Category: Function: Annotation (p value)	Gene	Name	Description
Behavior: Behavior: Behavior (1.19E-11)	ABI2	abl interactor 2	
	ACCN2	amiloride-sensitive cation channel 2, neuronal	The member encoded by this gene is expressed in most if not all brain neurons, and it may be an ion channel subunit.
	ADAM2	ADAM metallopeptidase domain 2	This gene has been implicated in a variety of biological processes involving cell-cell and cell-matrix interactions, including fertilization, muscle development, and neurogenesis.
	ADCY1	adenylate cyclase 1 (brain)	This gene encodes a form of adenylate cyclase expressed in brain.
	ADCY5	adenylate cyclase 5	ADCY5 belongs to the adenylate cyclase (EC 4.6.1.1) family of enzymes responsible for the synthesis of cAMP.
	AFF2	AF4/FMR2 family, member 2	
	AGTR1	angiotensin II receptor, type 1	Angiotensin II is a potent vasopressor hormone and a primary regulator of aldosterone secretion. It is an important effector controlling blood pressure and volume in the cardiovascular system.
	AGTR2	angiotensin II receptor, type 2	AGTR2 plays a role in the central nervous system and cardiovascular functions that are mediated by the renin-angiotensin system. This receptor mediates programmed cell death (apoptosis).
	ALS2	amyotrophic lateral sclerosis 2 (juvenile)	The protein functions as a guanine nucleotide exchange factor for the small GTPase RAB5.
	AR	androgen receptor	This protein functions as a steroid-hormone activated transcription factor.
	ATM	ataxia telangiectasia mutated	This protein functions as a regulator of a variety of downstream proteins, including tumor suppressor proteins p53 and BRCA1, checkpoint kinase CHK2, checkpoint proteins RAD17 and RAD9, and DNA repair protein NBS1. This protein is thought to be a master controller of cell cycle checkpoint signaling pathways that are required for cell response to DNA damage and for genome stability.
	ATP1A3	ATPase, Na+/K+ transporting, alpha 3 polypeptide	This Na+/K+ -ATPase is responsible for establishing and maintaining the electrochemical gradients of Na and K ions across the plasma membrane. These gradients are essential for osmoregulation, for sodium-coupled transport of a variety of organic and inorganic molecules, and for electrical excitability of nerve and muscle.
	ATP2B2	ATPase, Ca++ transporting, plasma membrane 2	The protein encoded by this gene removes bivalent calcium ions from eukaryotic cells against very large concentration gradients and plays a critical role in intracellular calcium homeostasis.
	B4GALNT1	beta-1,4-N-acetyl-galactosaminyl transferase 1	GalNAc-T is the enzyme involved in the biosynthesis of G(M2) and G(D2) glycosphingolipids. GalNAc-T catalyzes the transfer of GalNAc into G(M3) and G(D3) by a beta-1,4 linkage, resulting in the synthesis of G(M2) and G(D2), respectively.
	BACE1	beta-site APP-cleaving enzyme 1	The encoded protein, a member of the peptidase A1 protein family, is a type I integral membrane glycoprotein and aspartic protease that is found mainly in the Golgi.
	BCL2	B-cell CLL/lymphoma 2	This gene encodes an integral outer mitochondrial membrane protein that blocks the apoptotic death of some cells such as lymphocytes.
	CACNA1C	calcium channel, voltage-dependent, L type, alpha 1C subunit	This gene encodes an alpha-1 subunit of a voltage-dependent calcium channel. Calcium channels mediate the influx of calcium ions into the cell upon membrane polarization.
	CCKAR	cholecystokinin A receptor	This receptor is a major physiologic mediator of pancreatic enzyme secretion and smooth muscle contraction of the gallbladder and stomach. In the central and peripheral nervous system this receptor regulates satiety and the release of beta-endorphin and dopamine.

CELSR1	cadherin, EGF LAG seven-pass G-type receptor 1 (flamingo homolog, Drosophila)	This particular member is a developmentally regulated, neural-specific gene which plays an unspecified role in early embryogenesis.
CHD7	chromodomain helicase DNA binding protein 7	This gene encodes a protein that contains several helicase family domains.
CHL1	cell adhesion molecule with homology to L1CAM (close homolog of L1)	The protein encoded by this gene is a neural recognition molecule that may be involved in signal transduction pathways.
CHRM1	cholinergic receptor, muscarinic 1	The muscarinic cholinergic receptor 1 is involved in mediation of vagally-induced bronchoconstriction and in the acid secretion of the gastrointestinal tract.
CHRNA7	cholinergic receptor, nicotinic, alpha 7	The protein encoded by this gene forms a homo-oligomeric channel, displays marked permeability to calcium ions and is a major component of brain nicotinic receptors that are blocked by, and highly sensitive to, alpha-bungarotoxin.
CHRNB2	cholinergic receptor, nicotinic, beta 2 (neuronal)	The protein encoded by this gene belongs to a superfamily of ligand-gated ion channels which allow the flow of sodium and potassium across the plasma membrane in response to ligands such as acetylcholine and nicotine.
CLDN19	claudin 19	The product of this gene plays a major role in tight junction-specific obliteration of the intercellular space, through calcium-independent cell-adhesion activity.
CNR1	cannabinoid receptor 1 (brain)	This gene encodes one of two cannabinoid receptors, which have been found to be involved in the cannabinoid-induced CNS effects (including alterations in mood and cognition) experienced by users of marijuana.
CPLX2	complexin 2	The protein product of this gene binds to the SNAP receptor complex and disrupts it, allowing transmitter release.
CRH	corticotropin releasing hormone	CRH is secreted by the paraventricular nucleus (PVN) of the hypothalamus in response to stress. In the placenta CRH is a marker that determines the length of gestation and the timing of parturition and delivery. CRH may also act as a trigger for parturition.
CRHR1	corticotropin releasing hormone receptor 1	The encoded protein is essential for the activation of signal transduction pathways that regulate diverse physiological processes including stress, reproduction, immune response and obesity.
CTNNA2	catenin (cadherin-associated protein), alpha 2	
CYP11B2	cytochrome P450, family 11, subfamily B, polypeptide 2	This gene encodes a member of the cytochrome P450 superfamily which are monooxygenases which catalyze many reactions involved in drug metabolism and synthesis of cholesterol, steroids and other lipids.
CYP19A1	cytochrome P450, family 19, subfamily A, polypeptide 1	This protein localizes to the endoplasmic reticulum and catalyzes the last steps of estrogen biosynthesis, three successive hydroxylations of the A ring of androgens.
DDO	D-aspartate oxidase	The protein encoded by this gene is a peroxisomal flavoprotein that catalyzes the oxidative deamination of D-aspartate and N-methyl D-aspartate.
DKK3	dickkopf homolog 3 (Xenopus laevis)	This gene encodes a secreted protein involved in embryonic development through its interactions with the Wnt signaling pathway.
DLG4	discs, large homolog 4 (Drosophila)	This MAGUK protein may interact at postsynaptic sites to form a multimeric scaffold for the clustering of receptors, ion channels, and associated signaling proteins.

DMBX1	diencephalon/mesencephalon homeobox 1	The encoded protein acts as a transcription factor and may play a role in brain and sensory organ development.
DRD4	dopamine receptor D4	This gene encodes the D4 subtype of the dopamine receptor. Mutations in this gene have been associated with various behavioral phenotypes, including autonomic nervous system dysfunction, attention deficit/hyperactivity disorder, and the personality trait of novelty seeking.
DSCAM	Down syndrome cell adhesion molecule	
E2F1	E2F transcription factor 1	The protein encoded by this gene is a member of the E2F family of transcription factors which plays a crucial role in the control of cell cycle and action of tumor suppressor proteins and is also a target of the transforming proteins of small DNA tumor viruses. It can mediate both cell proliferation and p53-dependent/independent apoptosis.
EPOR	erythropoietin receptor	This erythropoietin receptor activates Jak2 tyrosine kinase which activates different intracellular pathways including: Ras/MAP kinase, phosphatidylinositol 3-kinase and STAT transcription factors. The stimulated erythropoietin receptor appears to have a role in erythroid cell survival.
ESPN	espin	
ESR1	estrogen receptor 1	This gene encodes an estrogen receptor which are essential for sexual development and reproductive function, but also play a role in other tissues such as bone.
FABP7	fatty acid binding protein 7, brain	The protein encoded by this gene is a brain fatty acid binding protein which is thought to play roles in fatty acid uptake, transport, and metabolism.
GABRB3	gamma-aminobutyric acid (GABA) A receptor, beta 3	The encoded protein is one of at least 13 distinct subunits of a multisubunit chloride channel that serves as the receptor for gamma-aminobutyric acid, the major inhibitory transmitter of the nervous system.
GABRG2	gamma-aminobutyric acid (GABA) A receptor, gamma 2	This gene encodes a gamma-aminobutyric acid (GABA) receptor. GABA is the major inhibitory neurotransmitter in the mammlian brain.
GAD1	glutamate decarboxylase 1 (brain, 67kDa)	The enzyme encoded is responsible for catalyzing the production of gamma-aminobutyric acid from L-glutamic acid.
GAD2	glutamate decarboxylase 2 (pancreatic islets and brain, 65kDa)	This gene encodes one of several forms of glutamic acid decarboxylase, identified as a major autoantigen in insulin-dependent diabetes.
GALP	galanin-like peptide	The encoded protein binds galanin receptors 1, 2 and 3 with the highest affinity for galanin receptor 3 and has been implicated in biological processes involving the central nervous system including hypothalamic regulation of metabolism and reproduction.
GALR3	galanin receptor 3	The neuropeptide galanin modulates a variety of physiologic processes including cognition/memory, sensory/pain processing, hormone secretion, and feeding behavior.
GCG	glucagon	Glucagon, is a pancreatic hormone that counteracts the glucose-lowering action of insulin by stimulating glycogenolysis and gluconeogenesis.
GDNF	glial cell derived neurotrophic factor	The recombinant form of this protein was shown to promote the survival and differentiation of dopaminergic neurons in culture, and was able to prevent apoptosis of motor neurons induced by axotomy.
GHSR	growth hormone secretagogue receptor	The encoded protein may play a role in energy homeostasis and regulation of body weight.

