involved in the regulation of proliferation.

	SOX4	SRY (sex determining region Y)-box 4	This protein may function in the apoptosis pathway leading to cell death as well as to tumorigenesis and may mediate downstream effects of PTH and PTHrP in bone development.
	SP3	Sp3 transcription factor	This protein contains a zinc finger DNA-binding domain and several transactivation domains, and has been reported to function as a bifunctional transcription factor that either stimulates or represses the transcription of numerous genes.
	STAT1	signal transducer and activator of transcription 1, 91kDa	This protein mediates the expression of a variety of genes, which is thought to be important for cell viability in response to different cell stimuli and pathogens.
	STAT6	signal transducer and activator of transcription 6, interleukin-4 induced	This protein plays a central role in exerting IL4 mediated biological responses. It is found to induce the expression of BCL2L1/BCL-X(L), which is responsible for the anti-apoptotic activity of IL4. It also plays a role in differentiation of T helper 2 (Th2) cells, expression of cell surface markers, and class switch of immunoglobulins.
	STAT5B	signal transducer and activator of transcription 5B	This protein mediates the signal transduction triggered by various cell ligands, such as IL2, IL4, CSF1, and different growth hormones. It is involved in TCR signaling, apoptosis, adult mammary gland development, and sexual dimorphism of liver gene expression.
	SYK	spleen tyrosine kinase	
	TGFBR2	transforming growth factor, beta receptor II (70/80kDa)	This receptor regulates the transcription of a subset of genes related to cell proliferation.
	TP53	tumor protein p53	This gene encodes tumor protein p53, which responds to diverse cellular stresses to regulate target genes that induce cell cycle arrest, apoptosis, senescence, DNA repair, or changes in metabolism.
	TWSG1	twisted gastrulation homolog 1 (Drosophila)	
	XRCC5	X-ray repair complementing defective repair in Chinese hamster cells 5 (double-strand-break rejoining)	This gene functionally complements Chinese hamster xrs-6, a mutant defective in DNA double-strand break repair and in ability to undergo V(D)J recombination.
Hematological System Development and Function: Development: Development of Blood Cells (2.01E-04)	ADAM17	ADAM metallopeptidase domain 17	This protein functions as a tumor necrosis factor-alpha converting enzyme; binds mitotic arrest deficient 2 protein, and also plays a prominent role in the activation of the Notch signaling pathway.
	ADAR	adenosine deaminase, RNA-specific	This gene encodes the enzyme responsible for RNA editing by site-specific deamination of adenosines.
	AKT1	v-akt murine thymoma viral oncogene homolog 1	In the developing nervous system AKT is a critical mediator of growth factor-induced neuronal survival. Survival factors can suppress apoptosis.
	AKT2	v-akt murine thymoma viral oncogene homolog 2	This gene is a putative oncogene encoding a subfamily of serine/threonine kinases containing SH2-like (Src homology 2-like) domains.The encoded protein is a general protein kinase capable of phophorylating several known proteins.

B2M	beta-2-microglobulin	Beta-2-microglobulin is a serum protein found in association with the major histocompatibility complex (MHC) class I heavy chain on the surface of nearly all nucleated cells.
BAX	BCL2-associated X protein	This protein forms a heterodimer with BCL2, and functions as an apoptotic activator.
CCND1	cyclin D1	This cyclin is required for cell cycle G1/S transition. It interacts with tumor suppressor protein Rb and the expression of this gene is regulated positively by Rb.
CD69	CD69 molecule	Expression of this protein is induced upon activation of T lymphocytes, and may play a role in proliferation. It may act to transmit signals in natural killer cells and platelets.
CD81	CD81 molecule	This protein appears to promote muscle cell fusion and support myotube maintenance, and may be involved in signal transduction.
CD83	CD83 molecule	
CDC2L5	cell division cycle 2-like 5 (cholinesterase-related cell division controller)	The proteins of this family are well known for their essential roles as master switches in cell cycle control. They may also be involved in neurocytoskeleton dynamics. The exact function of this protein has not yet been determined.
CHD4	chromodomain helicase DNA binding protein 4	This protein is the main component of the nucleosome remodeling and deacetylase complex and plays an important role in epigenetic transcriptional repression.
CREB1	cAMP responsive element binding protein 1	This protein induces transcription of genes in response to hormonal stimulation of the cAMP pathway.
CXCR4	chemokine (C-X-C motif) receptor 4	This protein acts with the CD4 protein to support HIV entry into cells and is also highly expressed in breast cancer cells.
DICER1	dicer 1, ribonuclease type III	This ribonuclease is required by the RNA interference and small temporal RNA pathways to produce the active small RNA component that represses gene expression.
EGFR	epidermal growth factor receptor (erythroblastic leukemia viral (v-erb-b) oncogene homolog, avian)	Binding of this receptor to a ligand induces dimerization and tyrosine autophosphorylation and leads to cell proliferation.
EGR1	early growth response 1	This protein is a transcriptional regulator required for differentitation and mitogenesis.
FADD	Fas (TNFRSF6)-associated via death domain	The protein encoded by this gene is an adaptor molecule that interacts with various cell surface receptors and mediates cell apoptotic signals.
FCGR2A	Fc fragment of IgG, low affinity IIa, receptor (CD32)	This protein is a cell surface receptor found on phagocytic cells such as macrophages and neutrophils, and is involved in the process of phagocytosis and clearing of immune complexes.
FOS	v-fos FBJ murine osteosarcoma viral oncogene homolog	The FOS proteins have been implicated as regulators of cell proliferation, differentiation, transformation, and apoptotic cell death.
FUS	fusion (involved in t(12;16) in malignant liposarcoma)	
ICAM1	intercellular adhesion molecule 1	This gene encodes a cell surface glycoprotein which is typically expressed on endothelial cells and cells of the immune system.

ICOSLG	inducible T-cell co-stimulator ligand	
IFNGR1	interferon gamma receptor 1	This gene encodes the ligand-binding chain (alpha) of the gamma interferon receptor.
IL2RG	interleukin 2 receptor, gamma (severe combined immunodeficiency)	The interleukin 2 (IL2) receptor gamma chain (IL2RG), an important signalling component of many interleukin receptors (IL2,IL4,IL7,IL9, and IL15).
IL4R	interleukin 4 receptor	This protein can bind interleukin 4 to promote differentiation of Th2 cells, can be produced by an alternate splice variant or by proteolysis of the membrane-bound protein, and can inhibit IL4-mediated cell proliferation and IL5 upregulation by T-cells.
IL6R	interleukin 6 receptor	Interleukin 6 (IL6) is a potent pleiotropic cytokine that regulates cell growth and differentiation and plays an important role in immune response.
IL7R	interleukin 7 receptor	This protein has been shown to play a critical role in the V(D)J recombination during lymphocyte development, and to control the accessibility of the TCR gamma locus by STAT5 and histone acetylation.
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IRF2	interferon regulatory factor 2	IRF2 competitively inhibits the IRF1-mediated transcriptional activation of interferons alpha and beta, and presumably other genes that employ IRF1 for transcription activation. However, IRF2 also functions as a transcriptional activator of histone H4.
ITGB2	integrin, beta 2 (complement component 3 receptor 3 and 4 subunit)	Integrins are known to participate in cell adhesion as well as cell-surface mediated signalling.
JAK1	Janus kinase 1	JAK1 is involved in the interferon-alpha/beta and -gamma signal transduction pathways. These kinases couple cytokine ligand binding to tyrosine phosphorylation of various known signaling proteins and of a unique family of transcription factors termed the signal transducers and activators of transcription, or STATs.
JMJD6	jumonji domain containing 6	JmjC domain-containing proteins are predicted to function as protein hydroxylases or histone demethylases.
LYN	v-yes-1 Yamaguchi sarcoma viral related oncogene homolog	
MAFB	v-maf musculoaponeurotic fibrosarcoma oncogene homolog B (avian)	This protein plays an important role in the regulation of lineage-specific hematopoiesis. It represses ETS1-mediated transcription of erythroid-specific genes in myeloid cells.
MAP3K7	mitogen-activated protein kinase kinase kinase 7	This kinase mediates the signaling transduction induced by TGF beta and morphogenetic protein (BMP), and controls a variety of cell functions including transcription regulation and apoptosis.This kinase can play a role in the cell response to environmental stresses.
NBN	nibrin	This gene product is thought to be involved in DNA double-strand break repair and DNA damage-induced checkpoint activation.
NFKB1	nuclear factor of kappa light polypeptide gene enhancer in B-cells 1	NFKB is a transcription regulator that is activated by various intra- and extra-cellular stimuli such as cytokines, oxidant-free radicals, ultraviolet irradiation, and bacterial or viral products.

NFKB2	nuclear factor of kappa light polypeptide gene enhancer in B-cells 2 (p49/p100)	NFKB has been detected in numerous cell types that express cytokines, chemokines, growth factors, cell adhesion molecules, and some acute phase proteins in health and in various disease states. NFKB is activated by a wide variety of stimuli.
NFYA	nuclear transcription factor Y, alpha	This protein is one subunit of a trimeric complex, forming a highly conserved transcription factor that binds to CCAAT motifs in the promoter regions in a variety of genes.
NOTCH3	Notch homolog 3 (Drosophila)	Notch interaction with its cell-bound ligands (delta, serrate) establishes an intercellular signalling pathway that plays a key role in neural development.
PIK3R1	phosphoinositide-3-kinase, regulatory subunit 1 (alpha)	Phosphatidylinositol 3-kinase plays an important role in the metabolic actions of insulin.
PRKCQ	protein kinase C, theta	This protein is one of the PKC family members important for T-cell activation, and may link the T cell receptor (TCR) signaling complex to the activation of the transcription factors.
PRNP	prion protein	This protein is a membrane glycosylphosphatidylinositol-anchored glycoprotein that tends to aggregate into rod-like structures.
PTPN2	protein tyrosine phosphatase, non-receptor type 2	This protein regulates a variety of cellular processes including cell growth, differentiation, mitotic cycle, and oncogenic transformation.
RALBP1	ralA binding protein 1	
RUNX1	runt-related transcription factor 1	This protein is thought to be involved in the development of normal hematopoiesis.
SMARCA5	SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily a, member 5	This protein is a component of the chromatin remodeling and spacing factor RSF, a facilitator of the transcription of class II genes by RNA polymerase II.
SOD1	superoxide dismutase 1, soluble	This protein binds copper and zinc ions and is one of two isozymes responsible for destroying free superoxide radicals in the body.
SRF	serum response factor (c-fos serum response element-binding transcription factor)	This protein stimulates both cell proliferation and differentiation. It participates in cell cycle regulation, apoptosis, cell growth, and cell differentiation.
STAT1	signal transducer and activator of transcription 1, 91kDa	This protein mediates the expression of a variety of genes, which is thought to be important for cell viability in response to different cell stimuli and pathogens.
STAT3	signal transducer and activator of transcription 3 (acute-phase response factor)	This protein mediates the expression of a variety of genes in response to cell stimuli, and thus plays a key role in many cellular processes such as cell growth and apoptosis.
STAT6	signal transducer and activator of transcription 6, interleukin-4 induced	This protein plays a central role in exerting IL4 mediated biological responses. It is found to induce the expression of BCL2L1/BCL-X(L), which is responsible for the anti-apoptotic activity of IL4. It also plays a role in differentiation of T helper 2 (Th2) cells, expression of cell surface markers, and class switch of immunoglobulins.

	SYK	spleen tyrosine kinase	
	TAPBP	TAP binding protein (tapasin)	This glycoprotein which mediates interaction between newly assembled major histocompatibility complex (MHC) class I molecules and the transporter associated with antigen processing (TAP), which is required for the transport of antigenic peptides across the endoplasmic reticulum membrane.
	TGFBR2	transforming growth factor, beta receptor II (70/80kDa)	This receptor regulates the transcription of a subset of genes related to cell proliferation.
	THBS1	thrombospondin 1	This protein is an adhesive glycoprotein that mediates cell-to-cell and cell-to-matrix interactions. It plays roles in platelet aggregation, angiogenesis, and tumorigenesis.
	TP53	tumor protein p53	This gene encodes tumor protein p53, which responds to diverse cellular stresses to regulate target genes that induce cell cycle arrest, apoptosis, senescence, DNA repair, or changes in metabolism.
	UBE2N	ubiquitin-conjugating enzyme E2N (UBC13 homolog, yeast)	The modification of proteins with ubiquitin is an important cellular mechanism for targeting abnormal or short-lived proteins for degradation.
	VAV3	vav 3 guanine nucleotide exchange factor	This protein associates maximally with the nucleotide-free states of these GTPases.
	XRCC5	X-ray repair complementing defective repair in Chinese hamster cells 5 (double-strand-break rejoining)	This gene functionally complements Chinese hamster xrs-6, a mutant defective in DNA double-strand break repair and in ability to undergo V(D)J recombination.
Hematological System Development and Function, Hematopoiesis: Development: Development of Leukocytes (6.32E-04)	ADAM17	ADAM metallopeptidase domain 17	This protein functions as a tumor necrosis factor-alpha converting enzyme; binds mitotic arrest deficient 2 protein, and also plays a prominent role in the activation of the Notch signaling pathway.
	ADAR	adenosine deaminase, RNA-specific	This gene encodes the enzyme responsible for RNA editing by site-specific deamination of adenosines.
	AKT1	v-akt murine thymoma viral oncogene homolog 1	In the developing nervous system AKT is a critical mediator of growth factor-induced neuronal survival. Survival factors can suppress apoptosis.
	AKT2	v-akt murine thymoma viral oncogene homolog 2	This gene is a putative oncogene encoding a subfamily of serine/threonine kinases containing SH2-like (Src homology 2-like) domains.The encoded protein is a general protein kinase capable of phophorylating several known proteins.
	B2M	beta-2-microglobulin	Beta-2-microglobulin is a serum protein found in association with the major histocompatibility complex (MHC) class I heavy chain on the surface of nearly all nucleated cells.
	BAX	BCL2-associated X protein	This protein forms a heterodimer with BCL2, and functions as an apoptotic activator.

CCND1	cyclin D1	This cyclin is required for cell cycle G1/S transition. It interacts with tumor suppressor protein Rb and the expression of this gene is regulated positively by Rb.
CD69	CD69 molecule	Expression of this protein is induced upon activation of T lymphocytes, and may play a role in proliferation. It may act to transmit signals in natural killer cells and platelets.
CD81	CD81 molecule	This protein appears to promote muscle cell fusion and support myotube maintenance, and may be involved in signal transduction.
CD83	CD83 molecule	
CHD4	chromodomain helicase DNA binding protein 4	This protein is the main component of the nucleosome remodeling and deacetylase complex and plays an important role in epigenetic transcriptional repression.
CREB1	cAMP responsive element binding protein 1	This protein induces transcription of genes in response to hormonal stimulation of the cAMP pathway.
CXCR4	chemokine (C-X-C motif) receptor 4	This protein acts with the CD4 protein to support HIV entry into cells and is also highly expressed in breast cancer cells.
DICER1	dicer 1, ribonuclease type III	This ribonuclease is required by the RNA interference and small temporal RNA pathways to produce the active small RNA component that represses gene expression.
EGR1	early growth response 1	This protein is a transcriptional regulator required for differentitation and mitogenesis.
FADD	Fas (TNFRSF6)-associated via death domain	The protein encoded by this gene is an adaptor molecule that interacts with various cell surface receptors and mediates cell apoptotic signals.
FCGR2A	Fc fragment of IgG, low affinity IIa, receptor (CD32)	This protein is a cell surface receptor found on phagocytic cells such as macrophages and neutrophils, and is involved in the process of phagocytosis and clearing of immune complexes.
FOS	v-fos FBJ murine osteosarcoma viral oncogene homolog	The FOS proteins have been implicated as regulators of cell proliferation, differentiation, transformation, and apoptotic cell death.
FUS	fusion (involved in t(12;16) in malignant liposarcoma)	
ICAM1	intercellular adhesion molecule 1	This gene encodes a cell surface glycoprotein which is typically expressed on endothelial cells and cells of the immune system.
ICOSLG	inducible T-cell co-stimulator ligand	
IFNGR1	interferon gamma receptor 1	This gene encodes the ligand-binding chain (alpha) of the gamma interferon receptor.
IL2RG	interleukin 2 receptor, gamma (severe combined immunodeficiency)	The interleukin 2 (IL2) receptor gamma chain (IL2RG), an important signalling component of many interleukin receptors (IL2,IL4,IL7,IL9, and IL15).
IL4R	interleukin 4 receptor	This protein can bind interleukin 4 to promote differentiation of Th2 cells, can be produced by an alternate splice variant or by proteolysis of the membrane-bound protein, and can inhibit IL4-mediated cell proliferation and IL5 upregulation by T-cells.
IL7R	interleukin 7 receptor	This protein has been shown to play a critical role in the V(D)J recombination during lymphocyte development, and to control the accessibility of the TCR gamma locus by STAT5 and histone acetylation.

IRF1	interferon regulatory factor 1	IRF1 is a transcription activator of genes induced by interferons alpha, beta, and gamma. It also plays roles in regulating apoptosis and tumor-suppressoion.
IRF2	interferon regulatory factor 2	IRF2 competitively inhibits the IRF1-mediated transcriptional activation of interferons alpha and beta, and presumably other genes that employ IRF1 for transcription activation. However, IRF2 also functions as a transcriptional activator of histone H4.
ITGB2	integrin, beta 2 (complement component 3 receptor 3 and 4 subunit)	Integrins are known to participate in cell adhesion as well as cell-surface mediated signalling.
JAK1	Janus kinase 1	JAK1 is involved in the interferon-alpha/beta and -gamma signal transduction pathways. These kinases couple cytokine ligand binding to tyrosine phosphorylation of various known signaling proteins and of a unique family of transcription factors termed the signal transducers and activators of transcription, or STATs.
LYN	v-yes-1 Yamaguchi sarcoma viral related oncogene homolog	
MAFB	v-maf musculoaponeurotic fibrosarcoma oncogene homolog B (avian)	This protein plays an important role in the regulation of lineage-specific hematopoiesis. It represses ETS1-mediated transcription of erythroid-specific genes in myeloid cells.
MAP3K7	mitogen-activated protein kinase kinase kinase 7	This kinase mediates the signaling transduction induced by TGF beta and morphogenetic protein (BMP), and controls a variety of cell functions including transcription regulation and apoptosis.This kinase can play a role in the cell response to environmental stresses.
NBN	nibrin	This gene product is thought to be involved in DNA double-strand break repair and DNA damage-induced checkpoint activation.
NFKB1	nuclear factor of kappa light polypeptide gene enhancer in B-cells 1	NFKB is a transcription regulator that is activated by various intra- and extra-cellular stimuli such as cytokines, oxidant-free radicals, ultraviolet irradiation, and bacterial or viral products.
NFKB2	nuclear factor of kappa light polypeptide gene enhancer in B-cells 2 (p49/p100)	NFKB has been detected in numerous cell types that express cytokines, chemokines, growth factors, cell adhesion molecules, and some acute phase proteins in health and in various disease states. NFKB is activated by a wide variety of stimuli.
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PTPN2	protein tyrosine phosphatase, non-receptor type 2	This protein regulates a variety of cellular processes including cell growth, differentiation, mitotic cycle, and oncogenic transformation.
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Hematological System Development and Function, Hematopoiesis: Development: Development of Lymphocytes (6.83E-04), Development of T Lymphocytes (6.83E-04)	ADAM17	ADAM metallopeptidase domain 17	This protein functions as a tumor necrosis factor-alpha converting enzyme; binds mitotic arrest deficient 2 protein, and also plays a prominent role in the activation of the Notch signaling pathway.
	AKT1	v-akt murine thymoma viral oncogene homolog 1	In the developing nervous system AKT is a critical mediator of growth factor-induced neuronal survival. Survival factors can suppress apoptosis.
	AKT2	v-akt murine thymoma viral oncogene homolog 2	This gene is a putative oncogene encoding a subfamily of serine/threonine kinases containing SH2-like (Src homology 2-like) domains.The encoded protein is a general protein kinase capable of phophorylating several known proteins.
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	CHD4	chromodomain helicase DNA binding protein 4	This protein is the main component of the nucleosome remodeling and deacetylase complex and plays an important role in epigenetic transcriptional repression.
	CREB1	cAMP responsive element binding protein 1	This protein induces transcription of genes in response to hormonal stimulation of the cAMP pathway.
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	FADD	Fas (TNFRSF6)-associated via death domain	The protein encoded by this gene is an adaptor molecule that interacts with various cell surface receptors and mediates cell apoptotic signals.

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MAP3K7	mitogen-activated protein kinase kinase kinase 7	This kinase mediates the signaling transduction induced by TGF beta and morphogenetic protein (BMP), and controls a variety of cell functions including transcription regulation and apoptosis.This kinase can play a role in the cell response to environmental stresses.
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NFKB1	nuclear factor of kappa light polypeptide gene enhancer in B-cells 1	NFKB is a transcription regulator that is activated by various intra- and extra-cellular stimuli such as cytokines, oxidant-free radicals, ultraviolet irradiation, and bacterial or viral products.

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TGFBR2	transforming growth factor, beta receptor II (70/80kDa)	This receptor regulates the transcription of a subset of genes related to cell proliferation.
TP53	tumor protein p53	This gene encodes tumor protein p53, which responds to diverse cellular stresses to regulate target genes that induce cell cycle arrest, apoptosis, senescence, DNA repair, or changes in metabolism.
UBE2N	ubiquitin-conjugating enzyme E2N (UBC13 homolog, yeast)	The modification of proteins with ubiquitin is an important cellular mechanism for targeting abnormal or short-lived proteins for degradation.

	VAV3	vav 3 guanine nucleotide exchange factor	This protein associates maximally with the nucleotide-free states of these GTPases.
	XRCC5	X-ray repair complementing defective repair in Chinese hamster cells 5 (double-strand-break rejoining)	This gene functionally complements Chinese hamster xrs-6, a mutant defective in DNA double-strand break repair and in ability to undergo V(D)J recombination.
Hematological System Development and Function: Proliferation: Proliferation of Leukocytes (7.07E-04), Proliferation of Mononuclear Leukocytes (6.37E-04)	ACPP	acid phosphatase, prostate	This gene encodes an enzyme that catalyzes the conversion of orthophosphoric monoester to alcohol and orthophosphate.
	AKAP13	A kinase (PRKA) anchor protein 13	This protein family is a group of structurally diverse proteins, which have the common function of binding to the regulatory subunit of protein kinase A (PKA) and confining the holoenzyme to discrete locations within the cell.
	AKT1	v-akt murine thymoma viral oncogene homolog 1	In the developing nervous system AKT is a critical mediator of growth factor-induced neuronal survival. Survival factors can suppress apoptosis.
	BAX	BCL2-associated X protein	This protein forms a heterodimer with BCL2, and functions as an apoptotic activator.
	BRAF	v-raf murine sarcoma viral oncogene homolog B1	This protein plays a role in regulating the MAP kinase/ERKs signaling pathway, which affects cell division, differentiation, and secretion.
	BSG	basigin (Ok blood group)	This protein is a plasma membrane protein that is important in spermatogenesis, embryo implantation, neural network formation, and tumor progression.
	CCL4	chemokine (C-C motif) ligand 4	
	CD44	CD44 molecule (Indian blood group)	This protein participates in a wide variety of cellular functions including lymphocyte activation, recirculation and homing, hematopoiesis, and tumor metastasis.
	CD58	CD58 molecule	This protein functions in adhesion and activation of T lymphocytes.
	CD81	CD81 molecule	This protein appears to promote muscle cell fusion and support myotube maintenance, and may be involved in signal transduction.
	CD83	CD83 molecule	
	CDKN1A	cyclin-dependent kinase inhibitor 1A (p21, Cip1)	This protein functions as a regulator of cell cycle progression at G1. It also plays a regulatory role in S phase DNA replication and DNA damage repair, and may be instrumental in the execution of apoptosis following caspase activation.

CDKN2A	cyclin-dependent kinase inhibitor 2A (melanoma, p16, inhibits CDK4)	This ARF product functions as a stabilizer of the tumor suppressor protein p53 as it can interact with, and sequester, MDM1, a protein responsible for the degradation of p53. It has a common functionality in cell cycle G1 control.
CDKN2B	cyclin-dependent kinase inhibitor 2B (p15, inhibits CDK4)	This cyclin-dependent kinase functions as a cell growth regulator that controls cell cycle G1 progression.
CEACAM1	carcinoembryonic antigen-related cell adhesion molecule 1 (biliary glycoprotein)	Multiple cellular activities have been attributed to this protein, including roles in the differentiation and arrangement of tissue three-dimensional structure, angiogenesis, apoptosis, tumor suppression, metastasis, and the modulation of innate and adaptive immune responses.
CEBPB	CCAAT/enhancer binding protein (C/EBP), beta	This protein is important in the regulation of genes involved in immune and inflammatory responses. It can also bind the promoter and upstream element and stimulate the expression of the collagen type I gene.
CFLAR	CASP8 and FADD-like apoptosis regulator	
CXCR4	chemokine (C-X-C motif) receptor 4	This protein acts with the CD4 protein to support HIV entry into cells and is also highly expressed in breast cancer cells.
CYLD	cylindromatosis (turban tumor syndrome)	This protein functions as a deubiquitinating enzyme.
DICER1	dicer 1, ribonuclease type III	This ribonuclease is required by the RNA interference and small temporal RNA pathways to produce the active small RNA component that represses gene expression.
DLG1	discs, large homolog 1 (Drosophila)	
DUSP10	dual specificity phosphatase 10	This protein binds to and inactivates p38 and SAPK/JNK, but not MAPK/ERK. It is widely expressed in various tissues and organs, and its expression is elevated by stress stimuli.
EGR1	early growth response 1	This protein is a transcriptional regulator required for differentitation and mitogenesis.
EIF2AK2	eukaryotic translation initiation factor 2-alpha kinase 2	
FADD	Fas (TNFRSF6)-associated via death domain	The protein encoded by this gene is an adaptor molecule that interacts with various cell surface receptors and mediates cell apoptotic signals.
FAS	Fas (TNF receptor superfamily, member 6)	This protein has been shown to play a central role in the physiological regulation of programmed cell death, and has been implicated in the pathogenesis of various malignancies and diseases of the immune system. This receptor is found to be involved in transducing the proliferating signals in normal diploid fibroblast and T cells.
FUS	fusion (involved in t(12;16) in malignant liposarcoma)	
GABPB2	GA binding protein transcription factor, beta subunit 2	

GCNT1	glucosaminyl (N-acetyl) transferase 1, core 2 (beta-1,6-N-acetylglucosaminyltransferase)	This protein is essential to the formation of Gal beta 1-3(GlcNAc beta 1-6)GalNAc structures and the core 2 O-glycan branch.
GSTP1	glutathione S-transferase pi 1	This GST family member functions in xenobiotic metabolism and play a role in susceptibility to cancer, and other diseases.
HLA-E	major histocompatibility complex, class I, E	HLA-E belongs to the HLA class I heavy chain paralogues. HLA-E binds a restricted subset of peptides derived from the leader peptides of other class I molecules.
HNRNPA2B1	heterogeneous nuclear ribonucleoprotein A2/B1	These proteins are associated with pre-mRNAs in the nucleus and appear to influence pre-mRNA processing and other aspects of mRNA metabolism and transport.
HRH1	histamine receptor H1	This protein mediates the contraction of smooth muscles, the increase in capillary permeability due to contraction of terminal venules, the release of catecholamine from adrenal medulla, and neurotransmission in the central nervous system.
HSP90B1	heat shock protein 90kDa beta (Grp94), member 1	HSP90 proteins play roles in folding newly synthesized proteins or stabilizing and refolding denatured proteins after stress.
HSPD1	heat shock 60kDa protein 1 (chaperonin)	This protein may function as a signaling molecule in the innate immune system. It is essential for the folding and assembly of newly imported proteins in the mitochondria.
ICAM1	intercellular adhesion molecule 1	This gene encodes a cell surface glycoprotein which is typically expressed on endothelial cells and cells of the immune system.
ICOSLG	inducible T-cell co-stimulator ligand	
IFNAR1	interferon (alpha, beta and omega) receptor 1	Binding and activation of this receptor stimulates Janus protein kinases, it also functions as an antiviral factor.
IFNGR1	interferon gamma receptor 1	This gene encodes the ligand-binding chain (alpha) of the gamma interferon receptor.
IKZF2	IKAROS family zinc finger 2 (Helios)	This protein is thought to function predominantly in early hematopoietic development.
IL2RG	interleukin 2 receptor, gamma (severe combined immunodeficiency)	The interleukin 2 (IL2) receptor gamma chain (IL2RG), an important signalling component of many interleukin receptors (IL2,IL4,IL7,IL9, and IL15).
IL4R	interleukin 4 receptor	This protein can bind interleukin 4 to promote differentiation of Th2 cells, can be produced by an alternate splice variant or by proteolysis of the membrane-bound protein, and can inhibit IL4-mediated cell proliferation and IL5 upregulation by T-cells.
IL7R	interleukin 7 receptor	This protein has been shown to play a critical role in the V(D)J recombination during lymphocyte development, and to control the accessibility of the TCR gamma locus by STAT5 and histone acetylation.
IMPDH1	IMP (inosine monophosphate) dehydrogenase 1	The protein encoded by this gene acts as a homotetramer to regulate cell growth. The encoded protein is an enzyme that catalyzes the synthesis of xanthine monophosphate (XMP) from inosine-5'-monophosphate (IMP).
ISG20	interferon stimulated exonuclease gene 20kDa	

ISG15	ISG15 ubiquitin-like modifier	G1P2 is a ubiquitin-like protein that becomes conjugated to many cellular proteins upon activation by interferon-alpha (IFNA; MIM 147660) and -beta (IFNB; MIM 147640).
ITGAM	integrin, alpha M (complement component 3 receptor 3 subunit)	The alpha M beta 2 integrin is important in the adherence of neutrophils and monocytes to stimulated endothelium, and also in the phagocytosis of complement coated particles.
ITGB2	integrin, beta 2 (complement component 3 receptor 3 and 4 subunit)	Integrins are known to participate in cell adhesion as well as cell-surface mediated signalling.
KLF2	Kruppel-like factor 2 (lung)	
KLF4	Kruppel-like factor 4 (gut)	
LGALS1	lectin, galactoside-binding, soluble, 1	This protein may act as an autocrine negative growth factor that regulates cell proliferation.
LYN	v-yes-1 Yamaguchi sarcoma viral related oncogene homolog	
MAP2K7	mitogen-activated protein kinase kinase 7	This kinase is involved in the signal transduction mediating the cell responses to proinflammatory cytokines, and environmental stresses.
MAP3K2	mitogen-activated protein kinase kinase kinase 2	This kinase preferentially activates other kinases involved in the MAP kinase signaling pathway. It phosphorylates and activates Ikappa B kinases, and so plays a role in NF-kappa B signaling pathway. It also activates protein kinase C-related kinase 2, which suggests its involvement in a regulated signaling process.
MAP3K7	mitogen-activated protein kinase kinase kinase 7	This kinase mediates the signaling transduction induced by TGF beta and morphogenetic protein (BMP), and controls a variety of cell functions including transcription regulation and apoptosis.This kinase can play a role in the cell response to environmental stresses.
MDM2	Mdm2 p53 binding protein homolog (mouse)	This protein is a nuclear phosphoprotein that binds and inhibits transactivation by tumor protein p53, as part of an autoregulatory negative feedback loop. It also affects the cell cycle, apoptosis, and tumorigenesis through interactions with other proteins, including retinoblastoma 1 and ribosomal protein L5.
MEIS1	Meis homeobox 1	Homeobox genes, of which the most well-characterized category is represented by the HOX genes, play a crucial role in normal development. In addition, several homeoproteins are involved in neoplasia.
MLL	myeloid/lymphoid or mixed-lineage leukemia (trithorax homolog, Drosophila)	The MLL gene encodes a DNA-binding protein that methylates histone H3 (see MIM 601128) lys4 (H3K4) and positively regulates expression of target genes, including multiple HOX genes (see MIM 142980).
MVP	major vault protein	This protein mediates drug resistance, perhaps via a transport process.
NFKB1	nuclear factor of kappa light polypeptide gene enhancer in B-cells 1	NFKB is a transcription regulator that is activated by various intra- and extra-cellular stimuli such as cytokines, oxidant-free radicals, ultraviolet irradiation, and bacterial or viral products.
NOTCH3	Notch homolog 3 (Drosophila)	Notch interaction with its cell-bound ligands (delta, serrate) establishes an intercellular signalling pathway that plays a key role in neural development.
NP	nucleoside phosphorylase	This protein is an enzyme which reversibly catalyzes the phosphorolysis of purine nucleosides.
PIK3AP1	phosphoinositide-3-kinase adaptor protein 1	