GLP1R	glucagon-like peptide 1 receptor	
GLS	glutaminase	This is the major enzyme yielding glutamate from glutamine. Significance of the enzyme derives from its possible implication in behavior disturbances in which glutamate acts as a neurotransmitter.
GNAO1	guanine nucleotide binding protein (G protein), alpha activating activity polypeptide O	
GNAT3	guanine nucleotide binding protein, alpha transducing 3	
GPR37	G protein-coupled receptor 37 (endothelin receptor type B-like)	
GRIA2	glutamate receptor, ionotropic, AMPA 2	Glutamate receptors are the predominant excitatory neurotransmitter receptors in the mammalian brain and are activated in a variety of normal neurophysiologic processes. This protein functions as ligand-activated cation channels.
GRIK2	glutamate receptor, ionotropic, kainate 2	This gene product belongs to the kainate family of glutamate receptors, which are composed of four subunits and function as ligand-activated ion channels.
GRIN2A	glutamate receptor, ionotropic, N-methyl D-aspartate 2A	These receptors have been shown to be involved in long-term potentiation, an activity-dependent increase in the efficiency of synaptic transmission thought to underlie certain kinds of memory and learning.
GRIN2B	glutamate receptor, ionotropic, N-methyl D-aspartate 2B	This NMDA receptor channel has been shown to be involved in long-term potentiation, an activity-dependent increase in the efficiency of synaptic transmission thought to underlie certain kinds of memory and learning.
GRM2	glutamate receptor, metabotropic 2	Glutamatergic neurotransmission is involved in most aspects of normal brain function and can be perturbed in many neuropathologic conditions. GRM2 and GRM3 are linked to the inhibition of the cyclic AMP cascade but differ in their agonist selectivities.
GRM6	glutamate receptor, metabotropic 6	Glutamatergic neurotransmission is involved in most aspects of normal brain function and can be perturbed in many neuropathologic conditions. GRM4, GRM6, GRM7 and GRM8 are linked to the inhibition of the cyclic AMP cascade but differ in their agonist selectivities.
GRM7	glutamate receptor, metabotropic 7	Glutamatergic neurotransmission is involved in most aspects of normal brain function and can be perturbed in many neuropathologic conditions. GRM4, GRM6, GRM7 and GRM8 are linked to the inhibition of the cyclic AMP cascade but differ in their agonist selectivities.
HCRTR2	hypocretin (orexin) receptor 2	The protein encoded by this gene is involved in the regulation of feeding behavior. The encoded protein binds the hypothalamic neuropeptides orexin A and orexin B.
HEXA	hexosaminidase A (alpha polypeptide)	Hexosaminidase A is the alpha subunit of the lysosomal enzyme beta-hexosaminidase that, together with the cofactor GM2 activator protein, catalyzes the degradation of the ganglioside GM2, and other molecules containing terminal N-acetyl hexosamines.
HRH3	histamine receptor H3	This gene encodes one of the histamine receptors (H3) which can regulate neurotransmitter release. This receptor can also increase voltage-dependent calcium current in smooth muscles and innervates the blood vessels and the heart in cardiovascular system.

HTR1A	5-hydroxytryptamine (serotonin) receptor 1A	
HTR2C	5-hydroxytryptamine (serotonin) receptor 2C	Serotonin (5-hydroxytryptamine, 5-HT), a neurotransmitter, elicits a wide array of physiological effects by binding to several receptor subtypes, including the 5-HT2 family of seven-transmembrane-spanning, G-protein-coupled receptors, which activate phospholipase C and D signaling pathways.
HTR5A	5-hydroxytryptamine (serotonin) receptor 5A	The neurotransmitter serotonin has been implicated in a wide range of psychiatric conditions and also has vasoconstrictive and vasodilatory effects. This protein is a member of serotonin receptor family and encodes a multi-pass membrane protein that functions as a receptor for serotonin and couples to G-proteins. This protein has been shown to function in part through the regulation of intracellular Ca2+ mobilization.
IGF1	insulin-like growth factor 1 (somatomedin C)	The protein encoded by this gene is similar to insulin in function and structure and is a member of a family of proteins involved in mediating growth and development.
IL1RN	interleukin 1 receptor antagonist	This protein inhibits the activities of interleukin 1, alpha (IL1A) and interleukin 1, beta (IL1B), and modulates a variety of interleukin 1 related immune and inflammatory responses.
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.
JPH1	junctophilin 1	The protein encoded by this gene is a component of junctional complexes and is composed of a C-terminal hydrophobic segment spanning the endoplasmic/sarcoplasmic reticulum membrane and a remaining cytoplasmic domain that shows specific affinity for the plasma membrane.
KCNAB1	potassium voltage-gated channel, shaker-related subfamily, beta member 1	Potassium channels' functions include regulating neurotransmitter release, heart rate, insulin secretion, neuronal excitability, epithelial electrolyte transport, smooth muscle contraction, and cell volume. This gene encodes a member of the potassium channel, voltage-gated, shaker-related subfamily.
KCNIP3	Kv channel interacting protein 3, calsenilin	This gene encodes a member of the family of voltage-gated potassium (Kv) channel-interacting proteins. They are integral subunit components of native Kv4 channel complexes that may regulate A-type currents, and hence neuronal excitability, in response to changes in intracellular calcium. The encoded protein also functions as a calcium-regulated transcriptional repressor, and interacts with presenilins.
KCNJ5	potassium inwardly-rectifying channel, subfamily J, member 5	Potassium channels are present in most mammalian cells, where they participate in a wide range of physiologic responses. The protein encoded by this gene is an integral membrane protein and inward-rectifier type potassium channel.
KIT	v-kit Hardy-Zuckerman 4 feline sarcoma viral oncogene homolog	This gene encodes the human homolog of the proto-oncogene c-kit. This protein is a type 3 transmembrane receptor for MGF (mast cell growth factor, also known as stem cell factor).
KRAS	v-Ki-ras2 Kirsten rat sarcoma viral oncogene homolog	This gene, a Kirsten ras oncogene, encodes a protein that is a member of the small GTPase superfamily.The transforming protein that results is implicated in various malignancies, including lung adenocarcinoma, mucinous adenoma, ductal carcinoma of the pancreas and colorectal carcinoma.
LALBA	lactalbumin, alpha-	This gene encodes alpha-lactalbumin, a principal protein of milk.
LAMA2	laminin, alpha 2	Laminin, an extracellular protein, is a major component of the basement membrane. It is thought to mediate the attachment, migration, and organization of cells into tissues during embryonic development by interacting with other extracellular matrix components.

LEPR	leptin receptor	Leptin (LEP; MIM 164160), an adipocyte-specific hormone that regulates adipose-tissue mass through hypothalamic effects on satiety and energy expenditure, acts through the leptin receptor (LEPR).
LHCGR	luteinizing hormone/choriogonadotropin receptor	This gene encodes the receptor for both luteinizing hormone and choriogonadotropin.
LHX8	LIM homeobox 8	Members of the LIM homeobox gene family, such as LHX8, encode transcription regulators that share common structural features Members of the LIM homeobox gene family are required for the patterning or the specification and differentiation of different cell types during embryonic development.
LINGO1	leucine rich repeat and Ig domain containing 1	
MAOB	monoamine oxidase B	This protein catalyzes the oxidative deamination of biogenic and xenobiotic amines and plays a role in the metabolism of neuroactive and vasoactive amines in the central nervous sysytem and peripheral tissues. This protein preferentially degrades benzylamine and phenylethylamine.
MAP6	microtubule-associated protein 6	This gene encodes a microtubule-associated protein. The encoded protein is a calmodulin-binding and calmodulin-regulated protein that is involved in microtubule stabilization.
MCHR1	melanin-concentrating hormone receptor 1	This protein binds melanin-concentrating hormone. The encoded protein can inhibit cAMP accumulation and stimulate intracellular calcium flux, and is probably involved in the neuronal regulation of food consumption.
MCOLN3	mucolipin 3	Mucolipins constitute a family of cation channel proteins with homologs in mouse, Drosophila, and C. elegans. Mutations in the human MCOLN1 gene (MIM 605248) cause mucolipodosis IV (MIM 262650).
MET	met proto-oncogene (hepatocyte growth factor receptor)	The proto-oncogene MET product is the hepatocyte growth factor receptor and encodes tyrosine-kinase activity.
MYCN	v-myc myelocytomatosis viral related oncogene, neuroblastoma derived (avian)	This protein is located in the nucleus and must dimerize with another bHLH protein in order to bind DNA. Amplification of this gene is associated with a variety of tumors, most notably neuroblastomas.
NCDN	neurochondrin	This gene encodes a protein, which is highly similar to a mouse protein that negatively regulates Ca/calmodulin-dependent protein kinase II phosphorylation and may be essential for spatial learning processes.
NEUROD2	neurogenic differentiation 2	Expression of this gene can induce transcription from neuron-specific promoters, such as the GAP-43 promoter, which contain a specific DNA sequence known as an E-box. The product of this gene is thought to play a role in the determination and maintenance of neuronal cell fates.
NF1	neurofibromin 1	This gene product appears to function as a negative regulator of the ras signal transduction pathway.
NHLH2	nescient helix loop helix 2	
NKX2-1	NK2 homeobox 1	
NLGN3	neuroligin 3	This gene encodes a member of a family of neuronal cell surface proteins. Members of this family may act as splice site-specific ligands for beta-neurexins and may be involved in the formation and remodeling of central nervous system synapses.
NLGN4X	neuroligin 4, X-linked	This protein may act as splice site-specific ligands for beta-neurexins and may be involved in the formation and remodeling of central nervous system synapses. The encoded protein interacts with discs, large (Drosophila) homolog 4 (DLG4).