PIK3R1	phosphoinositide-3-kinase, regulatory subunit 1 (alpha)	Phosphatidylinositol 3-kinase plays an important role in the metabolic actions of insulin.
PRKCQ	protein kinase C, theta	This protein is one of the PKC family members important for T-cell activation, and may link the T cell receptor (TCR) signaling complex to the activation of the transcription factors.
PRKCZ	protein kinase C, zeta	Protein kinase C (PKC) zeta is a member of the PKC family which are involved in a variety of cellular processes such as proliferation, differentiation and secretion.
PTPN2	protein tyrosine phosphatase, non-receptor type 2	This protein regulates a variety of cellular processes including cell growth, differentiation, mitotic cycle, and oncogenic transformation.
PTPN6	protein tyrosine phosphatase, non-receptor type 6	This protein is expressed primarily in hematopoietic cells, and functions as an important regulator of multiple signaling pathways in hematopoietic cells. It dephosphorylates a wide spectrum of phospho-proteins involved in hematopoietic cell signaling.
PTPRJ	protein tyrosine phosphatase, receptor type, J	This protein, present in all hematopoietic lineages, was shown to negatively regulate T cell receptor signaling possibly through interfering with the phosphorylation of Phospholipase C Gamma 1 and Linker for Activation of T Cells. It also dephosphorylates the PDGF beta receptor, and may be involved in UV-induced signal transduction.
PURA	purine-rich element binding protein A	This protein is implicated in the control of both DNA replication and transcription.
RBL2	retinoblastoma-like 2 (p130)	
RGS2	regulator of G-protein signaling 2, 24kDa	
RIPK2	receptor-interacting serine-threonine kinase 2	This protein is a component of signaling complexes in both the innate and adaptive immune pathways, and is a potent activator of NF-kappaB and inducer of apoptosis in response to various stimuli.
SCGB1A1	secretoglobin, family 1A, member 1 (uteroglobin)	
SEMA4D	sema domain, immunoglobulin domain (Ig), transmembrane domain (TM) and short cytoplasmic domain, (semaphorin) 4D	
SERPINA1	serpin peptidase inhibitor, clade A (alpha-1 antiproteinase, antitrypsin), member 1	This protein is a serine protease inhibitor whose targets include elastase, plasmin, thrombin, trypsin, chymotrypsin, and plasminogen activator.
SHC1	SHC (Src homology 2 domain containing) transforming protein 1	
SPP1	secreted phosphoprotein 1	

STAM2	signal transducing adaptor molecule (SH3 domain and ITAM motif) 2	This protein is thought to exhibit compensatory effects on the signaling pathway downstream of JAK kinases upon cytokine stimulation.
STAT1	signal transducer and activator of transcription 1, 91kDa	This protein mediates the expression of a variety of genes, which is thought to be important for cell viability in response to different cell stimuli and pathogens.
STAT3	signal transducer and activator of transcription 3 (acute-phase response factor)	This protein mediates the expression of a variety of genes in response to cell stimuli, and thus plays a key role in many cellular processes such as cell growth and apoptosis.
STAT6	signal transducer and activator of transcription 6, interleukin-4 induced	This protein plays a central role in exerting IL4 mediated biological responses. It is found to induce the expression of BCL2L1/BCL-X(L), which is responsible for the anti-apoptotic activity of IL4. It also plays a role in differentiation of T helper 2 (Th2) cells, expression of cell surface markers, and class switch of immunoglobulins.
STAT5B	signal transducer and activator of transcription 5B	This protein mediates the signal transduction triggered by various cell ligands, such as IL2, IL4, CSF1, and different growth hormones. It is involved in TCR signaling, apoptosis, adult mammary gland development, and sexual dimorphism of liver gene expression.
STK17B	serine/threonine kinase 17b	
SYK	spleen tyrosine kinase	
TGFBR2	transforming growth factor, beta receptor II (70/80kDa)	This receptor regulates the transcription of a subset of genes related to cell proliferation.
THBS1	thrombospondin 1	This protein is an adhesive glycoprotein that mediates cell-to-cell and cell-to-matrix interactions. It plays roles in platelet aggregation, angiogenesis, and tumorigenesis.
TLR2	toll-like receptor 2	This protein encoded by this gene is a member of the Toll-like receptor (TLR) family which plays a fundamental role in pathogen recognition and activation of innate immunity. It mediates host response to Gram-positive bacteria.
TP53	tumor protein p53	This gene encodes tumor protein p53, which responds to diverse cellular stresses to regulate target genes that induce cell cycle arrest, apoptosis, senescence, DNA repair, or changes in metabolism.
TP53INP1	tumor protein p53 inducible nuclear protein 1	
TSC22D3	TSC22 domain family, member 3	The proteinis a leucine zipper protein, that function as a transcriptional regulator. It appears to play a key role in the anti-inflammatory and immunosuppressive effects of this steroid and chemokine.
TXN	thioredoxin	Thioredoxin is a 12-kD oxidoreductase enzyme containing a dithiol-disulfide active site.
TYK2	tyrosine kinase 2	This protein associates with cytokine receptors and promulgate cytokine signals by phosphorylating receptor subunits.It may play a role in anti-viral immunity.
UBE2N	ubiquitin-conjugating enzyme E2N (UBC13 homolog, yeast)	The modification of proteins with ubiquitin is an important cellular mechanism for targeting abnormal or short-lived proteins for degradation.
USF1	upstream transcription factor 1	This protein can activate transcription through pyrimidine-rich initiator (Inr) elements and E-box motifs.

	XRCC5	X-ray repair complementing defective repair in Chinese hamster cells 5 (double-strand-break rejoining)	This gene functionally complements Chinese hamster xrs-6, a mutant defective in DNA double-strand break repair and in ability to undergo V(D)J recombination.
	ZFP36L1	zinc finger protein 36, C3H type-like 1	This putative nuclear transcription factor most likely functions in regulating the response to growth factors.
Hematological System Development and Function: Proliferation: Proliferation of Lymphocytes (8.53E-04), Proliferation of T Lymphocytes (1.66E-03)	ACPP	acid phosphatase, prostate	This gene encodes an enzyme that catalyzes the conversion of orthophosphoric monoester to alcohol and orthophosphate.
	AKAP13	A kinase (PRKA) anchor protein 13	This protein family is a group of structurally diverse proteins, which have the common function of binding to the regulatory subunit of protein kinase A (PKA) and confining the holoenzyme to discrete locations within the cell.
	AKT1	v-akt murine thymoma viral oncogene homolog 1	In the developing nervous system AKT is a critical mediator of growth factor-induced neuronal survival. Survival factors can suppress apoptosis.
	BAX	BCL2-associated X protein	This protein forms a heterodimer with BCL2, and functions as an apoptotic activator.
	BRAF	v-raf murine sarcoma viral oncogene homolog B1	This protein plays a role in regulating the MAP kinase/ERKs signaling pathway, which affects cell division, differentiation, and secretion.
	BSG	basigin (Ok blood group)	This protein is a plasma membrane protein that is important in spermatogenesis, embryo implantation, neural network formation, and tumor progression.
	CCL4	chemokine (C-C motif) ligand 4	
	CD44	CD44 molecule (Indian blood group)	This protein participates in a wide variety of cellular functions including lymphocyte activation, recirculation and homing, hematopoiesis, and tumor metastasis.
	CD58	CD58 molecule	This protein functions in adhesion and activation of T lymphocytes.
	CD81	CD81 molecule	This protein appears to promote muscle cell fusion and support myotube maintenance, and may be involved in signal transduction.
	CD83	CD83 molecule	
	CDKN1A	cyclin-dependent kinase inhibitor 1A (p21, Cip1)	This protein functions as a regulator of cell cycle progression at G1. It also plays a regulatory role in S phase DNA replication and DNA damage repair, and may be instrumental in the execution of apoptosis following caspase activation.
	CDKN2A	cyclin-dependent kinase inhibitor 2A (melanoma, p16, inhibits CDK4)	This ARF product functions as a stabilizer of the tumor suppressor protein p53 as it can interact with, and sequester, MDM1, a protein responsible for the degradation of p53. It has a common functionality in cell cycle G1 control.

CDKN2B	cyclin-dependent kinase inhibitor 2B (p15, inhibits CDK4)	This cyclin-dependent kinase functions as a cell growth regulator that controls cell cycle G1 progression.
CEACAM1	carcinoembryonic antigen-related cell adhesion molecule 1 (biliary glycoprotein)	Multiple cellular activities have been attributed to this protein, including roles in the differentiation and arrangement of tissue three-dimensional structure, angiogenesis, apoptosis, tumor suppression, metastasis, and the modulation of innate and adaptive immune responses.
CEBPB	CCAAT/enhancer binding protein (C/EBP), beta	This protein is important in the regulation of genes involved in immune and inflammatory responses. It can also bind the promoter and upstream element and stimulate the expression of the collagen type I gene.
CFLAR	CASP8 and FADD-like apoptosis regulator	
CXCR4	chemokine (C-X-C motif) receptor 4	This protein acts with the CD4 protein to support HIV entry into cells and is also highly expressed in breast cancer cells.
CYLD	cylindromatosis (turban tumor syndrome)	This protein functions as a deubiquitinating enzyme.
DICER1	dicer 1, ribonuclease type III	This ribonuclease is required by the RNA interference and small temporal RNA pathways to produce the active small RNA component that represses gene expression.
DLG1	discs, large homolog 1 (Drosophila)	
DUSP10	dual specificity phosphatase 10	This protein binds to and inactivates p38 and SAPK/JNK, but not MAPK/ERK. It is widely expressed in various tissues and organs, and its expression is elevated by stress stimuli.
EGR1	early growth response 1	This protein is a transcriptional regulator required for differentitation and mitogenesis.
EIF2AK2	eukaryotic translation initiation factor 2-alpha kinase 2	
FADD	Fas (TNFRSF6)-associated via death domain	The protein encoded by this gene is an adaptor molecule that interacts with various cell surface receptors and mediates cell apoptotic signals.
FAS	Fas (TNF receptor superfamily, member 6)	This protein has been shown to play a central role in the physiological regulation of programmed cell death, and has been implicated in the pathogenesis of various malignancies and diseases of the immune system. This receptor is found to be involved in transducing the proliferating signals in normal diploid fibroblast and T cells.
FUS	fusion (involved in t(12;16) in malignant liposarcoma)	
GABPB2	GA binding protein transcription factor, beta subunit 2	
GCNT1	glucosaminyl (N-acetyl) transferase 1, core 2 (beta-1,6-N-acetylglucosaminyltransferase)	This protein is essential to the formation of Gal beta 1-3(GlcNAc beta 1-6)GalNAc structures and the core 2 O-glycan branch.

HLA-E	major histocompatibility complex, class I, E	HLA-E belongs to the HLA class I heavy chain paralogues. HLA-E binds a restricted subset of peptides derived from the leader peptides of other class I molecules.
HNRNPA2B1	heterogeneous nuclear ribonucleoprotein A2/B1	These proteins are associated with pre-mRNAs in the nucleus and appear to influence pre-mRNA processing and other aspects of mRNA metabolism and transport.
HRH1	histamine receptor H1	This protein mediates the contraction of smooth muscles, the increase in capillary permeability due to contraction of terminal venules, the release of catecholamine from adrenal medulla, and neurotransmission in the central nervous system.
HSP90B1	heat shock protein 90kDa beta (Grp94), member 1	HSP90 proteins play roles in folding newly synthesized proteins or stabilizing and refolding denatured proteins after stress.
HSPD1	heat shock 60kDa protein 1 (chaperonin)	This protein may function as a signaling molecule in the innate immune system. It is essential for the folding and assembly of newly imported proteins in the mitochondria.
ICAM1	intercellular adhesion molecule 1	This gene encodes a cell surface glycoprotein which is typically expressed on endothelial cells and cells of the immune system.
ICOSLG	inducible T-cell co-stimulator ligand	
IFNAR1	interferon (alpha, beta and omega) receptor 1	Binding and activation of this receptor stimulates Janus protein kinases, it also functions as an antiviral factor.
IFNGR1	interferon gamma receptor 1	This gene encodes the ligand-binding chain (alpha) of the gamma interferon receptor.
IKZF2	IKAROS family zinc finger 2 (Helios)	This protein is thought to function predominantly in early hematopoietic development.
IL2RG	interleukin 2 receptor, gamma (severe combined immunodeficiency)	The interleukin 2 (IL2) receptor gamma chain (IL2RG), an important signalling component of many interleukin receptors (IL2,IL4,IL7,IL9, and IL15).
IL4R	interleukin 4 receptor	This protein can bind interleukin 4 to promote differentiation of Th2 cells, can be produced by an alternate splice variant or by proteolysis of the membrane-bound protein, and can inhibit IL4-mediated cell proliferation and IL5 upregulation by T-cells.
IL7R	interleukin 7 receptor	This protein has been shown to play a critical role in the V(D)J recombination during lymphocyte development, and to control the accessibility of the TCR gamma locus by STAT5 and histone acetylation.
IMPDH1	IMP (inosine monophosphate) dehydrogenase 1	The protein encoded by this gene acts as a homotetramer to regulate cell growth. The encoded protein is an enzyme that catalyzes the synthesis of xanthine monophosphate (XMP) from inosine-5'-monophosphate (IMP).
ISG20	interferon stimulated exonuclease gene 20kDa	
ISG15	ISG15 ubiquitin-like modifier	G1P2 is a ubiquitin-like protein that becomes conjugated to many cellular proteins upon activation by interferon-alpha (IFNA; MIM 147660) and -beta (IFNB; MIM 147640).
ITGAM	integrin, alpha M (complement component 3 receptor 3 subunit)	The alpha M beta 2 integrin is important in the adherence of neutrophils and monocytes to stimulated endothelium, and also in the phagocytosis of complement coated particles.
ITGB2	integrin, beta 2 (complement component 3 receptor 3 and 4 subunit)	Integrins are known to participate in cell adhesion as well as cell-surface mediated signalling.

KLF2	Kruppel-like factor 2 (lung)	
KLF4	Kruppel-like factor 4 (gut)	
LGALS1	lectin, galactoside-binding, soluble, 1	This protein may act as an autocrine negative growth factor that regulates cell proliferation.
LYN	v-yes-1 Yamaguchi sarcoma viral related oncogene homolog	
MAP2K7	mitogen-activated protein kinase kinase 7	This kinase is involved in the signal transduction mediating the cell responses to proinflammatory cytokines, and environmental stresses.
MAP3K2	mitogen-activated protein kinase kinase kinase 2	This kinase preferentially activates other kinases involved in the MAP kinase signaling pathway. It phosphorylates and activates Ikappa B kinases, and so plays a role in NF-kappa B signaling pathway. It also activates protein kinase C-related kinase 2, which suggests its involvement in a regulated signaling process.
MAP3K7	mitogen-activated protein kinase kinase kinase 7	This kinase mediates the signaling transduction induced by TGF beta and morphogenetic protein (BMP), and controls a variety of cell functions including transcription regulation and apoptosis.This kinase can play a role in the cell response to environmental stresses.
MDM2	Mdm2 p53 binding protein homolog (mouse)	This protein is a nuclear phosphoprotein that binds and inhibits transactivation by tumor protein p53, as part of an autoregulatory negative feedback loop. It also affects the cell cycle, apoptosis, and tumorigenesis through interactions with other proteins, including retinoblastoma 1 and ribosomal protein L5.
MVP	major vault protein	This protein mediates drug resistance, perhaps via a transport process.
NFKB1	nuclear factor of kappa light polypeptide gene enhancer in B-cells 1	NFKB is a transcription regulator that is activated by various intra- and extra-cellular stimuli such as cytokines, oxidant-free radicals, ultraviolet irradiation, and bacterial or viral products.
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PIK3AP1	phosphoinositide-3-kinase adaptor protein 1	
PIK3R1	phosphoinositide-3-kinase, regulatory subunit 1 (alpha)	Phosphatidylinositol 3-kinase plays an important role in the metabolic actions of insulin.
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SCGB1A1	secretoglobin, family 1A, member 1 (uteroglobin)	
SEMA4D	sema domain, immunoglobulin domain (Ig), transmembrane domain (TM) and short cytoplasmic domain, (semaphorin) 4D	
SERPINA1	serpin peptidase inhibitor, clade A (alpha-1 antiproteinase, antitrypsin), member 1	This protein is a serine protease inhibitor whose targets include elastase, plasmin, thrombin, trypsin, chymotrypsin, and plasminogen activator.
SHC1	SHC (Src homology 2 domain containing) transforming protein 1	
SPP1	secreted phosphoprotein 1	
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STAT5B	signal transducer and activator of transcription 5B	This protein mediates the signal transduction triggered by various cell ligands, such as IL2, IL4, CSF1, and different growth hormones. It is involved in TCR signaling, apoptosis, adult mammary gland development, and sexual dimorphism of liver gene expression.

	STK17B	serine/threonine kinase 17b	
	SYK	spleen tyrosine kinase	
	TGFBR2	transforming growth factor, beta receptor II (70/80kDa)	This receptor regulates the transcription of a subset of genes related to cell proliferation.
	THBS1	thrombospondin 1	This protein is an adhesive glycoprotein that mediates cell-to-cell and cell-to-matrix interactions. It plays roles in platelet aggregation, angiogenesis, and tumorigenesis.
	TLR2	toll-like receptor 2	This protein encoded by this gene is a member of the Toll-like receptor (TLR) family which plays a fundamental role in pathogen recognition and activation of innate immunity. It mediates host response to Gram-positive bacteria.
	TP53	tumor protein p53	This gene encodes tumor protein p53, which responds to diverse cellular stresses to regulate target genes that induce cell cycle arrest, apoptosis, senescence, DNA repair, or changes in metabolism.
	TP53INP1	tumor protein p53 inducible nuclear protein 1	
	TSC22D3	TSC22 domain family, member 3	The proteinis a leucine zipper protein, that function as a transcriptional regulator. It appears to play a key role in the anti-inflammatory and immunosuppressive effects of this steroid and chemokine.
	TXN	thioredoxin	Thioredoxin is a 12-kD oxidoreductase enzyme containing a dithiol-disulfide active site.
	TYK2	tyrosine kinase 2	This protein associates with cytokine receptors and promulgate cytokine signals by phosphorylating receptor subunits.It may play a role in anti-viral immunity.
	UBE2N	ubiquitin-conjugating enzyme E2N (UBC13 homolog, yeast)	The modification of proteins with ubiquitin is an important cellular mechanism for targeting abnormal or short-lived proteins for degradation.
	USF1	upstream transcription factor 1	This protein can activate transcription through pyrimidine-rich initiator (Inr) elements and E-box motifs.
	XRCC5	X-ray repair complementing defective repair in Chinese hamster cells 5 (double-strand-break rejoining)	This gene functionally complements Chinese hamster xrs-6, a mutant defective in DNA double-strand break repair and in ability to undergo V(D)J recombination.
Hematological System Development and Function: Activation: Activation of Leukocyte Cell Lines (1.02E-03)	B2M	beta-2-microglobulin	Beta-2-microglobulin is a serum protein found in association with the major histocompatibility complex (MHC) class I heavy chain on the surface of nearly all nucleated cells.
	CD300A	CD300a molecule	The CMRF35 antigen (CMRF35A; MIM 606786), which was identified by reactivity with a monoclonal antibody, is present on monocytes, neutrophils, and some T and B lymphocytes.
	CFL1	cofilin 1 (non-muscle)	Cofilin binds and depolymerizes filamentous F-actin and inhibits the polymerization of monomeric G-actin in a pH-dependent manner. It is involved in the translocation of actin-cofilin complex from cytoplasm to nucleus.

	HLA-A	major histocompatibility complex, class I, A	Class I molecules play a central role in the immune system by presenting peptides derived from the endoplasmic reticulum lumen. They are expressed in nearly all cells.
	HLA-C	major histocompatibility complex, class I, C	Class I molecules play a central role in the immune system by presenting peptides derived from endoplasmic reticulum lumen. They are expressed in nearly all cells.
	HSP90B1	heat shock protein 90kDa beta (Grp94), member 1	HSP90 proteins play roles in folding newly synthesized proteins or stabilizing and refolding denatured proteins after stress.
	IL6R	interleukin 6 receptor	Interleukin 6 (IL6) is a potent pleiotropic cytokine that regulates cell growth and differentiation and plays an important role in immune response.
	LGALS3	lectin, galactoside-binding, soluble, 3	
	TLR2	toll-like receptor 2	This protein encoded by this gene is a member of the Toll-like receptor (TLR) family which plays a fundamental role in pathogen recognition and activation of innate immunity. It mediates host response to Gram-positive bacteria.
Hematological System Development and Function: Cell Spreading: Cell Spreading of Neutrophils (2.05E-03)	FCAR	Fc fragment of IgA, receptor for	This receptor is a transmembrane glycoprotein present on the surface of myeloid lineage cells such as neutrophils, monocytes, macrophages, and eosinophils, where it mediates immunologic responses to pathogens. It interacts with IgA-opsonized targets and triggers several immunologic defense processes, including phagocytosis, antibody-dependent cell-mediated cytotoxicity, and stimulation of the release of inflammatory mediators.
	IL8	interleukin 8	This chemokine, one of the major mediators of the inflammatory response, functions as a chemoattractant, and is also a potent angiogenic factor.
	ITGAM	integrin, alpha M (complement component 3 receptor 3 subunit)	The alpha M beta 2 integrin is important in the adherence of neutrophils and monocytes to stimulated endothelium, and also in the phagocytosis of complement coated particles.
	ITGB2	integrin, beta 2 (complement component 3 receptor 3 and 4 subunit)	Integrins are known to participate in cell adhesion as well as cell-surface mediated signalling.
	LYN	v-yes-1 Yamaguchi sarcoma viral related oncogene homolog	
	SYK	spleen tyrosine kinase	
Hematological System Development and Function: Recruitment: Recruitment of Macrophages (2.34E-03)	B4GALT1	UDP-Gal:betaGlcNAc beta 1,4- galactosyltransferase, polypeptide 1	This gene is unique among the beta4GalT genes because it encodes an enzyme that participates both in glycoconjugate and lactose biosynthesis.
	C5AR1	complement component 5a receptor 1	

	CCL3	chemokine (C-C motif) ligand 3	Macrophage inflammatory protein-1 is a so-called monokine that is involved in the acute inflammatory state in the recruitment and activation of polymorphonuclear leukocytes.
	CCL4	chemokine (C-C motif) ligand 4	
	CD44	CD44 molecule (Indian blood group)	This protein participates in a wide variety of cellular functions including lymphocyte activation, recirculation and homing, hematopoiesis, and tumor metastasis.
	HMGB1	high-mobility group box 1	
	ICAM1	intercellular adhesion molecule 1	This gene encodes a cell surface glycoprotein which is typically expressed on endothelial cells and cells of the immune system.
	IL8	interleukin 8	This chemokine, one of the major mediators of the inflammatory response, functions as a chemoattractant, and is also a potent angiogenic factor.
	ITGB2	integrin, beta 2 (complement component 3 receptor 3 and 4 subunit)	Integrins are known to participate in cell adhesion as well as cell-surface mediated signalling.
	LSP1	lymphocyte-specific protein 1	The protein may regulate neutrophil motility, adhesion to fibrinogen matrix proteins, and transendothelial migration.
	NFE2L2	nuclear factor (erythroid-derived 2)-like 2	NFE2 (MIM 601490), NFE2L1 (MIM 163260), and NFE2L2 comprise a family of human genes encoding basic leucine zipper (bZIP) transcription factors. They share highly conserved regions that are distinct from other bZIP families, such as JUN (MIM 165160) and FOS (MIM 164810), although remaining regions have diverged considerably from each other.
	THBS1	thrombospondin 1	This protein is an adhesive glycoprotein that mediates cell-to-cell and cell-to-matrix interactions. It plays roles in platelet aggregation, angiogenesis, and tumorigenesis.
	TLR2	toll-like receptor 2	This protein encoded by this gene is a member of the Toll-like receptor (TLR) family which plays a fundamental role in pathogen recognition and activation of innate immunity. It mediates host response to Gram-positive bacteria.
	UCP2	uncoupling protein 2 (mitochondrial, proton carrier)	This gene is expressed in many tissues, with the greatest expression in skeletal muscle. It is thought to play a role in nonshivering thermogenesis, obesity and diabetes.
Connective Tissue Development and Function: Proliferation: Proliferation of Fibroblast Cell Lines (4.38E-08)	AHR	aryl hydrocarbon receptor	This protein regulates biological responses to planar aromatic hydrocarbons and xenobiotic-metabolizing enzymes such as cytochrome P450.
	AKT1	v-akt murine thymoma viral oncogene homolog 1	In the developing nervous system AKT is a critical mediator of growth factor-induced neuronal survival. Survival factors can suppress apoptosis.
	ARID5B	AT rich interactive domain 5B (MRF1-like)	

ATIC	5-aminoimidazole-4-carboxamide ribonucleotide formyltransferase/IMP cyclohydrolase	
BAX	BCL2-associated X protein	This protein forms a heterodimer with BCL2, and functions as an apoptotic activator.
BTG1	B-cell translocation gene 1, anti-proliferative	Expression of this gene is highest in the G0/G1 phases of the cell cycle and downregulated when cells progressed through G1. The encoded protein interacts with several nuclear receptors, and functions as a coactivator of cell differentiation.
BTG3	BTG family, member 3	This protein might play a role in neurogenesis in the central nervous system.
BTRC	beta-transducin repeat containing	This protein associates specifically with phosphorylated IkappaBalpha and beta-catenin destruction motifs, functioning in multiple transcriptional programs by activating the NF-kappaB pathway and inhibiting the beta-catenin pathway.
CAPRIN1	cell cycle associated protein 1	
CCND1	cyclin D1	This cyclin is required for cell cycle G1/S transition. It interacts with tumor suppressor protein Rb and the expression of this gene is regulated positively by Rb.
CD81	CD81 molecule	This protein appears to promote muscle cell fusion and support myotube maintenance, and may be involved in signal transduction.
CDKN1A	cyclin-dependent kinase inhibitor 1A (p21, Cip1)	This protein functions as a regulator of cell cycle progression at G1. It also plays a regulatory role in S phase DNA replication and DNA damage repair, and may be instrumental in the execution of apoptosis following caspase activation.
CDKN2A	cyclin-dependent kinase inhibitor 2A (melanoma, p16, inhibits CDK4)	This ARF product functions as a stabilizer of the tumor suppressor protein p53 as it can interact with, and sequester, MDM1, a protein responsible for the degradation of p53. It has a common functionality in cell cycle G1 control.
CDKN2B	cyclin-dependent kinase inhibitor 2B (p15, inhibits CDK4)	This cyclin-dependent kinase functions as a cell growth regulator that controls cell cycle G1 progression.
CEBPB	CCAAT/enhancer binding protein (C/EBP), beta	This protein is important in the regulation of genes involved in immune and inflammatory responses. It can also bind the promoter and upstream element and stimulate the expression of the collagen type I gene.
CRK	v-crk sarcoma virus CT10 oncogene homolog (avian)	This protein is involved in several signaling pathways, recruiting cytoplasmic proteins in the vicinity of tyrosine kinase through SH2-phosphotyrosine interaction.
DICER1	dicer 1, ribonuclease type III	This ribonuclease is required by the RNA interference and small temporal RNA pathways to produce the active small RNA component that represses gene expression.
EBNA1BP2	EBNA1 binding protein 2	
EIF2AK1	eukaryotic translation initiation factor 2-alpha kinase 1	The protein encoded by this gene acts at the level of translation initiation to downregulate protein synthesis in response to stress.

ERBB2	v-erb-b2 erythroblastic leukemia viral oncogene homolog 2, neuro/glioblastoma derived oncogene homolog (avian)	This protein binds to other ligand-bound EGF receptor family members to form a heterodimer, stabilizing ligand binding and enhancing kinase-mediated activation of downstream signalling pathways, such as those involving mitogen-activated protein kinase and phosphatidylinositol-3 kinase.
ETV6	ets variant 6	This gene encodes an ETS family transcription factor that it is required for hematopoiesis and maintenance of the developing vascular network.
HDGF	hepatoma-derived growth factor (high-mobility group protein 1-like)	This protein has mitogenic and DNA-binding activity and may play a role in cellular proliferation and differentiation.
HMGB1	high-mobility group box 1	
IFI16	interferon, gamma-inducible protein 16	This protein is involved in DNA binding, transcriptional regulation, and protein-protein interactions. It modulates p53 function, and inhibits cell growth in the Ras/Raf signaling pathway.
IGF2	insulin-like growth factor 2 (somatomedin A)	This gene encodes a member of the insulin family of polypeptide growth factors that is involved in development and growth.
JUN	jun oncogene	This protein interacts directly with specific target DNA sequences to regulate gene expression.
KLF2	Kruppel-like factor 2 (lung)	
KLF5	Kruppel-like factor 5 (intestinal)	Since this protein localizes to the nucleus and binds the epidermal growth factor response element, it is thought to be a transcription factor.
KLF6	Kruppel-like factor 6	This zinc finger protein is a transcriptional activator, and functions as a tumor suppressor.
MAP2K7	mitogen-activated protein kinase kinase 7	This kinase is involved in the signal transduction mediating the cell responses to proinflammatory cytokines, and environmental stresses.
MAPK14	mitogen-activated protein kinase 14	This kinase may be involved in stress related transcription and cell cycle regulation, as well as in genotoxic stress response.
MAPKAPK2	mitogen-activated protein kinase-activated protein kinase 2	This kinase is known to be involved in many cellular processes including stress and inflammatory responses, nuclear export, gene expression regulation and cell proliferation.
MDM2	Mdm2 p53 binding protein homolog (mouse)	This protein is a nuclear phosphoprotein that binds and inhibits transactivation by tumor protein p53, as part of an autoregulatory negative feedback loop. It also affects the cell cycle, apoptosis, and tumorigenesis through interactions with other proteins, including retinoblastoma 1 and ribosomal protein L5.
MDM4	Mdm4 p53 binding protein homolog (mouse)	This protein plays a role in apoptosis.
NPM1	nucleophosmin (nucleolar phosphoprotein B23, numatrin)	NPM1 is implicated in multiple functions, including ribosomal protein assembly and transport, control of centrosome duplication, and regulation of the tumor suppressor ARF (MIM 600160).
PDGFA	platelet-derived growth factor alpha polypeptide	The four members of this family are mitogenic factors for cells of mesenchymal origin.
PIAS1	protein inhibitor of activated STAT, 1	This protein functions in testis as a nuclear receptor transcriptional coregulator and may have a role in AR initiation and maintenance of spermatogenesis.

PLSCR1	phospholipid scramblase 1	
PTMA	prothymosin, alpha	
PTPN2	protein tyrosine phosphatase, non-receptor type 2	This protein regulates a variety of cellular processes including cell growth, differentiation, mitotic cycle, and oncogenic transformation.
RBL2	retinoblastoma-like 2 (p130)	
RIPK1	receptor (TNFRSF)-interacting serine-threonine kinase 1	
SOS1	son of sevenless homolog 1 (Drosophila)	This protein may regulate RAS proteins by facilitating the exchange of GTP for GDP.
STAT3	signal transducer and activator of transcription 3 (acute-phase response factor)	This protein mediates the expression of a variety of genes in response to cell stimuli, and thus plays a key role in many cellular processes such as cell growth and apoptosis.
TFG	TRK-fused gene	
TOB1	transducer of ERBB2, 1	This protein inhibits T cell proliferation and transcription of cytokines and cyclins. It interacts with mothers against decapentaplegic Drosophila homolog 2 and 4 to enhance their DNA binding activity. This interaction inhibits interleukin 2 transcription in T cells.
TP53	tumor protein p53	This gene encodes tumor protein p53, which responds to diverse cellular stresses to regulate target genes that induce cell cycle arrest, apoptosis, senescence, DNA repair, or changes in metabolism.
TPM3	tropomyosin 3	This member of the tropomyosin family of actin-binding proteins is involved in the contractile system of striated and smooth muscles and the cytoskeleton of non-muscle cells.
TPR	translocated promoter region (to activated MET oncogene)	The protein directly interacts with several components of the Nuclear Pore Complex. It is required for the nuclear export of mRNAs and some proteins.
TSC1	tuberous sclerosis 1	
TSC2	tuberous sclerosis 2	This protein is a tumor suppressor and is able to stimulate specific GTPases.
TSC22D3	TSC22 domain family, member 3	The proteinis a leucine zipper protein, that function as a transcriptional regulator. It appears to play a key role in the anti-inflammatory and immunosuppressive effects of this steroid and chemokine.
TXNIP	thioredoxin interacting protein	
ZBED1	zinc finger, BED-type containing 1	

Connective Tissue Development and Function: Proliferation: Proliferation of Fibroblasts (2.54E-06)	AHR	aryl hydrocarbon receptor	This protein regulates biological responses to planar aromatic hydrocarbons and xenobiotic-metabolizing enzymes such as cytochrome P450.
	AIF1	allograft inflammatory factor 1	This protein is involved in negative regulation of growth of vascular smooth muscle cells, which contributes to the anti-inflammatory response to vessel wall trauma.
	AKT1	v-akt murine thymoma viral oncogene homolog 1	In the developing nervous system AKT is a critical mediator of growth factor-induced neuronal survival. Survival factors can suppress apoptosis.
	ATF4	activating transcription factor 4 (tax-responsive enhancer element B67)	This transcription factor was isolated and characterized as the cAMP-response element binding protein 2 (CREB-2).
	BAX	BCL2-associated X protein	This protein forms a heterodimer with BCL2, and functions as an apoptotic activator.
	CCND1	cyclin D1	This cyclin is required for cell cycle G1/S transition. It interacts with tumor suppressor protein Rb and the expression of this gene is regulated positively by Rb.
	CD44	CD44 molecule (Indian blood group)	This protein participates in a wide variety of cellular functions including lymphocyte activation, recirculation and homing, hematopoiesis, and tumor metastasis.
	CDKN1A	cyclin-dependent kinase inhibitor 1A (p21, Cip1)	This protein functions as a regulator of cell cycle progression at G1. It also plays a regulatory role in S phase DNA replication and DNA damage repair, and may be instrumental in the execution of apoptosis following caspase activation.
	CDKN2A	cyclin-dependent kinase inhibitor 2A (melanoma, p16, inhibits CDK4)	This ARF product functions as a stabilizer of the tumor suppressor protein p53 as it can interact with, and sequester, MDM1, a protein responsible for the degradation of p53. It has a common functionality in cell cycle G1 control.
	CDKN2B	cyclin-dependent kinase inhibitor 2B (p15, inhibits CDK4)	This cyclin-dependent kinase functions as a cell growth regulator that controls cell cycle G1 progression.
	CEBPB	CCAAT/enhancer binding protein (C/EBP), beta	This protein is important in the regulation of genes involved in immune and inflammatory responses. It can also bind the promoter and upstream element and stimulate the expression of the collagen type I gene.
	EDN1	endothelin 1	
	EGFR	epidermal growth factor receptor (erythroblastic leukemia viral (v-erb-b) oncogene homolog, avian)	Binding of this receptor to a ligand induces dimerization and tyrosine autophosphorylation and leads to cell proliferation.
	FAS	Fas (TNF receptor superfamily, member 6)	This protein has been shown to play a central role in the physiological regulation of programmed cell death, and has been implicated in the pathogenesis of various malignancies and diseases of the immune system. This receptor is found to be involved in transducing the proliferating signals in normal diploid fibroblast and T cells.
	FBRS	fibrosin	Fibrosin is a lymphokine secreted by activated lymphocytes that induces fibroblast proliferation.