NOS1	nitric oxide synthase 1 (neuronal)	Nitric oxide is a reactive free radical which mediates neurotransmission and antimicrobial and antitumoral activities. Nitric oxide is synthesized from L-arginine by nitric oxide synthases. This gene encodes a nitric oxide synthase which is highly expressed in skeletal muscle.
NOVA1	neuro-oncological ventral antigen 1	This gene encodes a neuron-specific RNA-binding protein, a member of the Nova family of paraneoplastic disease antigens, that is recognized and inhibited by paraneoplastic antibodies.
NPAS3	neuronal PAS domain protein 3	
NPY1R	neuropeptide Y receptor Y1	Neuropeptide Y exhibits a diverse range of important physiologic activities, including effects on psychomotor activity, food intake, regulation of central endocrine secretion, and potent vasoactive effects on the cardiovascular system.
NPY2R	neuropeptide Y receptor Y2	
NR2E1	nuclear receptor subfamily 2, group E, member 1	
NRG1	neuregulin 1	This protein is a signaling protein that mediates cell-cell interactions and plays critical roles in the growth and development of multiple organ systems.
NRTN	neurturin	Neurturin is a member of the TGF-beta subfamily, TRN. This gene signals through RET and a GPI-linked coreceptor, and promotes survival of neuronal populations.
NTRK2	neurotrophic tyrosine kinase, receptor, type 2	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation.
OBP2B	odorant binding protein 2B	
OPRK1	opioid receptor, kappa 1	
OR2H2	olfactory receptor, family 2, subfamily H, member 2	Olfactory receptors interact with odorant molecules in the nose, to initiate a neuronal response that triggers the perception of a smell.
P2RX2	purinergic receptor P2X, ligand-gated ion channel, 2	The product of this gene belongs to the family of purinoceptors for ATP. This receptor functions as a ligand-gated ion channel. Binding to ATP mediates synaptic transmission between neurons and from neurons to smooth muscle.
PARK2	Parkinson disease (autosomal recessive, juvenile) 2, parkin	The encoded protein is a component of a multiprotein E3 ubiquitin ligase complex that mediates the targeting of substrate proteins for proteasomal degradation.
PCDH15	protocadherin 15	This gene encodes an integral membrane protein that mediates calcium-dependent cell-cell adhesion. It plays an essential role in maintenance of normal retinal and cochlear function.
PDE10A	phosphodiesterase 10A	Phosphodiesterases, such as PDE10A, eliminate cAMP- and cGMP-mediated intracellular signaling by hydrolyzing the cyclic nucleotide to the corresponding nucleoside 5-prime monophosphate.
PDE1B	phosphodiesterase 1B, calmodulin-dependent	
PEX13	peroxisomal biogenesis factor 13	This gene encodes a peroxisomal membrane protein that binds the type 1 peroxisomal targeting signal receptor via a SH3 domain located in the cytoplasm.
PGR	progesterone receptor	The encoded protein mediates the physiological effects of progesterone, which plays a central role in reproductive events associated with the establishment and maintenance of pregnancy.
PLCL1	phospholipase C-like 1	
POU4F1	POU class 4 homeobox 1	POU4F1 is a class IV POU domain-containing transcription factor highly expressed in the developing sensory nervous system and in cells of the B- and T-lymphocytic lineages.

PPARGC1A	peroxisome proliferator-activated receptor gamma, coactivator 1 alpha	This protein is a transcriptional coactivator that regulates the genes involved in energy metabolism. This protein may be also involved in controlling blood pressure, regulating cellular cholesterol homoeostasis, and the development of obesity.
PRKAR2B	protein kinase, cAMP-dependent, regulatory, type II, beta	Knockout studies in mice suggest that this subunit may play an important role in regulating energy balance and adiposity.
PRKCA	protein kinase C, alpha	This kinase plays roles in many cellular processes, such as cell adhesion, cell transformation, cell cycle checkpoint, and cell volume control. Knockout studies in mice suggest that this kinase may be a fundamental regulator of cardiac contractility and Ca(2+) handling in myocytes.
PRKCG	protein kinase C, gamma	This kinase is expressed solely in the brain and spinal cord and its localization is restricted to neurons. It has been demonstrated that several neuronal functions, including long term potentiation (LTP) and long term depression (LTD), specifically require this kinase. Knockout studies in mice also suggest that this kinase may be involved in neuropathic pain development.
PRKG1	protein kinase, cGMP-dependent, type I	
PRLH	prolactin releasing hormone	
PRLR	prolactin receptor	
PTGER3	prostaglandin E receptor 3 (subtype EP3)	The functions of this protein include digestion, nervous system, kidney reabsorption, and uterine contraction activities. This receptor may also mediate adrenocorticotropic hormone response as well as fever generation in response to exogenous and endogenous stimuli.
PTK2	PTK2 protein tyrosine kinase 2	Activation of this gene may be an important early step in cell growth and intracellular signal transduction pathways triggered in response to certain neural peptides or to cell interactions with the extracellular matrix.
PTN	pleiotrophin	
PTPRD	protein tyrosine phosphatase, receptor type, D	PTPs like this one are known to be signaling molecules that regulate a variety of cellular processes including cell growth, differentiation, mitotic cycle, and oncogenic transformation. This PTP may also promote neurite growth, and regulate neurons axon guidance.
PYY	peptide YY	
RCAN1	regulator of calcineurin 1	The protein encoded by this gene interacts with calcineurin A and inhibits calcineurin-dependent signaling pathways, possibly affecting central nervous system development.
SLC18A2	solute carrier family 18 (vesicular monoamine), member 2	The vesicular monoamine transporter acts to accumulate cytosolic monoamines into synaptic vesicles, using the proton gradient maintained across the synaptic vesicular membrane. Its proper function is essential to the correct activity of the monoaminergic systems that have been implicated in several human neuropsychiatric disorders.
SLC1A2	solute carrier family 1 (glial high affinity glutamate transporter), member 2	The membrane-bound protein is the principal transporter that clears the excitatory neurotransmitter glutamate from the extracellular space at synapses in the central nervous system. Glutamate clearance is necessary for proper synaptic activation and to prevent neuronal damage from excessive activation of glutamate receptors.
SLC6A2	solute carrier family 6 (neurotransmitter transporter, noradrenalin), member 2	The SLC6A2 gene encodes a norepinephrine (noradrenaline) transporter, which is responsible for reuptake of norepinephrine into presynaptic nerve terminals and is a regulator of norepinephrine homeostasis.

	SOBP	sine oculis binding protein homolog (Drosophila)	
	SPTBN4	spectrin, beta, non-erythrocytic 4	Spectrin is an actin crosslinking and molecular scaffold protein that links the plasma membrane to the actin cytoskeleton, and functions in the determination of cell shape, arrangement of transmembrane proteins, and organization of organelles.
	TACR1	tachykinin receptor 1	This gene encodes the receptor for the tachykinin substance P, also referred to as neurokinin 1. The encoded protein is also involved in the mediation of phosphatidylinositol metabolism of substance P.
	TAL2	T-cell acute lymphocytic leukemia 2	Translocations between this gene on chromosome 9 and the T-cell receptor beta-chain locus on chromosome 7 have been associated with activation of the T-cell acute lymphocytic leukemia 2 gene and T-cell acute lymphoblastic leukemia.
	TAS2R1	taste receptor, type 2, member 1	This gene encodes a member of a family of candidate taste receptors that are specifically expressed by taste receptor cells of the tongue and palate epithelia, functioning as a bitter taste receptor.
	TAS2R4	taste receptor, type 2, member 4	This gene encodes a member of a family of candidate taste receptors that are specifically expressed by taste receptor cells of the tongue and palate epithelia, functioning as a bitter taste receptor.
	TH	tyrosine hydroxylase	The protein encoded by this gene is involved in the conversion of tyrosine to dopamine. It is the rate-limiting enzyme in the synthesis of catecholamines, hence plays a key role in the physiology of adrenergic neurons.
	THRB	thyroid hormone receptor, beta (erythroblastic leukemia viral (v-erb-a) oncogene homolog 2, avian)	The protein encoded by this gene is a nuclear hormone receptor for triiodothyronine. It is one of the several receptors for thyroid hormone, and has been shown to mediate the biological activities of thyroid hormone.
	TRH	thyrotropin-releasing hormone	
	TRPV1	transient receptor potential cation channel, subfamily V, member 1	The protein encoded by this gene is a receptor for capsaicin and is a non-selective cation channel that is structurally related to members of the TRP family of ion channels. This receptor is also activated by increases in temperature in the noxious range, suggesting that it functions as a transducer of painful thermal stimuli in vivo.
	UNC13C	unc-13 homolog C (C. elegans)	
	ZIC1	Zic family member 1 (odd-paired homolog, Drosophila)	This gene encodes a transcription factor that can bind and transactivate the apolipoprotein E gene.
Behavior: Learning: Learning (7.85E-07)	ABI2	abl interactor 2	
	ACCN2	amiloride-sensitive cation channel 2, neuronal	The member encoded by this gene is expressed in most if not all brain neurons, and it may be an ion channel subunit
	ADAM2	ADAM metallopeptidase domain 2	This gene has been implicated in a variety of biological processes involving cell-cell and cell-matrix interactions, including fertilization, muscle development, and neurogenesis.
	AFF2	AF4/FMR2 family, member 2	