FOS	v-fos FBJ murine osteosarcoma viral oncogene homolog	The FOS proteins have been implicated as regulators of cell proliferation, differentiation, transformation, and apoptotic cell death.
FOSL2	FOS-like antigen 2	The FOS proteins have been implicated as regulators of cell proliferation, differentiation, and transformation.
GRB2	growth factor receptor-bound protein 2	The protein may be involved in the signal transduction pathway.
GRN	granulin	Different members of the granulin protein family may act as inhibitors, stimulators, or have dual actions on cell growth. Granulin family members are important in normal development, wound healing, and tumorigenesis.
GSTP1	glutathione S-transferase pi 1	This GST family member functions in xenobiotic metabolism and play a role in susceptibility to cancer, and other diseases.
IFNAR1	interferon (alpha, beta and omega) receptor 1	Binding and activation of this receptor stimulates Janus protein kinases, it also functions as an antiviral factor.
IGF2	insulin-like growth factor 2 (somatomedin A)	This gene encodes a member of the insulin family of polypeptide growth factors that is involved in development and growth.
ILK	integrin-linked kinase	Integrin-linked kinase (ILK), interacts with the cytoplasmic domain of beta-1 integrin in order to influence intracellular and extracellular functions.
JUN	jun oncogene	This protein interacts directly with specific target DNA sequences to regulate gene expression.
MAPK14	mitogen-activated protein kinase 14	This kinase may be involved in stress related transcription and cell cycle regulation, as well as in genotoxic stress response.
MDM2	Mdm2 p53 binding protein homolog (mouse)	This protein is a nuclear phosphoprotein that binds and inhibits transactivation by tumor protein p53, as part of an autoregulatory negative feedback loop. It also affects the cell cycle, apoptosis, and tumorigenesis through interactions with other proteins, including retinoblastoma 1 and ribosomal protein L5.
MDM4	Mdm4 p53 binding protein homolog (mouse)	This protein plays a role in apoptosis.
MORF4L1	mortality factor 4 like 1	
NCSTN	nicastrin	This protein cleaves integral membrane proteins, including Notch receptors and beta-amyloid precursor protein, and may be a stabilizing cofactor required for gamma-secretase complex assembly.
PA2G4	proliferation-associated 2G4, 38kDa	This gene encodes an RNA-binding protein that is involved in growth regulation, ribosome assembly, and the regulation of intermediate and late steps of rRNA processing. It is also a transcriptional co-repressor of androgen receptor-regulated genes and other cell cycle regulatory genes through its interactions with histone deacetylases.
PDGFA	platelet-derived growth factor alpha polypeptide	The four members of this family are mitogenic factors for cells of mesenchymal origin.
PITPNA	phosphatidylinositol transfer protein, alpha	Phosphatidylinositol transfer protein is a member of a diverse set of cytosolic phospholipid transfer proteins that are distinguished by their ability to transfer phospholipids between membranes in vitro.
PML	promyelocytic leukemia	This phosphoprotein localizes to nuclear bodies where it functions as a transcription factor and tumor suppressor. Its expression is cell-cycle related and it regulates the p53 response to oncogenic signals.
PTPN2	protein tyrosine phosphatase, non-receptor type 2	This protein regulates a variety of cellular processes including cell growth, differentiation, mitotic cycle, and oncogenic transformation.
SYCE1	synaptonemal complex central element protein 1	
SKIL	SKI-like oncogene	

	STAT1	signal transducer and activator of transcription 1, 91kDa	This protein mediates the expression of a variety of genes, which is thought to be important for cell viability in response to different cell stimuli and pathogens.
	TGFBR2	transforming growth factor, beta receptor II (70/80kDa)	This receptor regulates the transcription of a subset of genes related to cell proliferation.
	TP53	tumor protein p53	This gene encodes tumor protein p53, which responds to diverse cellular stresses to regulate target genes that induce cell cycle arrest, apoptosis, senescence, DNA repair, or changes in metabolism.
	TXNIP	thioredoxin interacting protein	
	VCAN	versican	
	WASF2	WAS protein family, member 2	This multiprotein complex serves to tranduce signals that involve changes in cell shape, motility or function.
Connective Tissue Development and Function: Growth: Growth of Fibroblast Cell Lines (3.79E-06)	ACP1	acid phosphatase 1, soluble	This protein functions as an acid phosphatase and a protein tyrosine phosphatase by hydrolyzing protein tyrosine phosphate to protein tyrosine and orthophosphate. It also hydrolyzes orthophosphoric monoesters to alcohol and orthophosphate.
	AHR	aryl hydrocarbon receptor	This protein regulates biological responses to planar aromatic hydrocarbons and xenobiotic-metabolizing enzymes such as cytochrome P450.
	ANP32A	acidic (leucine-rich) nuclear phosphoprotein 32 family, member A	
	CCND1	cyclin D1	This cyclin is required for cell cycle G1/S transition. It interacts with tumor suppressor protein Rb and the expression of this gene is regulated positively by Rb.
	CDKN1A	cyclin-dependent kinase inhibitor 1A (p21, Cip1)	This protein functions as a regulator of cell cycle progression at G1. It also plays a regulatory role in S phase DNA replication and DNA damage repair, and may be instrumental in the execution of apoptosis following caspase activation.
	CDKN2A	cyclin-dependent kinase inhibitor 2A (melanoma, p16, inhibits CDK4)	This ARF product functions as a stabilizer of the tumor suppressor protein p53 as it can interact with, and sequester, MDM1, a protein responsible for the degradation of p53. It has a common functionality in cell cycle G1 control.
	CDKN2B	cyclin-dependent kinase inhibitor 2B (p15, inhibits CDK4)	This cyclin-dependent kinase functions as a cell growth regulator that controls cell cycle G1 progression.
	CEACAM1	carcinoembryonic antigen-related cell adhesion molecule 1 (biliary glycoprotein)	Multiple cellular activities have been attributed to this protein, including roles in the differentiation and arrangement of tissue three-dimensional structure, angiogenesis, apoptosis, tumor suppression, metastasis, and the modulation of innate and adaptive immune responses.

CEBPB	CCAAT/enhancer binding protein (C/EBP), beta	This protein is important in the regulation of genes involved in immune and inflammatory responses. It can also bind the promoter and upstream element and stimulate the expression of the collagen type I gene.
CNOT6L	CCR4-NOT transcription complex, subunit 6-like	
CRK	v-crk sarcoma virus CT10 oncogene homolog (avian)	This protein is involved in several signaling pathways, recruiting cytoplasmic proteins in the vicinity of tyrosine kinase through SH2-phosphotyrosine interaction.
DDX3X	DEAD (Asp-Glu-Ala-Asp) box polypeptide 3, X-linked	DEAD box proteins are implicated in a number of cellular processes involving alteration of RNA secondary structure such as translation initiation, nuclear and mitochondrial splicing, and ribosome and spliceosome assembly.
EGFR	epidermal growth factor receptor (erythroblastic leukemia viral (v-erb-b) oncogene homolog, avian)	Binding of this receptor to a ligand induces dimerization and tyrosine autophosphorylation and leads to cell proliferation.
EIF2AK2	eukaryotic translation initiation factor 2-alpha kinase 2	
ERBB2	v-erb-b2 erythroblastic leukemia viral oncogene homolog 2, neuro/glioblastoma derived oncogene homolog (avian)	This protein binds to other ligand-bound EGF receptor family members to form a heterodimer, stabilizing ligand binding and enhancing kinase-mediated activation of downstream signalling pathways, such as those involving mitogen-activated protein kinase and phosphatidylinositol-3 kinase.
ERBB3	v-erb-b2 erythroblastic leukemia viral oncogene homolog 3 (avian)	This protein has a neuregulin binding domain but not an active kinase domain. Heterodimerization with other EGF family memebers leads to the activation of pathways which leads to cell proliferation or differentiation.
ETV6	ets variant 6	This gene encodes an ETS family transcription factor that it is required for hematopoiesis and maintenance of the developing vascular network.
FOS	v-fos FBJ murine osteosarcoma viral oncogene homolog	The FOS proteins have been implicated as regulators of cell proliferation, differentiation, transformation, and apoptotic cell death.
GBP2	guanylate binding protein 2, interferon-inducible	Interferons are cytokines that have antiviral effects and inhibit tumor cell proliferation, by inducing a large number of genes in their target cells.
GRN	granulin	Different members of the granulin protein family may act as inhibitors, stimulators, or have dual actions on cell growth. Granulin family members are important in normal development, wound healing, and tumorigenesis.
INSR	insulin receptor	Binding of insulin to the insulin receptor (INSR) stimulates glucose uptake.
IRF1	interferon regulatory factor 1	IRF1 is a transcription activator of genes induced by interferons alpha, beta, and gamma. It also plays roles in regulating apoptosis and tumor-suppressoion.
IRF2	interferon regulatory factor 2	IRF2 competitively inhibits the IRF1-mediated transcriptional activation of interferons alpha and beta, and presumably other genes that employ IRF1 for transcription activation. However, IRF2 also functions as a transcriptional activator of histone H4.

IVNS1ABP	influenza virus NS1A binding protein	
JUN	jun oncogene	This protein interacts directly with specific target DNA sequences to regulate gene expression.
KHDRBS1	KH domain containing, RNA binding, signal transduction associated 1	
LMNA	lamin A/C	Lamin proteins are thought to be involved in nuclear stability, chromatin structure and gene expression.
MAP2K7	mitogen-activated protein kinase kinase 7	This kinase is involved in the signal transduction mediating the cell responses to proinflammatory cytokines, and environmental stresses.
MAX	MYC associated factor X	The homodimers and heterodimers this protein forms compete for a common DNA target site (the E box) and rearrangement among these dimer forms provides a complex system of transcriptional regulation.
NPM1	nucleophosmin (nucleolar phosphoprotein B23, numatrin)	NPM1 is implicated in multiple functions, including ribosomal protein assembly and transport, control of centrosome duplication, and regulation of the tumor suppressor ARF (MIM 600160).
PLAGL2	pleiomorphic adenoma gene-like 2	Pleiomorphic adenoma gene-like 2 is a zinc-finger protein that recognizes DNA and/or RNA.
PLAUR	plasminogen activator, urokinase receptor	This receptor for urokinase plasminogen activator has a role in localizing and promoting plasmin formation, and likely influences many normal and pathological processes related to cell-surface plasminogen activation and localized degradation of the extracellular matrix.
PML	promyelocytic leukemia	This phosphoprotein localizes to nuclear bodies where it functions as a transcription factor and tumor suppressor. Its expression is cell-cycle related and it regulates the p53 response to oncogenic signals.
PPP1R15A	protein phosphatase 1, regulatory (inhibitor) subunit 15A	This gene is a member of a group of genes whose transcript levels are increased following stressful growth arrest conditions and treatment with DNA-damaging agents.
PRKCE	protein kinase C, epsilon	This kinase is involved in neuron channel activation, apoptosis, cardioprotection from ischemia, heat shock response, and insulin exocytosis. It may also be important for LPS-mediated signaling in activated macrophages and may play a role in controlling anxiety-like behavior.
PTMA	prothymosin, alpha	
RASSF1	Ras association (RalGDS/AF-6) domain family member 1	This protein was shown to inhibit the accumulation of cyclin D1, and thus induce cell cycle arrest.
SKIL	SKI-like oncogene	
SMARCA2	SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily a, member 2	This protein is part of the large ATP-dependent chromatin remodeling complex SNF/SWI, which is required for transcriptional activation of genes normally repressed by chromatin.
SMC3	structural maintenance of chromosomes 3	This protein is a component of the multimeric cohesin complex that holds together sister chromatids during mitosis, enabling proper chromosome segregation.
SOS1	son of sevenless homolog 1 (Drosophila)	This protein may regulate RAS proteins by facilitating the exchange of GTP for GDP.

	SS18	synovial sarcoma translocation, chromosome 18	
	STAT3	signal transducer and activator of transcription 3 (acute-phase response factor)	This protein mediates the expression of a variety of genes in response to cell stimuli, and thus plays a key role in many cellular processes such as cell growth and apoptosis.
	STUB1	STIP1 homology and U-box containing protein 1	
	TFE3	transcription factor binding to IGHM enhancer 3	TFE3 binds to the mu-E3 motif of the immunoglobulin heavy-chain enhancer and is expressed in many cell types.
	TFRC	transferrin receptor (p90, CD71)	
	TNK1	tyrosine kinase, non-receptor, 1	TNK1 is a nonreceptor tyrosine kinase. These kinases, like members of the SRC (MIM 190090) and JAK (see MIM 147795) families, mediate intracellular signaling downstream of receptor activation.
	TP53	tumor protein p53	This gene encodes tumor protein p53, which responds to diverse cellular stresses to regulate target genes that induce cell cycle arrest, apoptosis, senescence, DNA repair, or changes in metabolism.
	TSC2	tuberous sclerosis 2	This protein is a tumor suppressor and is able to stimulate specific GTPases.
Connective Tissue Development and Function: Growth: Growth of Fibroblasts (1.31E-04)	ATF3	activating transcription factor 3	The longer isoform represses rather than activates transcription from promoters with ATF binding elements. The shorter isoform (deltaZip2) lacks the leucine zipper protein-dimerization motif and does not bind to DNA, and it stimulates transcription presumably by sequestering inhibitory co-factors away from the promoter.
	CCND1	cyclin D1	This cyclin is required for cell cycle G1/S transition. It interacts with tumor suppressor protein Rb and the expression of this gene is regulated positively by Rb.
	CDKN1A	cyclin-dependent kinase inhibitor 1A (p21, Cip1)	This protein functions as a regulator of cell cycle progression at G1. It also plays a regulatory role in S phase DNA replication and DNA damage repair, and may be instrumental in the execution of apoptosis following caspase activation.
	CDKN2A	cyclin-dependent kinase inhibitor 2A (melanoma, p16, inhibits CDK4)	This ARF product functions as a stabilizer of the tumor suppressor protein p53 as it can interact with, and sequester, MDM1, a protein responsible for the degradation of p53. It has a common functionality in cell cycle G1 control.
	DUSP1	dual specificity phosphatase 1	DUSP1 may play an important role in the human cellular response to environmental stress as well as in the negative regulation of cellular proliferation.
	EDN1	endothelin 1	
	EGFR	epidermal growth factor receptor (erythroblastic leukemia viral (v-erb-b) oncogene homolog, avian)	Binding of this receptor to a ligand induces dimerization and tyrosine autophosphorylation and leads to cell proliferation.

ERBB2	v-erb-b2 erythroblastic leukemia viral oncogene homolog 2, neuro/glioblastoma derived oncogene homolog (avian)	This protein binds to other ligand-bound EGF receptor family members to form a heterodimer, stabilizing ligand binding and enhancing kinase-mediated activation of downstream signalling pathways, such as those involving mitogen-activated protein kinase and phosphatidylinositol-3 kinase.
FRS2	fibroblast growth factor receptor substrate 2	
HMGN1	high-mobility group nucleosome binding domain 1	Chromosomal protein HMG14 and its close analog HMG17alter the interaction between the DNA and the histone octamer, and may be involved in the process that maintains transcribable genes in a unique chromatin conformation.
JUN	jun oncogene	This protein interacts directly with specific target DNA sequences to regulate gene expression.
MDM2	Mdm2 p53 binding protein homolog (mouse)	This protein is a nuclear phosphoprotein that binds and inhibits transactivation by tumor protein p53, as part of an autoregulatory negative feedback loop. It also affects the cell cycle, apoptosis, and tumorigenesis through interactions with other proteins, including retinoblastoma 1 and ribosomal protein L5.
MDM4	Mdm4 p53 binding protein homolog (mouse)	This protein plays a role in apoptosis.
MLL	myeloid/lymphoid or mixed-lineage leukemia (trithorax homolog, Drosophila)	The MLL gene encodes a DNA-binding protein that methylates histone H3 (see MIM 601128) lys4 (H3K4) and positively regulates expression of target genes, including multiple HOX genes (see MIM 142980).
NCOA6	nuclear receptor coactivator 6	This protein is a transcriptional coactivator that can interact with nuclear hormone receptors to enhance their transcriptional activator functions. It is involved in the hormone-dependent coactivation of several receptors. It may also act as a general coactivator.
PML	promyelocytic leukemia	This phosphoprotein localizes to nuclear bodies where it functions as a transcription factor and tumor suppressor. Its expression is cell-cycle related and it regulates the p53 response to oncogenic signals.
PTPN6	protein tyrosine phosphatase, non-receptor type 6	This protein is expressed primarily in hematopoietic cells, and functions as an important regulator of multiple signaling pathways in hematopoietic cells. It dephosphorylates a wide spectrum of phospho-proteins involved in hematopoietic cell signaling.
RHOA	ras homolog gene family, member A	
STARD10	StAR-related lipid transfer (START) domain containing 10	
STAT1	signal transducer and activator of transcription 1, 91kDa	This protein mediates the expression of a variety of genes, which is thought to be important for cell viability in response to different cell stimuli and pathogens.
STAT3	signal transducer and activator of transcription 3 (acute-phase response factor)	This protein mediates the expression of a variety of genes in response to cell stimuli, and thus plays a key role in many cellular processes such as cell growth and apoptosis.
TACC1	transforming, acidic coiled-coil containing protein 1	This locus may represent a breast cancer candidate gene.

	TP53	tumor protein p53	This gene encodes tumor protein p53, which responds to diverse cellular stresses to regulate target genes that induce cell cycle arrest, apoptosis, senescence, DNA repair, or changes in metabolism.
	TPR	translocated promoter region (to activated MET oncogene)	The protein directly interacts with several components of the Nuclear Pore Complex. It is required for the nuclear export of mRNAs and some proteins.
	TSC2	tuberous sclerosis 2	This protein is a tumor suppressor and is able to stimulate specific GTPases.
	TXN	thioredoxin	Thioredoxin is a 12-kD oxidoreductase enzyme containing a dithiol-disulfide active site.
Connective Tissue Development and Function: G2 Phase: Arrest in G2 Phase of Fibroblast Cell Lines (5.46E-05)	CDKN2A	cyclin-dependent kinase inhibitor 2A (melanoma, p16, inhibits CDK4)	This ARF product functions as a stabilizer of the tumor suppressor protein p53 as it can interact with, and sequester, MDM1, a protein responsible for the degradation of p53. It has a common functionality in cell cycle G1 control.
	ERBB2	v-erb-b2 erythroblastic leukemia viral oncogene homolog 2, neuro/glioblastoma derived oncogene homolog (avian)	This protein binds to other ligand-bound EGF receptor family members to form a heterodimer, stabilizing ligand binding and enhancing kinase-mediated activation of downstream signalling pathways, such as those involving mitogen-activated protein kinase and phosphatidylinositol-3 kinase.
	JUN	jun oncogene	This protein interacts directly with specific target DNA sequences to regulate gene expression.
	LATS1	LATS, large tumor suppressor, homolog 1 (Drosophila)	The protein encoded by this gene is a putative serine/threonine kinase that localizes to the mitotic apparatus and complexes with cell cycle controller CDC2 kinase in early mitosis.
	MAP2K7	mitogen-activated protein kinase kinase 7	This kinase is involved in the signal transduction mediating the cell responses to proinflammatory cytokines, and environmental stresses.
	PTPN11	protein tyrosine phosphatase, non-receptor type 11	This PTP is widely expressed in most tissues and plays a regulatory role in various cell signaling events that are important for a diversity of cell functions, such as mitogenic activation, metabolic control, transcription regulation, and cell migration.
	PURA	purine-rich element binding protein A	This protein is implicated in the control of both DNA replication and transcription.
	TP53	tumor protein p53	This gene encodes tumor protein p53, which responds to diverse cellular stresses to regulate target genes that induce cell cycle arrest, apoptosis, senescence, DNA repair, or changes in metabolism.

Connective Tissue Development and Function: Shape Change: Shape Change of Fibroblast Cell Lines (5.08E-04)	ACP1	acid phosphatase 1, soluble	This protein functions as an acid phosphatase and a protein tyrosine phosphatase by hydrolyzing protein tyrosine phosphate to protein tyrosine and orthophosphate. It also hydrolyzes orthophosphoric monoesters to alcohol and orthophosphate.
	CD151	CD151 molecule (Raph blood group)	This protein is involved in cell adhesion and may regulate integrin trafficking and/or function. It enhances cell motility, invasion and metastasis of cancer cells.
	CDC42	cell division cycle 42 (GTP binding protein, 25kDa)	This protein regulates signaling pathways that control diverse cellular functions including cell morphology, migration, endocytosis and cell cycle progression.
	CDC42SE1	CDC42 small effector 1	
	CDC42SE2	CDC42 small effector 2	
	FAS	Fas (TNF receptor superfamily, member 6)	This protein has been shown to play a central role in the physiological regulation of programmed cell death, and has been implicated in the pathogenesis of various malignancies and diseases of the immune system. This receptor is found to be involved in transducing the proliferating signals in normal diploid fibroblast and T cells.
	FGD4	FYVE, RhoGEF and PH domain containing 4	This protein is involved in the regulation of the actin cytoskeleton and cell shape.
	GNG12	guanine nucleotide binding protein (G protein), gamma 12	
	INSR	insulin receptor	Binding of insulin to the insulin receptor (INSR) stimulates glucose uptake.
	LGALS8	lectin, galactoside-binding, soluble, 8	This gene is widely expressed in tumoral tissues and seems to be involved in integrin-like cell interactions.
	MAPK14	mitogen-activated protein kinase 14	This kinase may be involved in stress related transcription and cell cycle regulation, as well as in genotoxic stress response.
	PTPN11	protein tyrosine phosphatase, non-receptor type 11	This PTP is widely expressed in most tissues and plays a regulatory role in various cell signaling events that are important for a diversity of cell functions, such as mitogenic activation, metabolic control, transcription regulation, and cell migration.
	PTPN12	protein tyrosine phosphatase, non-receptor type 12	This PTP may play a role in oncogenesis. It may also have a regulatory role in controlling cell shape and mobility.
	RALBP1	ralA binding protein 1	
	RHOA	ras homolog gene family, member A	
	ROCK1	Rho-associated, coiled-coil containing protein kinase 1	This protein serine/threonine kinase that is activated when bound to the GTP-bound form of Rho. This protein, a downstream effector of Rho, phosphorylates and activates LIM kinase, which in turn, phosphorylates cofilin, inhibiting its actin-depolymerizing activity.
	THBS1	thrombospondin 1	This protein is an adhesive glycoprotein that mediates cell-to-cell and cell-to-matrix interactions. It plays roles in platelet aggregation, angiogenesis, and tumorigenesis.

	TP53	tumor protein p53	This gene encodes tumor protein p53, which responds to diverse cellular stresses to regulate target genes that induce cell cycle arrest, apoptosis, senescence, DNA repair, or changes in metabolism.
	VAV3	vav 3 guanine nucleotide exchange factor	This protein associates maximally with the nucleotide-free states of these GTPases.
Connective Tissue Development and Function: G1 Phase: G1 Phase of Fibroblast Cell Lines (1.18E-03) *including* Arrest in G1 Phase of Fibroblast Cell Lines (7.49E-04)	AKT1	v-akt murine thymoma viral oncogene homolog 1	In the developing nervous system AKT is a critical mediator of growth factor-induced neuronal survival. Survival factors can suppress apoptosis.
	CCND1	cyclin D1	This cyclin is required for cell cycle G1/S transition. It interacts with tumor suppressor protein Rb and the expression of this gene is regulated positively by Rb.
	CDC42	cell division cycle 42 (GTP binding protein, 25kDa)	This protein regulates signaling pathways that control diverse cellular functions including cell morphology, migration, endocytosis and cell cycle progression.
	CDKN1A	cyclin-dependent kinase inhibitor 1A (p21, Cip1)	This protein functions as a regulator of cell cycle progression at G1. It also plays a regulatory role in S phase DNA replication and DNA damage repair, and may be instrumental in the execution of apoptosis following caspase activation.
	CDKN2A	cyclin-dependent kinase inhibitor 2A (melanoma, p16, inhibits CDK4)	This ARF product functions as a stabilizer of the tumor suppressor protein p53 as it can interact with, and sequester, MDM1, a protein responsible for the degradation of p53. It has a common functionality in cell cycle G1 control.
	CDKN2B	cyclin-dependent kinase inhibitor 2B (p15, inhibits CDK4)	This cyclin-dependent kinase functions as a cell growth regulator that controls cell cycle G1 progression.
	EP300	E1A binding protein p300	This protein functions as histone acetyltransferase that regulates transcription via chromatin remodeling and is important in the processes of cell proliferation and differentiation.
	EP400	E1A binding protein p400	
	LMNA	lamin A/C	Lamin proteins are thought to be involved in nuclear stability, chromatin structure and gene expression.
	MAPK14	mitogen-activated protein kinase 14	This kinase may be involved in stress related transcription and cell cycle regulation, as well as in genotoxic stress response.
	PURA	purine-rich element binding protein A	This protein is implicated in the control of both DNA replication and transcription.
	RBL2	retinoblastoma-like 2 (p130)	
	TOB2	transducer of ERBB2, 2	TOB2 is involved in the regulation of cell cycle progression.

	TP53	tumor protein p53	This gene encodes tumor protein p53, which responds to diverse cellular stresses to regulate target genes that induce cell cycle arrest, apoptosis, senescence, DNA repair, or changes in metabolism.
Connective Tissue Development and Function; Ruffling: Ruffling of Fibroblasts (1.25E-03)	GSN	gelsolin (amyloidosis, Finnish type)	This protein functions in both assembly and disassembly of actin filaments.
	TP53	tumor protein p53	This gene encodes tumor protein p53, which responds to diverse cellular stresses to regulate target genes that induce cell cycle arrest, apoptosis, senescence, DNA repair, or changes in metabolism.
	TSC2	tuberous sclerosis 2	This protein is a tumor suppressor and is able to stimulate specific GTPases.
	WASF2	WAS protein family, member 2	This multiprotein complex serves to tranduce signals that involve changes in cell shape, motility or function.
Connective Tissue Development and Function: Blebbing: Blebbing of Fibroblast Cell Lines (1.44E-03)	CDC42SE1	CDC42 small effector 1	
	CDC42SE2	CDC42 small effector 2	
	FAS	Fas (TNF receptor superfamily, member 6)	This protein has been shown to play a central role in the physiological regulation of programmed cell death, and has been implicated in the pathogenesis of various malignancies and diseases of the immune system. This receptor is found to be involved in transducing the proliferating signals in normal diploid fibroblast and T cells.
	ROCK1	Rho-associated, coiled-coil containing protein kinase 1	This protein serine/threonine kinase that is activated when bound to the GTP-bound form of Rho. This protein, a downstream effector of Rho, phosphorylates and activates LIM kinase, which in turn, phosphorylates cofilin, inhibiting its actin-depolymerizing activity.
	TP53	tumor protein p53	This gene encodes tumor protein p53, which responds to diverse cellular stresses to regulate target genes that induce cell cycle arrest, apoptosis, senescence, DNA repair, or changes in metabolism.

Connective Tissue Development and Function: Focus Formation: Focus Formation of Fibroblast Cell Lines (1.48E-03)	CD44	CD44 molecule (Indian blood group)	This protein participates in a wide variety of cellular functions including lymphocyte activation, recirculation and homing, hematopoiesis, and tumor metastasis.
	CDKN2B	cyclin-dependent kinase inhibitor 2B (p15, inhibits CDK4)	This cyclin-dependent kinase functions as a cell growth regulator that controls cell cycle G1 progression.
	CEBPB	CCAAT/enhancer binding protein (C/EBP), beta	This protein is important in the regulation of genes involved in immune and inflammatory responses. It can also bind the promoter and upstream element and stimulate the expression of the collagen type I gene.
	EGFR	epidermal growth factor receptor (erythroblastic leukemia viral (v-erb-b) oncogene homolog, avian)	Binding of this receptor to a ligand induces dimerization and tyrosine autophosphorylation and leads to cell proliferation.
	ERBB2	v-erb-b2 erythroblastic leukemia viral oncogene homolog 2, neuro/glioblastoma derived oncogene homolog (avian)	This protein binds to other ligand-bound EGF receptor family members to form a heterodimer, stabilizing ligand binding and enhancing kinase-mediated activation of downstream signalling pathways, such as those involving mitogen-activated protein kinase and phosphatidylinositol-3 kinase.
	IL8	interleukin 8	This chemokine, one of the major mediators of the inflammatory response, functions as a chemoattractant, and is also a potent angiogenic factor.
	SPP1	secreted phosphoprotein 1	
	TACC1	transforming, acidic coiled-coil containing protein 1	This locus may represent a breast cancer candidate gene.
	TP53	tumor protein p53	This gene encodes tumor protein p53, which responds to diverse cellular stresses to regulate target genes that induce cell cycle arrest, apoptosis, senescence, DNA repair, or changes in metabolism.

Connective Tissue Development and Function: Senescence: Senescence of Fibroblast Cell Lines (2.25E-03)	BUB3	budding uninhibited by benzimidazoles 3 homolog (yeast)	This gene encodes a protein involved in spindle checkpoint function.
	CDKN1A	cyclin-dependent kinase inhibitor 1A (p21, Cip1)	This protein functions as a regulator of cell cycle progression at G1. It also plays a regulatory role in S phase DNA replication and DNA damage repair, and may be instrumental in the execution of apoptosis following caspase activation.
	CDKN2A	cyclin-dependent kinase inhibitor 2A (melanoma, p16, inhibits CDK4)	This ARF product functions as a stabilizer of the tumor suppressor protein p53 as it can interact with, and sequester, MDM1, a protein responsible for the degradation of p53. It has a common functionality in cell cycle G1 control.
	CEBPB	CCAAT/enhancer binding protein (C/EBP), beta	This protein is important in the regulation of genes involved in immune and inflammatory responses. It can also bind the promoter and upstream element and stimulate the expression of the collagen type I gene.
	DICER1	dicer 1, ribonuclease type III	This ribonuclease is required by the RNA interference and small temporal RNA pathways to produce the active small RNA component that represses gene expression.
	DUSP1	dual specificity phosphatase 1	DUSP1 may play an important role in the human cellular response to environmental stress as well as in the negative regulation of cellular proliferation.
	EGR1	early growth response 1	This protein is a transcriptional regulator required for differentitation and mitogenesis.
	EP300	E1A binding protein p300	This protein functions as histone acetyltransferase that regulates transcription via chromatin remodeling and is important in the processes of cell proliferation and differentiation.
	MAP2K7	mitogen-activated protein kinase kinase 7	This kinase is involved in the signal transduction mediating the cell responses to proinflammatory cytokines, and environmental stresses.
	PSMB5	proteasome (prosome, macropain) subunit, beta type, 5	Proteasomes are distributed throughout eukaryotic cells at a high concentration and cleave peptides in an ATP/ubiquitin-dependent process in a non-lysosomal pathway.
	RBL2	retinoblastoma-like 2 (p130)	
	TP53	tumor protein p53	This gene encodes tumor protein p53, which responds to diverse cellular stresses to regulate target genes that induce cell cycle arrest, apoptosis, senescence, DNA repair, or changes in metabolism.

Connective Tissue Development and Function: Contact Growth Inhibition: Contact Growth Inhibition of Fibroblast Cell Lines (2.31E-03)	ANP32A	acidic (leucine-rich) nuclear phosphoprotein 32 family, member A	
	CDKN2A	cyclin-dependent kinase inhibitor 2A (melanoma, p16, inhibits CDK4)	This ARF product functions as a stabilizer of the tumor suppressor protein p53 as it can interact with, and sequester, MDM1, a protein responsible for the degradation of p53. It has a common functionality in cell cycle G1 control.
	GBP2	guanylate binding protein 2, interferon-inducible	Interferons are cytokines that have antiviral effects and inhibit tumor cell proliferation, by inducing a large number of genes in their target cells.
	HAS3	hyaluronan synthase 3	This protein is involved in the synthesis of the unbranched glycosaminoglycan hyaluronan which is a major constituent of the extracellular matrix.
	PLAGL2	pleiomorphic adenoma gene-like 2	Pleiomorphic adenoma gene-like 2 is a zinc-finger protein that recognizes DNA and/or RNA.
	PTMA	prothymosin, alpha	
	SMC3	structural maintenance of chromosomes 3	This protein is a component of the multimeric cohesin complex that holds together sister chromatids during mitosis, enabling proper chromosome segregation.
	TP53	tumor protein p53	This gene encodes tumor protein p53, which responds to diverse cellular stresses to regulate target genes that induce cell cycle arrest, apoptosis, senescence, DNA repair, or changes in metabolism.
Connective Tissue Development and Function: Cytostasis: Cytostasis of Fibroblasts (2.31E-03)	CASP2	caspase 2, apoptosis-related cysteine peptidase	Sequential activation of caspases plays a central role in the execution-phase of cell apoptosis.
	CDKN2A	cyclin-dependent kinase inhibitor 2A (melanoma, p16, inhibits CDK4)	This ARF product functions as a stabilizer of the tumor suppressor protein p53 as it can interact with, and sequester, MDM1, a protein responsible for the degradation of p53. It has a common functionality in cell cycle G1 control.
	HDAC1	histone deacetylase 1	Histone acetylation and deacetylation, catalyzed by multisubunit complexes, play a key role in the regulation of eukaryotic gene expression and in cell growth and apoptosis.
	JUN	jun oncogene	This protein interacts directly with specific target DNA sequences to regulate gene expression.