ATM	ataxia telangiectasia mutated	This protein functions as a regulator of a wide variety of downstream proteins, including tumor suppressor proteins p53 and BRCA1, checkpoint kinase CHK2, checkpoint proteins RAD17 and RAD9, and DNA repair protein NBS1. This protein and the closely related kinase ATR are thought to be master controllers of cell cycle checkpoint signaling pathways that are required for cell response to DNA damage and for genome stability.
ATP1A3	ATPase, Na+/K+ transporting, alpha 3 polypeptide	This Na+/K+ -ATPase is responsible for establishing and maintaining the electrochemical gradients of Na and K ions across the plasma membrane. These gradients are essential for osmoregulation, for sodium-coupled transport of a variety of organic and inorganic molecules, and for electrical excitability of nerve and muscle.
BACE1	beta-site APP-cleaving enzyme 1	The encoded protein, a member of the peptidase A1 protein family, is a type I integral membrane glycoprotein and aspartic protease that is found mainly in the Golgi.
CACNA1C	calcium channel, voltage-dependent, L type, alpha 1C subunit	This gene encodes an alpha-1 subunit of a voltage-dependent calcium channel. Calcium channels mediate the influx of calcium ions into the cell upon membrane polarization.
CHRNA7	cholinergic receptor, nicotinic, alpha 7	The protein encoded by this gene forms a homo-oligomeric channel, displays marked permeability to calcium ions and is a major component of brain nicotinic receptors that are blocked by, and highly sensitive to, alpha-bungarotoxin.
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CRH	corticotropin releasing hormone	CRH is secreted by the paraventricular nucleus (PVN) of the hypothalamus in response to stress. In the placenta CRH is a marker that determines the length of gestation and the timing of parturition and delivery. CRH may also act as a trigger for parturition.
CRHR1	corticotropin releasing hormone receptor 1	The encoded protein is essential for the activation of signal transduction pathways that regulate diverse physiological processes including stress, reproduction, immune response and obesity.
DLG4	discs, large homolog 4 (Drosophila)	This MAGUK protein may interact at postsynaptic sites to form a multimeric scaffold for the clustering of receptors, ion channels, and associated signaling proteins.
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GABRB3	gamma-aminobutyric acid (GABA) A receptor, beta 3	The encoded protein is one of at least 13 distinct subunits of a multisubunit chloride channel that serves as the receptor for gamma-aminobutyric acid, the major inhibitory transmitter of the nervous system.
GALR3	galanin receptor 3	The neuropeptide galanin modulates a variety of physiologic processes including cognition/memory, sensory/pain processing, hormone secretion, and feeding behavior.
GLP1R	glucagon-like peptide 1 receptor	

GRIN2A	glutamate receptor, ionotropic, N-methyl D-aspartate 2A	These receptors have been shown to be involved in long-term potentiation, an activity-dependent increase in the efficiency of synaptic transmission thought to underlie certain kinds of memory and learning.
GRIN2B	glutamate receptor, ionotropic, N-methyl D-aspartate 2B	This NMDA receptor channel has been shown to be involved in long-term potentiation, an activity-dependent increase in the efficiency of synaptic transmission thought to underlie certain kinds of memory and learning.
GRM7	glutamate receptor, metabotropic 7	Glutamatergic neurotransmission is involved in most aspects of normal brain function and can be perturbed in many neuropathologic conditions. GRM4, GRM6, GRM7 and GRM8 are linked to the inhibition of the cyclic AMP cascade but differ in their agonist selectivities.
HRH3	histamine receptor H3	This gene encodes one of the histamine receptors (H3) which can regulate neurotransmitter release. This receptor can also increase voltage-dependent calcium current in smooth muscles and innervates the blood vessels and the heart in cardiovascular system.
HTR1A	5-hydroxytryptamine (serotonin) receptor 1A	
KCNAB1	potassium voltage-gated channel, shaker-related subfamily, beta member 1	Potassium channels' functions include regulating neurotransmitter release, heart rate, insulin secretion, neuronal excitability, epithelial electrolyte transport, smooth muscle contraction, and cell volume. This gene encodes a member of the potassium channel, voltage-gated, shaker-related subfamily.
KCNJ5	potassium inwardly-rectifying channel, subfamily J, member 5	Potassium channels are present in most mammalian cells, where they participate in a wide range of physiologic responses. The protein encoded by this gene is an integral membrane protein and inward-rectifier type potassium channel.
KCNJ5	potassium inwardly-rectifying channel, subfamily J, member 5	Potassium channels are present in most mammalian cells, where they participate in a wide range of physiologic responses. The protein encoded by this gene is an integral membrane protein and inward-rectifier type potassium channel.
KIT	v-kit Hardy-Zuckerman 4 feline sarcoma viral oncogene homolog	This gene encodes the human homolog of the proto-oncogene c-kit. This protein is a type 3 transmembrane receptor for MGF (mast cell growth factor, also known as stem cell factor).
KRAS	v-Ki-ras2 Kirsten rat sarcoma viral oncogene homolog	This gene, a Kirsten ras oncogene, encodes a protein that is a member of the small GTPase superfamily.The transforming protein that results is implicated in various malignancies, including lung adenocarcinoma, mucinous adenoma, ductal carcinoma of the pancreas and colorectal carcinoma.
LHX8	LIM homeobox 8	Members of the LIM homeobox gene family, such as LHX8, encode transcription regulators that share common structural features Members of the LIM homeobox gene family are required for the patterning or the specification and differentiation of different cell types during embryonic development.
NCDN	neurochondrin	This gene encodes a protein, which is highly similar to a mouse protein that negatively regulates Ca/calmodulin-dependent protein kinase II phosphorylation and may be essential for spatial learning processes.
NEUROD2	neurogenic differentiation 2	Expression of this gene can induce transcription from neuron-specific promoters, such as the GAP-43 promoter, which contain a specific DNA sequence known as an E-box. The product of this gene is thought to play a role in the determination and maintenance of neuronal cell fates.
NF1	neurofibromin 1	This gene product appears to function as a negative regulator of the ras signal transduction pathway.
NLGN3	neuroligin 3	This gene encodes a member of a family of neuronal cell surface proteins. Members of this family may act as splice site-specific ligands for beta-neurexins and may be involved in the formation and remodeling of central nervous system synapses.

	NRG1	neuregulin 1	This protein is a signaling protein that mediates cell-cell interactions and plays critical roles in the growth and development of multiple organ systems.
	NTRK2	neurotrophic tyrosine kinase, receptor, type 2	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation.
	PARK2	Parkinson disease (autosomal recessive, juvenile) 2, parkin	The encoded protein is a component of a multiprotein E3 ubiquitin ligase complex that mediates the targeting of substrate proteins for proteasomal degradation.
	PDE1B	phosphodiesterase 1B, calmodulin-dependent	
	PRKAR2B	protein kinase, cAMP-dependent, regulatory, type II, beta	Knockout studies in mice suggest that this subunit may play an important role in regulating energy balance and adiposity.
	PRKCA	protein kinase C, alpha	This kinase plays roles in many cellular processes, such as cell adhesion, cell transformation, cell cycle checkpoint, and cell volume control. Knockout studies in mice suggest that this kinase may be a fundamental regulator of cardiac contractility and Ca(2+) handling in myocytes.
	PRKCG	protein kinase C, gamma	This kinase is expressed solely in the brain and spinal cord and its localization is restricted to neurons. It has been demonstrated that several neuronal functions, including long term potentiation (LTP) and long term depression (LTD), specifically require this kinase. Knockout studies in mice also suggest that this kinase may be involved in neuropathic pain development.
	PTN	pleiotrophin	
	PTPRD	protein tyrosine phosphatase, receptor type, D	PTPs like this one are known to be signaling molecules that regulate a variety of cellular processes including cell growth, differentiation, mitotic cycle, and oncogenic transformation. This PTP may also promote neurite growth, and regulate neurons axon guidance.
	TH	tyrosine hydroxylase	The protein encoded by this gene is involved in the conversion of tyrosine to dopamine. It is the rate-limiting enzyme in the synthesis of catecholamines, hence plays a key role in the physiology of adrenergic neurons.
	UNC13C	unc-13 homolog C (C. elegans)	
Behavior: Cognition: Cognition (1.50E-06)	ABI2	abl interactor 2	
	ACCN2	amiloride-sensitive cation channel 2, neuronal	The member encoded by this gene is expressed in most if not all brain neurons, and it may be an ion channel subunit
	ADAM2	ADAM metallopeptidase domain 2	This gene has been implicated in a variety of biological processes involving cell-cell and cell-matrix interactions, including fertilization, muscle development, and neurogenesis.
	AFF2	AF4/FMR2 family, member 2	
	ATM	ataxia telangiectasia mutated	This protein functions as a regulator of a wide variety of downstream proteins, including tumor suppressor proteins p53 and BRCA1, checkpoint kinase CHK2, checkpoint proteins RAD17 and RAD9, and DNA repair protein NBS1. This protein and the closely related kinase ATR are thought to be master controllers of cell cycle checkpoint signaling pathways that are required for cell response to DNA damage and for genome stability.