	OAZ1	ornithine decarboxylase antizyme 1	The antizyme encoded by this gene inhibits ornithine decarboxylase and accelerates its degradation.
	PCYOX1	prenylcysteine oxidase 1	PCYOX1 catalyzes the degradation of prenylcysteine to yield free cysteines and a hydrophobic isoprenoid product.
	SAT1	spermidine/spermine N1-acetyltransferase 1	Spermidine/spermine N(1)-acetyltransferase (SSAT; EC 2.3.1.57) is a rate-limiting enzyme in the catabolic pathway of polyamine metabolism.
	TP53	tumor protein p53	This gene encodes tumor protein p53, which responds to diverse cellular stresses to regulate target genes that induce cell cycle arrest, apoptosis, senescence, DNA repair, or changes in metabolism.
Organismal Survival: Death: Death of Animal(1.36E-06), Death of Mammalia (6.50E-07)	ACLY	ATP citrate lyase	ATP citrate lyase is responsible for the synthesis of cytosolic acetyl-CoA in many tissues. Acetyl-CoA, serves several important biosynthetic pathways, including lipogenesis and cholesterogenesis. In nervous tissue, ATP citrate-lyase may be involved in the biosynthesis of acetylcholine.
	ADAR	adenosine deaminase, RNA-specific	This gene encodes the enzyme responsible for RNA editing by site-specific deamination of adenosines.
	AHR	aryl hydrocarbon receptor	This protein regulates biological responses to planar aromatic hydrocarbons and xenobiotic-metabolizing enzymes such as cytochrome P450.
	AKT1	v-akt murine thymoma viral oncogene homolog 1	In the developing nervous system AKT is a critical mediator of growth factor-induced neuronal survival. Survival factors can suppress apoptosis.
	APAF1	apoptotic peptidase activating factor 1	This gene encodes a cytoplasmic protein that initiates apoptosis.
	APLP2	amyloid beta (A4) precursor-like protein 2	
	ARNT	aryl hydrocarbon receptor nuclear translocator	This protein forms a complex with the ligand-bound Ah receptor, and is required for receptor function.
	ASAH1	N-acylsphingosine amidohydrolase (acid ceramidase) 1	This protein catalyzes the synthesis and degradation of ceramide into sphingosine and fatty acid.
	ATG7	ATG7 autophagy related 7 homolog (S. cerevisiae)	This protein appears to be required for fusion of peroxisomal and vacuolar membranes. Itshows homology to the ATP-binding and catalytic sites of the E1 ubiquitin activating enzymes.
	ATN1	atrophin 1	Dentatorubral pallidoluysian atrophy, a rare neurodegenerative disorder characterized by cerebellar ataxia, myoclonic epilepsy, choreoathetosis, and dementia, is related to a trinucleotide repeat within this gene.
	B2M	beta-2-microglobulin	Beta-2-microglobulin is a serum protein found in association with the major histocompatibility complex (MHC) class I heavy chain on the surface of nearly all nucleated cells.
	BID	BH3 interacting domain death agonist	This gene encodes a death agonist that heterodimerizes with either agonist BAX or antagonist BCL2.
	BRAF	v-raf murine sarcoma viral oncogene homolog B1	This protein plays a role in regulating the MAP kinase/ERKs signaling pathway, which affects cell division, differentiation, and secretion.

BUB3	budding uninhibited by benzimidazoles 3 homolog (yeast)	This gene encodes a protein involved in spindle checkpoint function.
C5AR1	complement component 5a receptor 1	
CALR	calreticulin	Calreticulin is a multifunctional protein that acts as a major Ca(2+)-binding (storage) protein in the lumen of the endoplasmic reticulum. It is also found in the nucleus, suggesting that it may have a role in transcription regulation.
CAPNS1	calpain, small subunit 1	This gene encodes a small subunit common to both calpain I and II and is associated with myotonic dystrophy.
CAPZB	capping protein (actin filament) muscle Z-line, beta	This protein regulates growth of the actin filament by capping the barbed end of growing actin filaments.
CARM1	coactivator-associated arginine methyltransferase 1	CARM1 is involved in the process of protein arginine methylation which has been implicated in signal transduction, metabolism of nascent pre-RNA, and transcriptional activation.
CCL3	chemokine (C-C motif) ligand 3	Macrophage inflammatory protein-1 is a so-called monokine that is involved in the acute inflammatory state in the recruitment and activation of polymorphonuclear leukocytes.
CCND1	cyclin D1	This cyclin is required for cell cycle G1/S transition. It interacts with tumor suppressor protein Rb and the expression of this gene is regulated positively by Rb.
CD44	CD44 molecule (Indian blood group)	This protein participates in a wide variety of cellular functions including lymphocyte activation, recirculation and homing, hematopoiesis, and tumor metastasis.
CDKN1A	cyclin-dependent kinase inhibitor 1A (p21, Cip1)	This protein functions as a regulator of cell cycle progression at G1. It also plays a regulatory role in S phase DNA replication and DNA damage repair, and may be instrumental in the execution of apoptosis following caspase activation.
CDKN2A	cyclin-dependent kinase inhibitor 2A (melanoma, p16, inhibits CDK4)	This ARF product functions as a stabilizer of the tumor suppressor protein p53 as it can interact with, and sequester, MDM1, a protein responsible for the degradation of p53. It has a common functionality in cell cycle G1 control.
CEBPB	CCAAT/enhancer binding protein (C/EBP), beta	This protein is important in the regulation of genes involved in immune and inflammatory responses. It can also bind the promoter and upstream element and stimulate the expression of the collagen type I gene.
CEBPD	CCAAT/enhancer binding protein (C/EBP), delta	This protein is important in the regulation of genes involved in immune and inflammatory responses, and may be involved in the regulation of genes associated with activation and/or differentiation of macrophages.
CEBPG	CCAAT/enhancer binding protein (C/EBP), gamma	The C/EBP family of transcription factors regulates viral and cellular CCAAT/enhancer element-mediated transcription.
CFLAR	CASP8 and FADD-like apoptosis regulator	
CHUK	conserved helix-loop-helix ubiquitous kinase	This protein phosphorylates sites that trigger the degradation of the inhibitor via the ubiquination pathway, thereby activating the transcription factor.
CLDN1	claudin 1	This protein is an integral membrane protein and a component of tight junction strands.
CNP	2',3'-cyclic nucleotide 3' phosphodiesterase	
COL5A1	collagen, type V, alpha 1	Type V collagen appears to regulate the assembly of heterotypic fibers composed of both type I and type V collagen.

COX17	COX17 cytochrome c oxidase assembly homolog (S. cerevisiae)	Cytochrome c oxidase (COX), the terminal component of the mitochondrial respiratory chain, catalyzes the electron transfer from reduced cytochrome c to oxygen.
CREB1	cAMP responsive element binding protein 1	This protein induces transcription of genes in response to hormonal stimulation of the cAMP pathway.
CREBBP	CREB binding protein	This protein binds to cAMP-response element binding protein (CREB), and plays critical roles in embryonic development, growth control, and homeostasis by coupling chromatin remodeling to transcription factor recognition.
CREM	cAMP responsive element modulator	This protein is an important component of cAMP-mediated signal transduction during the spermatogenetic cycle, as well as other complex processes.
CRK	v-crk sarcoma virus CT10 oncogene homolog (avian)	This protein is involved in several signaling pathways, recruiting cytoplasmic proteins in the vicinity of tyrosine kinase through SH2-phosphotyrosine interaction.
CTSB	cathepsin B	This protein is a lysosomal cysteine proteinase, and an amyloid precursor protein secretase involved in the proteolytic processing of amyloid precursor protein (APP).
CXCR4	chemokine (C-X-C motif) receptor 4	This protein acts with the CD4 protein to support HIV entry into cells and is also highly expressed in breast cancer cells.
CYBB	cytochrome b-245, beta polypeptide	Cytochrome b (-245) has been proposed as a primary component of the microbicidal oxidase system of phagocytes.
DDR1	discoidin domain receptor tyrosine kinase 1	The protein encoded by this gene is a RTK that is widely expressed in normal and transformed epithelial cells and is activated by various types of collagen.
DICER1	dicer 1, ribonuclease type III	This ribonuclease is required by the RNA interference and small temporal RNA pathways to produce the active small RNA component that represses gene expression.
DUSP1	dual specificity phosphatase 1	DUSP1 may play an important role in the human cellular response to environmental stress as well as in the negative regulation of cellular proliferation.
DYRK1A	dual-specificity tyrosine-(Y)-phosphorylation regulated kinase 1A	This protein may play a significant role in a signaling pathway regulating cell proliferation and may be involved in brain development.
EIF2AK1	eukaryotic translation initiation factor 2-alpha kinase 1	The protein encoded by this gene acts at the level of translation initiation to downregulate protein synthesis in response to stress.
EP300	E1A binding protein p300	This protein functions as histone acetyltransferase that regulates transcription via chromatin remodeling and is important in the processes of cell proliferation and differentiation.
ERBB2	v-erb-b2 erythroblastic leukemia viral oncogene homolog 2, neuro/glioblastoma derived oncogene homolog (avian)	This protein binds to other ligand-bound EGF receptor family members to form a heterodimer, stabilizing ligand binding and enhancing kinase-mediated activation of downstream signalling pathways, such as those involving mitogen-activated protein kinase and phosphatidylinositol-3 kinase.
ERBB3	v-erb-b2 erythroblastic leukemia viral oncogene homolog 3 (avian)	This protein has a neuregulin binding domain but not an active kinase domain. Heterodimerization with other EGF family memebers leads to the activation of pathways which leads to cell proliferation or differentiation.

ETV6	ets variant 6	This gene encodes an ETS family transcription factor that it is required for hematopoiesis and maintenance of the developing vascular network.
FADD	Fas (TNFRSF6)-associated via death domain	The protein encoded by this gene is an adaptor molecule that interacts with various cell surface receptors and mediates cell apoptotic signals.
FAS	Fas (TNF receptor superfamily, member 6)	This protein has been shown to play a central role in the physiological regulation of programmed cell death, and has been implicated in the pathogenesis of various malignancies and diseases of the immune system. This receptor is found to be involved in transducing the proliferating signals in normal diploid fibroblast and T cells.
FDFT1	farnesyl-diphosphate farnesyltransferase 1	This protein is the first specific enzyme in cholesterol biosynthesis, catalyzing the dimerization of two molecules of farnesyl diphosphate in a two-step reaction to form squalene.
FGFR2	fibroblast growth factor receptor 2	The extracellular portion of this protein interacts with fibroblast growth factors, setting in motion a cascade of downstream signals, ultimately influencing mitogenesis and differentiation.
FLNB	filamin B, beta (actin binding protein 278)	
FOXP1	forkhead box P1	This protein may act as a tumor suppressor as it is lost in several tumor types.
GLCE	glucuronic acid epimerase	GLCE is responsible for epimerization of D-glucuronic acid (GlcA) to L-iduronic acid (IdoA) of Heparin Sulfate, which endows the nascent polysaccharide chain with the ability to bind growth factors and cytokines.
GNAQ	guanine nucleotide binding protein (G protein), q polypeptide	G-alpha-q is the alpha subunit of one of the heterotrimeric GTP-binding proteins that mediates stimulation of phospholipase C-beta (MIM 600230).
GSK3B	glycogen synthase kinase 3 beta	Glycogen synthase kinase-3 (GSK3) is a proline-directed serine-threonine kinase that was initially identified as a phosphorylating and inactivating glycogen synthase.
HIPK1	homeodomain interacting protein kinase 1	This protein may function as a co-repressor for homeodomain transcription factors.
HIST1H1C	histone cluster 1, H1c	The linker histone, H1, interacts with linker DNA between nucleosomes and functions in the compaction of chromatin into higher order structures. This gene is intronless and encodes a member of the histone H1 family.
HMGB1	high-mobility group box 1	
HNRNPC	heterogeneous nuclear ribonucleoprotein C (C1/C2)	The protein encoded by this gene can act as a tetramer and is involved in the assembly of 40S hnRNP particles.
HOPX	HOP homeobox	This protein may interact with serum response factor (SRF) and modulate SRF-dependent cardiac-specific gene expression and cardiac development.
HRH1	histamine receptor H1	This protein mediates the contraction of smooth muscles, the increase in capillary permeability due to contraction of terminal venules, the release of catecholamine from adrenal medulla, and neurotransmission in the central nervous system.
HSP90AB1	heat shock protein 90kDa alpha (cytosolic), class B member 1	HSP90 proteins are highly conserved molecular chaperones that have key roles in signal transduction, protein folding, protein degradation, and morphologic evolution.
IFNAR1	interferon (alpha, beta and omega) receptor 1	Binding and activation of this receptor stimulates Janus protein kinases, it also functions as an antiviral factor.
IFNGR1	interferon gamma receptor 1	This gene encodes the ligand-binding chain (alpha) of the gamma interferon receptor.

IGF2R	insulin-like growth factor 2 receptor	This receptor functions in the intracellular trafficking of lysosomal enzymes, the activation of transforming growth factor beta, and the degradation of IGF2.
IL18R1	interleukin 18 receptor 1	This receptor specifically binds interleukin 18 (IL18), and is essential for IL18 mediated signal transduction.
IL6R	interleukin 6 receptor	Interleukin 6 (IL6) is a potent pleiotropic cytokine that regulates cell growth and differentiation and plays an important role in immune response.
ILK	integrin-linked kinase	Integrin-linked kinase (ILK), interacts with the cytoplasmic domain of beta-1 integrin in order to influence intracellular and extracellular functions.
INSR	insulin receptor	Binding of insulin to the insulin receptor (INSR) stimulates glucose uptake.
IRF2	interferon regulatory factor 2	IRF2 competitively inhibits the IRF1-mediated transcriptional activation of interferons alpha and beta, and presumably other genes that employ IRF1 for transcription activation. However, IRF2 also functions as a transcriptional activator of histone H4.
ITGAM	integrin, alpha M (complement component 3 receptor 3 subunit)	The alpha M beta 2 integrin is important in the adherence of neutrophils and monocytes to stimulated endothelium, and also in the phagocytosis of complement coated particles.
ITGB4	integrin, beta 4	Integrins mediate cell-matrix or cell-cell adhesion, and transduced signals that regulate gene expression and cell growth. This subunit tends to associate with alpha 6 subunit and is likely to play a pivotal role in the biology of invasive carcinoma.
ITGB8	integrin, beta 8	Integrin complexes mediate cell-cell and cell-extracellular matrix interactions and this complex plays a role in human airway epithelial proliferation.
JAK1	Janus kinase 1	JAK1 is involved in the interferon-alpha/beta and -gamma signal transduction pathways. These kinases couple cytokine ligand binding to tyrosine phosphorylation of various known signaling proteins and of a unique family of transcription factors termed the signal transducers and activators of transcription, or STATs.
KEAP1	kelch-like ECH-associated protein 1	This protein interacts with NF-E2-related factor 2 in a redox-sensitive manner and the dissociation of the proteins in the cytoplasm is followed by transportation of NF-E2-related factor 2 to the nucleus.
KIF5B	kinesin family member 5B	
KLF2	Kruppel-like factor 2 (lung)	
KRT8	keratin 8	This protein plays a role in maintaining cellular structural integrity and also functions in signal transduction and cellular differentiation.
LDLR	low density lipoprotein receptor	Low density lipoprotein (LDL) is taken into the cell ending up in lysosomes where it is degraded and the cholesterol is made available for repression of microsomal enzyme HMG CoA reductase, the rate-limiting step in cholesterol synthesis.
LIMS1	LIM and senescent cell antigen-like domains 1	This protein is likely involved in integrin and growth factor receptor kinase signaling pathways. It may play a role in integrin-mediated cell adhesion or spreading.
LPL	LPL	LPL is expressed in heart, muscle, and adipose tissue, and has the dual functions of triglyceride hydrolase and ligand/bridging factor for receptor-mediated lipoprotein uptake.
LYN	v-yes-1 Yamaguchi sarcoma viral related oncogene homolog	
MACF1	microtubule-actin crosslinking factor 1	This protein may function in microtubule dynamics to facilitate actin-microtubule interactions at the cell periphery and to couple the microtubule network to cellular junctions.

MADD	MAP-kinase activating death domain	This protein encoded by this gene is a death domain-containing adaptor protein that interacts with the death domain of TNF-alpha receptor 1 to activate mitogen-activated protein kinase (MAPK) and propagate the apoptotic signal.
MAFG	v-maf musculoaponeurotic fibrosarcoma oncogene homolog G (avian)	
MAP2K7	mitogen-activated protein kinase kinase 7	This kinase is involved in the signal transduction mediating the cell responses to proinflammatory cytokines, and environmental stresses.
MAP3K3	mitogen-activated protein kinase kinase kinase 3	This protein directly regulates the stress-activated protein kinase (SAPK) and extracellular signal-regulated protein kinase (ERK) pathways by activating SEK and MEK1/2 respectively.
MAP3K7	mitogen-activated protein kinase kinase kinase 7	This kinase mediates the signaling transduction induced by TGF beta and morphogenetic protein (BMP), and controls a variety of cell functions including transcription regulation and apoptosis.This kinase can play a role in the cell response to environmental stresses.
MAPK14	mitogen-activated protein kinase 14	This kinase may be involved in stress related transcription and cell cycle regulation, as well as in genotoxic stress response.
MAPKAPK5	mitogen-activated protein kinase-activated protein kinase 5	In response to cellular stress and proinflammatory cytokines, this kinase is activated through its phosphorylation by MAP kinases.
MAX	MYC associated factor X	The homodimers and heterodimers this protein forms compete for a common DNA target site (the E box) and rearrangement among these dimer forms provides a complex system of transcriptional regulation.
MBD3	methyl-CpG binding domain protein 3	MBD3 mediates the association of metastasis-associated protein 2 (MTA2) with the core histone deacetylase complex.
MCL1	myeloid cell leukemia sequence 1 (BCL2-related)	The longer gene product (isoform 1) enhances cell survival by inhibiting apoptosis while the alternatively spliced shorter gene product (isoform 2) promotes apoptosis and is death-inducing.
MDM2	Mdm2 p53 binding protein homolog (mouse)	This protein is a nuclear phosphoprotein that binds and inhibits transactivation by tumor protein p53, as part of an autoregulatory negative feedback loop. It also affects the cell cycle, apoptosis, and tumorigenesis through interactions with other proteins, including retinoblastoma 1 and ribosomal protein L5.
MDM4	Mdm4 p53 binding protein homolog (mouse)	This protein plays a role in apoptosis.
MED1	mediator complex subunit 1	The protein encoded by this gene is a subunit of the CRSP (cofactor required for SP1 activation) complex, which, along with TFIID, is required for efficient activation by SP1. It also regulates p53-dependent apoptosis and it is essential for adipogenesis.
MFN1	mitofusin 1	This protein is a mediator of mitochondrial fusion, and helps facilitate mitochondrial targeting.
MFN2	mitofusin 2	This protein participates in mitochondrial fusion and contributes to the maintenance and operation of the mitochondrial network. It is involved in the regulation of vascular smooth muscle cell proliferation, and may play a role in the pathophysiology of obesity.
MORF4L1	mortality factor 4 like 1	
NBN	nibrin	This gene product is thought to be involved in DNA double-strand break repair and DNA damage-induced checkpoint activation.

NCOA6	nuclear receptor coactivator 6	This protein is a transcriptional coactivator that can interact with nuclear hormone receptors to enhance their transcriptional activator functions. It is involved in the hormone-dependent coactivation of several receptors. It may also act as a general coactivator.
NCSTN	nicastrin	This protein cleaves integral membrane proteins, including Notch receptors and beta-amyloid precursor protein, and may be a stabilizing cofactor required for gamma-secretase complex assembly.
NFE2L2	nuclear factor (erythroid-derived 2)-like 2	NFE2 (MIM 601490), NFE2L1 (MIM 163260), and NFE2L2 comprise a family of human genes encoding basic leucine zipper (bZIP) transcription factors. They share highly conserved regions that are distinct from other bZIP families, such as JUN (MIM 165160) and FOS (MIM 164810), although remaining regions have diverged considerably from each other.
NFIA	nuclear factor I/A	Nuclear factor I (NFI) proteins function as cellular transcription factors and as replication factors for adenovirus DNA replication. Diversity in this protein family is generated by multiple genes, differential splicing, and heterodimerization.
NFIC	nuclear factor I/C (CCAAT-binding transcription factor)	
NFKB1	nuclear factor of kappa light polypeptide gene enhancer in B-cells 1	NFKB is a transcription regulator that is activated by various intra- and extra-cellular stimuli such as cytokines, oxidant-free radicals, ultraviolet irradiation, and bacterial or viral products.
NFKB2	nuclear factor of kappa light polypeptide gene enhancer in B-cells 2 (p49/p100)	NFKB has been detected in numerous cell types that express cytokines, chemokines, growth factors, cell adhesion molecules, and some acute phase proteins in health and in various disease states. NFKB is activated by a wide variety of stimuli.
NRP2	neuropilin 2	The encoded transmembrane protein binds to SEMA3C protein and SEMA3F protein, and interacts with vascular endothelial growth factor (VEGF). This protein may play a role in cardiovascular development, axon guidance, and tumorigenesis.
PAK4	p21 protein (Cdc42/Rac)-activated kinase 4	PAK4 weakly activates the JNK family of MAP kinases, is a mediator of filopodia formation, and may play a role in the reorganization of the actin cytoskeleton.
PCMT1	protein-L-isoaspartate (D-aspartate) O-methyltransferase	PCMT1 (EC 2.1.1.77) is a protein repair enzyme that initiates the conversion of abnormal D-aspartyl and L-isoaspartyl residues to the normal L-aspartyl form.
PDGFA	platelet-derived growth factor alpha polypeptide	The four members of this family are mitogenic factors for cells of mesenchymal origin.
PDPK1	3-phosphoinositide dependent protein kinase-1	
PEA15	phosphoprotein enriched in astrocytes 15	PEA15 is a death effector domain (DED)-containing protein predominantly expressed in the central nervous system, particularly in astrocytes.
PFN1	profilin 1	The protein encoded by this gene is a ubiquitous actin monomer-binding protein belonging to the profilin family. It is thought to regulate actin polymerization in response to extracellular signals. Deletion of this gene is associated with Miller-Dieker syndrome.
PIAS2	protein inhibitor of activated STAT, 2	This gene encodes a protein involved in the regulation of transcription factors involved in MAP kinase signaling.

PIK3R1	phosphoinositide-3-kinase, regulatory subunit 1 (alpha)	Phosphatidylinositol 3-kinase plays an important role in the metabolic actions of insulin.
PISD	phosphatidylserine decarboxylase	Phosphatidylserine decarboxylases catalyze the formation of phosphatidylethanolamine (PE) by decarboxylation of phosphatidylserine (PS).
PNPLA8	patatin-like phospholipase domain containing 8	Phospholipase A2 catalyzes cleavage of fatty acids from phospholipids, thereby regulating membrane physical properties and the release of lipid second messengers and growth factors. It modulates cellular growth programs, inflammation, and ion channel function.
POU2F1	POU class 2 homeobox 1	
PRKAR1A	protein kinase, cAMP-dependent, regulatory, type I, alpha (tissue specific extinguisher 1)	This protein is a tissue-specific extinguisher that down-regulates the expression of seven liver genes in hepatoma x fibroblast hybrids. It may also have a role in DNA replication via the protein serving as a nuclear transport protein for the second subunit of the Replication Factor C (RFC40).
PSEN1	presenilin 1	Presenilins may regulate APP processing through their effects on gamma-secretase. Also, it is thought that they help cleave the Notch receptor, such that they either directly regulate gamma-secretase activity or themselves are protease enzymes.
PSMD4	proteasome (prosome, macropain) 26S subunit, non-ATPase, 4	Proteasomes are distributed throughout eukaryotic cells at a high concentration and cleave peptides in an ATP/ubiquitin-dependent process in a non-lysosomal pathway.
PTPN2	protein tyrosine phosphatase, non-receptor type 2	This protein regulates a variety of cellular processes including cell growth, differentiation, mitotic cycle, and oncogenic transformation.
PTPN11	protein tyrosine phosphatase, non-receptor type 11	This PTP is widely expressed in most tissues and plays a regulatory role in various cell signaling events that are important for a diversity of cell functions, such as mitogenic activation, metabolic control, transcription regulation, and cell migration.
PTS	6-pyruvoyltetrahydropterin synthase	The enzyme encoded by this gene catalyzes the elimination of inorganic triphosphate from dihydroneopterin triphosphate, which is the second and irreversible step in the biosynthesis of tetrahydrobiopterin from GTP.
RBL2	retinoblastoma-like 2 (p130)	
REST	RE1-silencing transcription factor	This transcriptional repressor which represses neuronal genes in non-neuronal tissues, and it is thought that this repressor may act as a master negative regular of neurogenesis.
RHOA	ras homolog gene family, member A	
RIPK1	receptor (TNFRSF)-interacting serine-threonine kinase 1	
SIM2	single-minded homolog 2 (Drosophila)	The Drosophila sim transcription factor is a master regulator of fruit fly neurogenesis.
SKIL	SKI-like oncogene	
SMAD2	SMAD family member 2	This protein mediates the signal of the transforming growth factor (TGF)-beta, and thus regulates multiple cellular processes, such as cell proliferation, apoptosis, and differentiation.

SMARCA5	SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily a, member 5	This protein is a component of the chromatin remodeling and spacing factor RSF, a facilitator of the transcription of class II genes by RNA polymerase II.
SMN1	survival of motor neuron 1, telomeric	Within the nucleus, the protein localizes to subnuclear bodies called gems which are found near coiled bodies containing high concentrations of small ribonucleoproteins (snRNPs). It also interacts with several proteins known to be involved in the biogenesis of snRNPs.
SOD1	superoxide dismutase 1, soluble	This protein binds copper and zinc ions and is one of two isozymes responsible for destroying free superoxide radicals in the body.
SP1	Sp1 transcription factor	
SPEN	spen homolog, transcriptional regulator (Drosophila)	This gene encodes a hormone inducible transcriptional repressor.
SPRED2	sprouty-related, EVH1 domain containing 2	SPRED2 is a member of the Sprouty (see SPRY1; MIM 602465)/SPRED family of proteins that regulate growth factor-induced activation of the MAP kinase cascade (see MAPK1; MIM 176948).
SRF	serum response factor (c-fos serum response element-binding transcription factor)	This protein stimulates both cell proliferation and differentiation. It participates in cell cycle regulation, apoptosis, cell growth, and cell differentiation.
STAT1	signal transducer and activator of transcription 1, 91kDa	This protein mediates the expression of a variety of genes, which is thought to be important for cell viability in response to different cell stimuli and pathogens.
STAT2	signal transducer and activator of transcription 2, 113kDa	This protein acts as a transactivator, but lacks the ability to bind DNA directly. It is thought to be involved in the process of blocking IFN-alpha response by adenovirus.
STAT3	signal transducer and activator of transcription 3 (acute-phase response factor)	This protein mediates the expression of a variety of genes in response to cell stimuli, and thus plays a key role in many cellular processes such as cell growth and apoptosis.
STAT6	signal transducer and activator of transcription 6, interleukin-4 induced	This protein plays a central role in exerting IL4 mediated biological responses. It is found to induce the expression of BCL2L1/BCL-X(L), which is responsible for the anti-apoptotic activity of IL4. It also plays a role in differentiation of T helper 2 (Th2) cells, expression of cell surface markers, and class switch of immunoglobulins.
STAT5B	signal transducer and activator of transcription 5B	This protein mediates the signal transduction triggered by various cell ligands, such as IL2, IL4, CSF1, and different growth hormones. It is involved in TCR signaling, apoptosis, adult mammary gland development, and sexual dimorphism of liver gene expression.
STUB1	STIP1 homology and U-box containing protein 1	
STX4	syntaxin 4	
TBK1	TANK-binding kinase 1	The protein encoded by this gene is similar to IKB kinases and can mediate NFKB activation in response to certain growth factors.

TFAP2C	transcription factor AP-2 gamma (activating enhancer binding protein 2 gamma)	This protein plays a role in the development of the eyes, face, body wall, limbs, and neural tube.
THBD	thrombomodulin	The binding of this protein to thrombin results in the activation of protein C, which degrades clotting factors Va and VIIIa and reduces the amount of thrombin generated.
TLR2	toll-like receptor 2	This protein encoded by this gene is a member of the Toll-like receptor (TLR) family which plays a fundamental role in pathogen recognition and activation of innate immunity. It mediates host response to Gram-positive bacteria.
TMOD1	tropomodulin 1	
TOP1	topoisomerase (DNA) I	This enzyme catalyzes the transient breaking and rejoining of a single strand of DNA which allows the strands to pass through one another, thus altering the topology of DNA.
TP53	tumor protein p53	This gene encodes tumor protein p53, which responds to diverse cellular stresses to regulate target genes that induce cell cycle arrest, apoptosis, senescence, DNA repair, or changes in metabolism.
TPM3	tropomyosin 3	This gene encodes a member of the tropomyosin family of actin-binding proteins involved in the contractile system of striated and smooth muscles and the cytoskeleton of non-muscle cells.
TSC1	tuberous sclerosis 1	
TSC2	tuberous sclerosis 2	This protein is a tumor suppressor and is able to stimulate specific GTPases.
TWSG1	twisted gastrulation homolog 1 (Drosophila)	
TXN	thioredoxin	Thioredoxin is a 12-kD oxidoreductase enzyme containing a dithiol-disulfide active site.
TYK2	tyrosine kinase 2	This protein associates with cytokine receptors and promulgate cytokine signals by phosphorylating receptor subunits.It may play a role in anti-viral immunity.
UBE2N	ubiquitin-conjugating enzyme E2N (UBC13 homolog, yeast)	The modification of proteins with ubiquitin is an important cellular mechanism for targeting abnormal or short-lived proteins for degradation.
UBE4B	ubiquitination factor E4B (UFD2 homolog, yeast)	This protein is involved in multiubiquitin chain assembly.
USF1	upstream transcription factor 1	This protein can activate transcription through pyrimidine-rich initiator (Inr) elements and E-box motifs.
VPRBP	Vpr (HIV-1) binding protein	
WASF2	WAS protein family, member 2	This multiprotein complex serves to tranduce signals that involve changes in cell shape, motility or function.
XRCC5	X-ray repair complementing defective repair in Chinese hamster cells 5 (double-strand-break rejoining)	This gene functionally complements Chinese hamster xrs-6, a mutant defective in DNA double-strand break repair and in ability to undergo V(D)J recombination.
ZFR	zinc finger RNA binding protein	

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	B2M	beta-2-microglobulin	Beta-2-microglobulin is a serum protein found in association with the major histocompatibility complex (MHC) class I heavy chain on the surface of nearly all nucleated cells.
	DYRK1A	dual-specificity tyrosine-(Y)-phosphorylation regulated kinase 1A	This protein may play a significant role in a signaling pathway regulating cell proliferation and may be involved in brain development.
	EGFR	epidermal growth factor receptor (erythroblastic leukemia viral (v-erb-b) oncogene homolog, avian)	Binding of this receptor to a ligand induces dimerization and tyrosine autophosphorylation and leads to cell proliferation.
	ETV6	ets variant 6	This gene encodes an ETS family transcription factor that it is required for hematopoiesis and maintenance of the developing vascular network.
	FUS	fusion (involved in t(12;16) in malignant liposarcoma)	
	MAPK14	mitogen-activated protein kinase 14	This kinase may be involved in stress related transcription and cell cycle regulation, as well as in genotoxic stress response.
	NFIC	nuclear factor I/C (CCAAT-binding transcription factor)	
	PFN1	profilin 1	The protein encoded by this gene is a ubiquitous actin monomer-binding protein belonging to the profilin family. It is thought to regulate actin polymerization in response to extracellular signals. Deletion of this gene is associated with Miller-Dieker syndrome.
	POU2F1	POU class 2 homeobox 1	
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	TSC2	tuberous sclerosis 2	This protein is a tumor suppressor and is able to stimulate specific GTPases.
	UBE2A	ubiquitin-conjugating enzyme E2A (RAD6 homolog)	This enzyme is required for post-replicative DNA damage repair.

XRCC5	X-ray repair complementing defective repair in Chinese hamster cells 5 (double-strand-break rejoining)	This gene functionally complements Chinese hamster xrs-6, a mutant defective in DNA double-strand break repair and in ability to undergo V(D)J recombination.
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