ATP1A3	ATPase, Na+/K+ transporting, alpha 3 polypeptide	This Na+/K+ -ATPase is responsible for establishing and maintaining the electrochemical gradients of Na and K ions across the plasma membrane. These gradients are essential for osmoregulation, for sodium-coupled transport of a variety of organic and inorganic molecules, and for electrical excitability of nerve and muscle.
BACE1	beta-site APP-cleaving enzyme 1	The encoded protein, a member of the peptidase A1 protein family, is a type I integral membrane glycoprotein and aspartic protease that is found mainly in the Golgi.
CACNA1C	calcium channel, voltage-dependent, L type, alpha 1C subunit	This gene encodes an alpha-1 subunit of a voltage-dependent calcium channel. Calcium channels mediate the influx of calcium ions into the cell upon membrane polarization.
CHD7	chromodomain helicase DNA binding protein 7	This gene encodes a protein that contains several helicase family domains.
CHL1	cell adhesion molecule with homology to L1CAM (close homolog of L1)	The protein encoded by this gene is a neural recognition molecule that may be involved in signal transduction pathways.
CHRNA7	cholinergic receptor, nicotinic, alpha 7	The protein encoded by this gene forms a homo-oligomeric channel, displays marked permeability to calcium ions and is a major component of brain nicotinic receptors that are blocked by, and highly sensitive to, alpha-bungarotoxin.
CHRNB2	cholinergic receptor, nicotinic, beta 2 (neuronal)	The protein encoded by this gene belongs to a superfamily of ligand-gated ion channels which allow the flow of sodium and potassium across the plasma membrane in response to ligands such as acetylcholine and nicotine.
CPLX2	complexin 2	The protein product of this gene binds to the SNAP receptor complex and disrupts it, allowing transmitter release.
CRH	corticotropin releasing hormone	CRH is secreted by the paraventricular nucleus (PVN) of the hypothalamus in response to stress. In the placenta CRH is a marker that determines the length of gestation and the timing of parturition and delivery. CRH may also act as a trigger for parturition.
CRHR1	corticotropin releasing hormone receptor 1	The encoded protein is essential for the activation of signal transduction pathways that regulate diverse physiological processes including stress, reproduction, immune response and obesity.
DLG4	discs, large homolog 4 (Drosophila)	This MAGUK protein may interact at postsynaptic sites to form a multimeric scaffold for the clustering of receptors, ion channels, and associated signaling proteins.
DRD4	dopamine receptor D4	This gene encodes the D4 subtype of the dopamine receptor. Mutations in this gene have been associated with various behavioral phenotypes, including autonomic nervous system dysfunction, attention deficit/hyperactivity disorder, and the personality trait of novelty seeking.
EPOR	erythropoietin receptor	This erythropoietin receptor activates Jak2 tyrosine kinase which activates different intracellular pathways including: Ras/MAP kinase, phosphatidylinositol 3-kinase and STAT transcription factors. The stimulated erythropoietin receptor appears to have a role in erythroid cell survival.
GABRB3	gamma-aminobutyric acid (GABA) A receptor, beta 3	The encoded protein is one of at least 13 distinct subunits of a multisubunit chloride channel that serves as the receptor for gamma-aminobutyric acid, the major inhibitory transmitter of the nervous system.
GALR3	galanin receptor 3	The neuropeptide galanin modulates a variety of physiologic processes including cognition/memory, sensory/pain processing, hormone secretion, and feeding behavior.
GLP1R	glucagon-like peptide 1 receptor	

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HRH3	histamine receptor H3	This gene encodes one of the histamine receptors (H3) which can regulate neurotransmitter release. This receptor can also increase voltage-dependent calcium current in smooth muscles and innervates the blood vessels and the heart in cardiovascular system.
HTR4	5-hydroxytryptamine (serotonin) receptor 4	This gene is a member of the family of serotonin receptors, which stimulate cAMP production in response to serotonin (5-hydroxytryptamine). The gene product is a glycosylated transmembrane protein that functions in both the peripheral and central nervous system to modulate the release of various neurotransmitters.
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KCNAB1	potassium voltage-gated channel, shaker-related subfamily, beta member 1	Potassium channels' functions include regulating neurotransmitter release, heart rate, insulin secretion, neuronal excitability, epithelial electrolyte transport, smooth muscle contraction, and cell volume. This gene encodes a member of the potassium channel, voltage-gated, shaker-related subfamily.
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LHX8	LIM homeobox 8	Members of the LIM homeobox gene family, such as LHX8, encode transcription regulators that share common structural features Members of the LIM homeobox gene family are required for the patterning or the specification and differentiation of different cell types during embryonic development.
MAPT	microtubule-associated protein tau	MAPT transcripts are differentially expressed in the nervous system, depending on stage of neuronal maturation and neuron type.
NCDN	neurochondrin	This gene encodes a protein, which is highly similar to a mouse protein that negatively regulates Ca/calmodulin-dependent protein kinase II phosphorylation and may be essential for spatial learning processes.
NEUROD2	neurogenic differentiation 2	Expression of this gene can induce transcription from neuron-specific promoters, such as the GAP-43 promoter, which contain a specific DNA sequence known as an E-box. The product of this gene is thought to play a role in the determination and maintenance of neuronal cell fates.
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	PDE1B	phosphodiesterase 1B, calmodulin-dependent	
	PRKAR2B	protein kinase, cAMP-dependent, regulatory, type II, beta	Knockout studies in mice suggest that this subunit may play an important role in regulating energy balance and adiposity.
	PRKCA	protein kinase C, alpha	This kinase plays roles in many cellular processes, such as cell adhesion, cell transformation, cell cycle checkpoint, and cell volume control. Knockout studies in mice suggest that this kinase may be a fundamental regulator of cardiac contractility and Ca(2+) handling in myocytes.
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	PTN	pleiotrophin	
	PTPRD	protein tyrosine phosphatase, receptor type, D	PTPs like this one are known to be signaling molecules that regulate a variety of cellular processes including cell growth, differentiation, mitotic cycle, and oncogenic transformation. This PTP may also promote neurite growth, and regulate neurons axon guidance.
	TH	tyrosine hydroxylase	The protein encoded by this gene is involved in the conversion of tyrosine to dopamine. It is the rate-limiting enzyme in the synthesis of catecholamines, hence plays a key role in the physiology of adrenergic neurons.
	UNC13C	unc-13 homolog C (C. elegans)	
Behavior: Feeding: Feeding (1.23E-05), Feeding of Organism (2.02E-05)	CCKAR	cholecystokinin A receptor	This receptor is a major physiologic mediator of pancreatic enzyme secretion and smooth muscle contraction of the gallbladder and stomach. In the central and peripheral nervous system this receptor regulates satiety and the release of beta-endorphin and dopamine.
	CNR1	cannabinoid receptor 1 (brain)	This gene encodes one of two cannabinoid receptors, which have been found to be involved in the cannabinoid-induced CNS effects (including alterations in mood and cognition) experienced by users of marijuana.
	CRH	corticotropin releasing hormone	CRH is secreted by the paraventricular nucleus (PVN) of the hypothalamus in response to stress. In the placenta CRH is a marker that determines the length of gestation and the timing of parturition and delivery. CRH may also act as a trigger for parturition.

CRHR1	corticotropin releasing hormone receptor 1	The encoded protein is essential for the activation of signal transduction pathways that regulate diverse physiological processes including stress, reproduction, immune response and obesity.
DMBX1	diencephalon/mesencephalon homeobox 1	The encoded protein acts as a transcription factor and may play a role in brain and sensory organ development.
GALP	galanin-like peptide	The encoded protein binds galanin receptors 1, 2 and 3 with the highest affinity for galanin receptor 3 and has been implicated in biological processes involving the central nervous system including hypothalamic regulation of metabolism and reproduction.
GALR3	galanin receptor 3	The neuropeptide galanin modulates a variety of physiologic processes including cognition/memory, sensory/pain processing, hormone secretion, and feeding behavior.
GCG	glucagon	Glucagon, is a pancreatic hormone that counteracts the glucose-lowering action of insulin by stimulating glycogenolysis and gluconeogenesis.
GHSR	growth hormone secretagogue receptor	The encoded protein may play a role in energy homeostasis and regulation of body weight.
GLP1R	glucagon-like peptide 1 receptor	
GRIN2B	glutamate receptor, ionotropic, N-methyl D-aspartate 2B	This NMDA receptor channel has been shown to be involved in long-term potentiation, an activity-dependent increase in the efficiency of synaptic transmission thought to underlie certain kinds of memory and learning.
HCRTR2	hypocretin (orexin) receptor 2	The protein encoded by this gene is involved in the regulation of feeding behavior. The encoded protein binds the hypothalamic neuropeptides orexin A and orexin B.
HRH3	histamine receptor H3	This gene encodes one of the histamine receptors (H3) which can regulate neurotransmitter release. This receptor can also increase voltage-dependent calcium current in smooth muscles and innervates the blood vessels and the heart in cardiovascular system.
HTR2C	5-hydroxytryptamine (serotonin) receptor 2C	Serotonin (5-hydroxytryptamine, 5-HT), a neurotransmitter, elicits a wide array of physiological effects by binding to several receptor subtypes, including the 5-HT2 family of seven-transmembrane-spanning, G-protein-coupled receptors, which activate phospholipase C and D signaling pathways.
IL1RN	interleukin 1 receptor antagonist	This protein inhibits the activities of interleukin 1, alpha (IL1A) and interleukin 1, beta (IL1B), and modulates a variety of interleukin 1 related immune and inflammatory responses.
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.
JPH1	junctophilin 1	The protein encoded by this gene is a component of junctional complexes and is composed of a C-terminal hydrophobic segment spanning the endoplasmic/sarcoplasmic reticulum membrane and a remaining cytoplasmic domain that shows specific affinity for the plasma membrane.
LALBA	lactalbumin, alpha-	This gene encodes alpha-lactalbumin, a principal protein of milk.
LEPR	leptin receptor	Leptin (LEP; MIM 164160), an adipocyte-specific hormone that regulates adipose-tissue mass through hypothalamic effects on satiety and energy expenditure, acts through the leptin receptor (LEPR).
MCHR1	melanin-concentrating hormone receptor 1	This protein binds melanin-concentrating hormone. The encoded protein can inhibit cAMP accumulation and stimulate intracellular calcium flux, and is probably involved in the neuronal regulation of food consumption.
NKX2-1	NK2 homeobox 1	

	NPY1R	neuropeptide Y receptor Y1	Neuropeptide Y exhibits a diverse range of important physiologic activities, including effects on psychomotor activity, food intake, regulation of central endocrine secretion, and potent vasoactive effects on the cardiovascular system.
	NPY2R	neuropeptide Y receptor Y2	
	NTRK2	neurotrophic tyrosine kinase, receptor, type 2	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation.
	OPRK1	opioid receptor, kappa 1	
	PEX13	peroxisomal biogenesis factor 13	This gene encodes a peroxisomal membrane protein that binds the type 1 peroxisomal targeting signal receptor via a SH3 domain located in the cytoplasm.
	POU4F1	POU class 4 homeobox 1	POU4F1 is a class IV POU domain-containing transcription factor highly expressed in the developing sensory nervous system and in cells of the B- and T-lymphocytic lineages.
	PRLH	prolactin releasing hormone	
	PTGER3	prostaglandin E receptor 3 (subtype EP3)	The functions of this protein include digestion, nervous system, kidney reabsorption, and uterine contraction activities. This receptor may also mediate adrenocorticotropic hormone response as well as fever generation in response to exogenous and endogenous stimuli.
	PTK2	PTK2 protein tyrosine kinase 2	Activation of this gene may be an important early step in cell growth and intracellular signal transduction pathways triggered in response to certain neural peptides or to cell interactions with the extracellular matrix.
	PYY	peptide YY	
	SLC18A2	solute carrier family 18 (vesicular monoamine), member 2	The vesicular monoamine transporter acts to accumulate cytosolic monoamines into synaptic vesicles, using the proton gradient maintained across the synaptic vesicular membrane. Its proper function is essential to the correct activity of the monoaminergic systems that have been implicated in several human neuropsychiatric disorders.
	TH	tyrosine hydroxylase	The protein encoded by this gene is involved in the conversion of tyrosine to dopamine. It is the rate-limiting enzyme in the synthesis of catecholamines, hence plays a key role in the physiology of adrenergic neurons.
	TRH	thyrotropin-releasing hormone	
Behavior: Locomotion: Locomotion (1.86E-05)	ADCY1	adenylate cyclase 1 (brain)	This gene encodes a form of adenylate cyclase expressed in brain.
	ADCY5	adenylate cyclase 5	ADCY5 belongs to the adenylate cyclase (EC 4.6.1.1) family of enzymes responsible for the synthesis of cAMP.
	ALS2	amyotrophic lateral sclerosis 2 (juvenile)	The protein functions as a guanine nucleotide exchange factor for the small GTPase RAB5.
	AR	androgen receptor	This protein functions as a steroid-hormone activated transcription factor.
	ATP1A3	ATPase, Na+/K+ transporting, alpha 3 polypeptide	This Na+/K+ -ATPase is responsible for establishing and maintaining the electrochemical gradients of Na and K ions across the plasma membrane. These gradients are essential for osmoregulation, for sodium-coupled transport of a variety of organic and inorganic molecules, and for electrical excitability of nerve and muscle.

ATP2B2	ATPase, Ca++ transporting, plasma membrane 2	The protein encoded by this gene removes bivalent calcium ions from eukaryotic cells against very large concentration gradients and plays a critical role in intracellular calcium homeostasis. The expression of different isoforms and splice variants is regulated in a developmental, tissue- and cell type-specific manner, suggesting that these pumps are functionally adapted to the physiological needs of particular cells and tissues.
CACNA1C	calcium channel, voltage-dependent, L type, alpha 1C subunit	This gene encodes an alpha-1 subunit of a voltage-dependent calcium channel. Calcium channels mediate the influx of calcium ions into the cell upon membrane polarization.
CELSR1	cadherin, EGF LAG seven-pass G-type receptor 1 (flamingo homolog, Drosophila)	This particular member is a developmentally regulated, neural-specific gene which plays an unspecified role in early embryogenesis.
CHD7	chromodomain helicase DNA binding protein 7	This gene encodes a protein that contains several helicase family domains.
CHL1	cell adhesion molecule with homology to L1CAM (close homolog of L1)	The protein encoded by this gene is a neural recognition molecule that may be involved in signal transduction pathways.
CHRM1	cholinergic receptor, muscarinic 1	The muscarinic cholinergic receptor 1 is involved in mediation of vagally-induced bronchoconstriction and in the acid secretion of the gastrointestinal tract.
CHRNB2	cholinergic receptor, nicotinic, beta 2 (neuronal)	The protein encoded by this gene belongs to a superfamily of ligand-gated ion channels which allow the flow of sodium and potassium across the plasma membrane in response to ligands such as acetylcholine and nicotine.
CLN6	ceroid-lipofuscinosis, neuronal 6, late infantile, variant	This gene is one of eight which have been associated with neuronal ceroid lipofuscinoses (NCL). The genes responsible likely encode proteins involved in the degradation of post-translationally modified proteins in lysosomes.
CNR1	cannabinoid receptor 1 (brain)	This gene encodes one of two cannabinoid receptors, which have been found to be involved in the cannabinoid-induced CNS effects (including alterations in mood and cognition) experienced by users of marijuana.
CRH	corticotropin releasing hormone	CRH is secreted by the paraventricular nucleus (PVN) of the hypothalamus in response to stress. In the placenta CRH is a marker that determines the length of gestation and the timing of parturition and delivery. CRH may also act as a trigger for parturition.
CRHR1	corticotropin releasing hormone receptor 1	The encoded protein is essential for the activation of signal transduction pathways that regulate diverse physiological processes including stress, reproduction, immune response and obesity.
CSTB	cystatin B (stefin B)	This gene encodes a stefin that functions as an intracellular thiol protease inhibitor. The protein is able to form a dimer stabilized by noncovalent forces, inhibiting papain and cathepsins l, h and b. The protein is thought to play a role in protecting against the proteases leaking from lysosomes.
DLG4	discs, large homolog 4 (Drosophila)	This MAGUK protein may interact at postsynaptic sites to form a multimeric scaffold for the clustering of receptors, ion channels, and associated signaling proteins.
DMBX1	diencephalon/mesencephalon homeobox 1	The encoded protein acts as a transcription factor and may play a role in brain and sensory organ development.
DOCK1	dedicator of cytokinesis 1	This gene product binds to the SH3 domain of CRK protein. It may regulate cell surface extension and may have a role in the cell surface extension of an engulfing cell around a dying cell during apoptosis.

DRD4	dopamine receptor D4	This gene encodes the D4 subtype of the dopamine receptor. Mutations in this gene have been associated with various behavioral phenotypes, including autonomic nervous system dysfunction, attention deficit/hyperactivity disorder, and the personality trait of novelty seeking.
DSCAM	Down syndrome cell adhesion molecule	
EFNB3	ephrin-B3	EFNB3, a member of the ephrin gene family, is important in brain development as well as in its maintenance. It may play a pivotal role in forebrain function. The EPH and EPH-related receptors comprise the largest subfamily of receptor protein-tyrosine kinases and have been implicated in mediating developmental events, particularly in the nervous system.
ESPN	espin	
GABRB3	gamma-aminobutyric acid (GABA) A receptor, beta 3	The encoded protein is one of at least 13 distinct subunits of a multisubunit chloride channel that serves as the receptor for gamma-aminobutyric acid, the major inhibitory transmitter of the nervous system.
GAD2	glutamate decarboxylase 2 (pancreatic islets and brain, 65kDa)	This gene encodes one of several forms of glutamic acid decarboxylase, identified as a major autoantigen in insulin-dependent diabetes.
GDNF	glial cell derived neurotrophic factor	The recombinant form of this protein was shown to promote the survival and differentiation of dopaminergic neurons in culture, and was able to prevent apoptosis of motor neurons induced by axotomy.
GLP1R	glucagon-like peptide 1 receptor	
GNAO1	guanine nucleotide binding protein (G protein), alpha activating activity polypeptide O	
GPR37	G protein-coupled receptor 37 (endothelin receptor type B-like)	
GRIN2A	glutamate receptor, ionotropic, N-methyl D-aspartate 2A	These receptors have been shown to be involved in long-term potentiation, an activity-dependent increase in the efficiency of synaptic transmission thought to underlie certain kinds of memory and learning.
GRM2	glutamate receptor, metabotropic 2	Glutamatergic neurotransmission is involved in most aspects of normal brain function and can be perturbed in many neuropathologic conditions. GRM2 and GRM3 are linked to the inhibition of the cyclic AMP cascade but differ in their agonist selectivities.
GRM6	glutamate receptor, metabotropic 6	Glutamatergic neurotransmission is involved in most aspects of normal brain function and can be perturbed in many neuropathologic conditions. GRM4, GRM6, GRM7 and GRM8 are linked to the inhibition of the cyclic AMP cascade but differ in their agonist selectivities.
HEXA	hexosaminidase A (alpha polypeptide)	Hexosaminidase A is the alpha subunit of the lysosomal enzyme beta-hexosaminidase that, together with the cofactor GM2 activator protein, catalyzes the degradation of the ganglioside GM2, and other molecules containing terminal N-acetyl hexosamines.
HIPK2	homeodomain interacting protein kinase 2	HIPK2 is a conserved serine/threonine nuclear kinase that interacts with homeodomain transcription factors.

HOXD9	homeobox D9	This gene belongs to the homeobox family of genes. The homeobox genes encode a highly conserved family of transcription factors that play an important role in morphogenesis in all multicellular organisms. The exact role of this gene has not been determined.
HTRA2	HtrA serine peptidase 2	This gene encodes a serine protease. The protein is thought to induce apoptosis by binding the apoptosis inhibitory protein baculoviral IAP repeat-containing 4. Nuclear localization of this protein has also been observed.
KCNMA1	potassium large conductance calcium-activated channel, subfamily M, alpha member 1	MaxiK channels are large conductance, voltage and calcium-sensitive potassium channels which are fundamental to the control of smooth muscle tone and neuronal excitability.
MAOB	monoamine oxidase B	This protein catalyzes the oxidative deamination of biogenic and xenobiotic amines and plays a role in the metabolism of neuroactive and vasoactive amines in the central nervous sysytem and peripheral tissues. This protein preferentially degrades benzylamine and phenylethylamine.
MCOLN3	mucolipin 3	Mucolipins constitute a family of cation channel proteins with homologs in mouse, Drosophila, and C. elegans. Mutations in the human MCOLN1 gene (MIM 605248) cause mucolipodosis IV (MIM 262650).
MYO5A	myosin VA (heavy chain 12, myoxin)	Myosin V is a class of actin-based motor proteins involved in cytoplasmic vesicle transport and anchorage, spindle-pole alignment and mRNA translocation. The protein encoded by this gene is abundant in melanocytes and nerve cells.
NEFL	neurofilament, light polypeptide	Neurofilaments are type IV intermediate filament heteropolymers composed of light, medium, and heavy chains. Neurofilaments comprise the axoskeleton and they functionally maintain the neuronal caliber. They may also play a role in intracellular transport to axons and dendrites. This gene encodes the light chain neurofilament protein.
NOS1	nitric oxide synthase 1 (neuronal)	Nitric oxide is a reactive free radical which mediates neurotransmission and antimicrobial and antitumoral activities. Nitric oxide is synthesized from L-arginine by nitric oxide synthases. This gene encodes a nitric oxide synthase which is highly expressed in skeletal muscle.
NOVA1	neuro-oncological ventral antigen 1	This gene encodes a neuron-specific RNA-binding protein, a member of the Nova family of paraneoplastic disease antigens, that is recognized and inhibited by paraneoplastic antibodies.
NPAS3	neuronal PAS domain protein 3	
NPY1R	neuropeptide Y receptor Y1	Neuropeptide Y exhibits a diverse range of important physiologic activities, including effects on psychomotor activity, food intake, regulation of central endocrine secretion, and potent vasoactive effects on the cardiovascular system.
NPY2R	neuropeptide Y receptor Y2	
NRG1	neuregulin 1	This protein is a signaling protein that mediates cell-cell interactions and plays critical roles in the growth and development of multiple organ systems.
OPRK1	opioid receptor, kappa 1	
PARK2	Parkinson disease (autosomal recessive, juvenile) 2, parkin	The encoded protein is a component of a multiprotein E3 ubiquitin ligase complex that mediates the targeting of substrate proteins for proteasomal degradation.
PBX3	pre-B-cell leukemia homeobox 3	

	PCDH15	protocadherin 15	This gene encodes an integral membrane protein that mediates calcium-dependent cell-cell adhesion. It plays an essential role in maintenance of normal retinal and cochlear function.
	PDE10A	phosphodiesterase 10A	Phosphodiesterases, such as PDE10A, eliminate cAMP- and cGMP-mediated intracellular signaling by hydrolyzing the cyclic nucleotide to the corresponding nucleoside 5-prime monophosphate.
	PDE1B	phosphodiesterase 1B, calmodulin-dependent	
	PEX13	peroxisomal biogenesis factor 13	This gene encodes a peroxisomal membrane protein that binds the type 1 peroxisomal targeting signal receptor via a SH3 domain located in the cytoplasm.
	RCAN1	regulator of calcineurin 1	The protein encoded by this gene interacts with calcineurin A and inhibits calcineurin-dependent signaling pathways, possibly affecting central nervous system development.
	SLC18A2	solute carrier family 18 (vesicular monoamine), member 2	The vesicular monoamine transporter acts to accumulate cytosolic monoamines into synaptic vesicles, using the proton gradient maintained across the synaptic vesicular membrane. Its proper function is essential to the correct activity of the monoaminergic systems that have been implicated in several human neuropsychiatric disorders.
	SLC6A2	solute carrier family 6 (neurotransmitter transporter, noradrenalin), member 2	The SLC6A2 gene encodes a norepinephrine (noradrenaline) transporter, which is responsible for reuptake of norepinephrine into presynaptic nerve terminals and is a regulator of norepinephrine homeostasis.
	SNCG	synuclein, gamma (breast cancer-specific protein 1)	This gene encodes a member of the synuclein family of proteins which are believed to be involved in the pathogenesis of neurodegenerative diseases.
	SOBP	sine oculis binding protein homolog (Drosophila)	
	SPTBN4	spectrin, beta, non-erythrocytic 4	Spectrin is an actin crosslinking and molecular scaffold protein that links the plasma membrane to the actin cytoskeleton, and functions in the determination of cell shape, arrangement of transmembrane proteins, and organization of organelles.
	TH	tyrosine hydroxylase	The protein encoded by this gene is involved in the conversion of tyrosine to dopamine. It is the rate-limiting enzyme in the synthesis of catecholamines, hence plays a key role in the physiology of adrenergic neurons.
	TRH	thyrotropin-releasing hormone	
Behavior, Nervous System Development and Function: Memory: Memory (2.00E-04)	ACCN2	amiloride-sensitive cation channel 2, neuronal	The member encoded by this gene is expressed in most if not all brain neurons, and it may be an ion channel subunit
	ADCY1	adenylate cyclase 1 (brain)	This gene encodes a form of adenylate cyclase expressed in brain.
	ATP1A3	ATPase, Na+/K+ transporting, alpha 3 polypeptide	This Na+/K+ -ATPase is responsible for establishing and maintaining the electrochemical gradients of Na and K ions across the plasma membrane. These gradients are essential for osmoregulation, for sodium-coupled transport of a variety of organic and inorganic molecules, and for electrical excitability of nerve and muscle.
	BACE1	beta-site APP-cleaving enzyme 1	The encoded protein, a member of the peptidase A1 protein family, is a type I integral membrane glycoprotein and aspartic protease that is found mainly in the Golgi.

CD47	CD47 molecule	This protein, involved in the increase in intracellular calcium concentration that occurs upon cell adhesion to extracellular matrix, is also a receptor for the C-terminal cell binding domain of thrombospondin, and plays a role in membrane transport and signal transduction. Is has broad tissue distribution.
CHRNA7	cholinergic receptor, nicotinic, alpha 7	The protein encoded by this gene forms a homo-oligomeric channel, displays marked permeability to calcium ions and is a major component of brain nicotinic receptors that are blocked by, and highly sensitive to, alpha-bungarotoxin.
CHRNB2	cholinergic receptor, nicotinic, beta 2 (neuronal)	The protein encoded by this gene belongs to a superfamily of ligand-gated ion channels which allow the flow of sodium and potassium across the plasma membrane in response to ligands such as acetylcholine and nicotine.
CRH	corticotropin releasing hormone	CRH is secreted by the paraventricular nucleus (PVN) of the hypothalamus in response to stress. In the placenta CRH is a marker that determines the length of gestation and the timing of parturition and delivery. CRH may also act as a trigger for parturition.
CRHR1	corticotropin releasing hormone receptor 1	The encoded protein is essential for the activation of signal transduction pathways that regulate diverse physiological processes including stress, reproduction, immune response and obesity.
CSF3	colony stimulating factor 3 (granulocyte)	The protein encoded by this gene is a cytokine that controls the production, differentiation, and function of granulocytes.
DRD4	dopamine receptor D4	This gene encodes the D4 subtype of the dopamine receptor. Mutations in this gene have been associated with various behavioral phenotypes, including autonomic nervous system dysfunction, attention deficit/hyperactivity disorder, and the personality trait of novelty seeking.
ESR1	estrogen receptor 1	This gene encodes an estrogen receptor which are essential for sexual development and reproductive function, but also play a role in other tissues such as bone.
GABRB3	gamma-aminobutyric acid (GABA) A receptor, beta 3	The encoded protein is one of at least 13 distinct subunits of a multisubunit chloride channel that serves as the receptor for gamma-aminobutyric acid, the major inhibitory transmitter of the nervous system.
GLP1R	glucagon-like peptide 1 receptor	
GRIA2	glutamate receptor, ionotropic, AMPA 2	Glutamate receptors are the predominant excitatory neurotransmitter receptors in the mammalian brain and are activated in a variety of normal neurophysiologic processes. This protein functions as ligand-activated cation channels.
GRIN2A	glutamate receptor, ionotropic, N-methyl D-aspartate 2A	These receptors have been shown to be involved in long-term potentiation, an activity-dependent increase in the efficiency of synaptic transmission thought to underlie certain kinds of memory and learning.
GRIN2B	glutamate receptor, ionotropic, N-methyl D-aspartate 2B	This NMDA receptor channel has been shown to be involved in long-term potentiation, an activity-dependent increase in the efficiency of synaptic transmission thought to underlie certain kinds of memory and learning.
GRM7	glutamate receptor, metabotropic 7	Glutamatergic neurotransmission is involved in most aspects of normal brain function and can be perturbed in many neuropathologic conditions. GRM4, GRM6, GRM7 and GRM8 are linked to the inhibition of the cyclic AMP cascade but differ in their agonist selectivities.
HRH3	histamine receptor H3	This gene encodes one of the histamine receptors (H3) which can regulate neurotransmitter release. This receptor can also increase voltage-dependent calcium current in smooth muscles and innervates the blood vessels and the heart in cardiovascular system.
HTR1A	5-hydroxytryptamine (serotonin) receptor 1A	

	HTR2C	5-hydroxytryptamine (serotonin) receptor 2C	Serotonin (5-hydroxytryptamine, 5-HT), a neurotransmitter, elicits a wide array of physiological effects by binding to several receptor subtypes, including the 5-HT2 family of seven-transmembrane-spanning, G-protein-coupled receptors, which activate phospholipase C and D signaling pathways.
	IGF1	insulin-like growth factor 1 (somatomedin C)	The protein encoded by this gene is similar to insulin in function and structure and is a member of a family of proteins involved in mediating growth and development.
	IL1RN	interleukin 1 receptor antagonist	This protein inhibits the activities of interleukin 1, alpha (IL1A) and interleukin 1, beta (IL1B), and modulates a variety of interleukin 1 related immune and inflammatory responses.
	JPH4	junctophilin 4	This gene encodes a member of the junctophilin family of transmembrane proteins that are involved in the formation of the junctional membrane complexes between the plasma membrane and the endoplasmic/sarcoplasmic reticulum in excitable cells.
	KCNAB1	potassium voltage-gated channel, shaker-related subfamily, beta member 1	Potassium channels' functions include regulating neurotransmitter release, heart rate, insulin secretion, neuronal excitability, epithelial electrolyte transport, smooth muscle contraction, and cell volume. This gene encodes a member of the potassium channel, voltage-gated, shaker-related subfamily.
	KCNJ5	potassium inwardly-rectifying channel, subfamily J, member 5	Potassium channels are present in most mammalian cells, where they participate in a wide range of physiologic responses. The protein encoded by this gene is an integral membrane protein and inward-rectifier type potassium channel.
	NCAM1	neural cell adhesion molecule 1	
	NPAS3	neuronal PAS domain protein 3	
	PTEN	phosphatase and tensin homolog	This protein preferentially dephosphorylates phosphoinositide substrates. It negatively regulates intracellular levels of phosphatidylinositol-3,4,5-trisphosphate in cells and functions as a tumor suppressor by negatively regulating AKT/PKB signaling pathway.
	RCAN1	regulator of calcineurin 1	The protein encoded by this gene interacts with calcineurin A and inhibits calcineurin-dependent signaling pathways, possibly affecting central nervous system development.
	SNAP25	synaptosomal-associated protein, 25kDa	This gene product is a presynaptic plasma membrane protein involved in the regulation of neurotransmitter release.
	TH	tyrosine hydroxylase	The protein encoded by this gene is involved in the conversion of tyrosine to dopamine. It is the rate-limiting enzyme in the synthesis of catecholamines, hence plays a key role in the physiology of adrenergic neurons.
Behavior: Fear: Fear (6.29E-04)	AFF2	AF4/FMR2 family, member 2	
	ALS2	amyotrophic lateral sclerosis 2 (juvenile)	The protein functions as a guanine nucleotide exchange factor for the small GTPase RAB5.
	BCL2	B-cell CLL/lymphoma 2	This gene encodes an integral outer mitochondrial membrane protein that blocks the apoptotic death of some cells such as lymphocytes.
	CRH	corticotropin releasing hormone	CRH is secreted by the paraventricular nucleus (PVN) of the hypothalamus in response to stress. In the placenta CRH is a marker that determines the length of gestation and the timing of parturition and delivery. CRH may also act as a trigger for parturition.
	CTNNA2	catenin (cadherin-associated protein), alpha 2	

	DRD4	dopamine receptor D4	This gene encodes the D4 subtype of the dopamine receptor. Mutations in this gene have been associated with various behavioral phenotypes, including autonomic nervous system dysfunction, attention deficit/hyperactivity disorder, and the personality trait of novelty seeking.
	GABRG2	gamma-aminobutyric acid (GABA) A receptor, gamma 2	This gene encodes a gamma-aminobutyric acid (GABA) receptor. GABA is the major inhibitory neurotransmitter in the mammlian brain.
	GRIK2	glutamate receptor, ionotropic, kainate 2	This gene product belongs to the kainate family of glutamate receptors, which are composed of four subunits and function as ligand-activated ion channels.
	GRIN2B	glutamate receptor, ionotropic, N-methyl D-aspartate 2B	This NMDA receptor channel has been shown to be involved in long-term potentiation, an activity-dependent increase in the efficiency of synaptic transmission thought to underlie certain kinds of memory and learning.
	GRM2	glutamate receptor, metabotropic 2	Glutamatergic neurotransmission is involved in most aspects of normal brain function and can be perturbed in many neuropathologic conditions. GRM2 and GRM3 are linked to the inhibition of the cyclic AMP cascade but differ in their agonist selectivities.
	GRM7	glutamate receptor, metabotropic 7	Glutamatergic neurotransmission is involved in most aspects of normal brain function and can be perturbed in many neuropathologic conditions. GRM4, GRM6, GRM7 and GRM8 are linked to the inhibition of the cyclic AMP cascade but differ in their agonist selectivities.
	NEUROD2	neurogenic differentiation 2	Expression of this gene can induce transcription from neuron-specific promoters, such as the GAP-43 promoter, which contain a specific DNA sequence known as an E-box. The product of this gene is thought to play a role in the determination and maintenance of neuronal cell fates.
	NPY2R	neuropeptide Y receptor Y2	
Behavior: Maternal Behavior: Maternal Behavior (5.00E-03)	ESR1	estrogen receptor 1	This gene encodes an estrogen receptor which are essential for sexual development and reproductive function, but also play a role in other tissues such as bone.
	GABRB3	gamma-aminobutyric acid (GABA) A receptor, beta 3	The encoded protein is one of at least 13 distinct subunits of a multisubunit chloride channel that serves as the receptor for gamma-aminobutyric acid, the major inhibitory transmitter of the nervous system.
	NR2E1	nuclear receptor subfamily 2, group E, member 1	
	PGR	progesterone receptor	The encoded protein mediates the physiological effects of progesterone, which plays a central role in reproductive events associated with the establishment and maintenance of pregnancy.
	PRLR	prolactin receptor	
Behavior: Sniffing: Sniffing (4.95E-03)	CYP19A1	cytochrome P450, family 19, subfamily A, polypeptide 1	This protein localizes to the endoplasmic reticulum and catalyzes the last steps of estrogen biosynthesis, three successive hydroxylations of the A ring of androgens.
	OBP2B	odorant binding protein 2B	
	PRKCG	protein kinase C, gamma	This kinase is expressed solely in the brain and spinal cord and its localization is restricted to neurons. It has been demonstrated that several neuronal functions, including long term potentiation (LTP) and long term depression (LTD), specifically require this kinase. Knockout studies in mice also suggest that this kinase may be involved in neuropathic pain development.
	TAS2R1	taste receptor, type 2, member 1	This gene encodes a member of a family of candidate taste receptors that are specifically expressed by taste receptor cells of the tongue and palate epithelia, functioning as a bitter taste receptor.

	TRPV1	transient receptor potential cation channel, subfamily V, member 1	The protein encoded by this gene is a receptor for capsaicin and is a non-selective cation channel that is structurally related to members of the TRP family of ion channels. This receptor is also activated by increases in temperature in the noxious range, suggesting that it functions as a transducer of painful thermal stimuli in vivo.
Behavior: Spatial Learning: Spatial Learning (1.31E-02)	ADAM2	ADAM metallopeptidase domain 2	This gene has been implicated in a variety of biological processes involving cell-cell and cell-matrix interactions, including fertilization, muscle development, and neurogenesis.
	ATP1A3	ATPase, Na+/K+ transporting, alpha 3 polypeptide	This Na+/K+ -ATPase is responsible for establishing and maintaining the electrochemical gradients of Na and K ions across the plasma membrane. These gradients are essential for osmoregulation, for sodium-coupled transport of a variety of organic and inorganic molecules, and for electrical excitability of nerve and muscle.
	CACNA1C	calcium channel, voltage-dependent, L type, alpha 1C subunit	This gene encodes an alpha-1 subunit of a voltage-dependent calcium channel. Calcium channels mediate the influx of calcium ions into the cell upon membrane polarization.
	CHRNB2	cholinergic receptor, nicotinic, beta 2 (neuronal)	The protein encoded by this gene belongs to a superfamily of ligand-gated ion channels which allow the flow of sodium and potassium across the plasma membrane in response to ligands such as acetylcholine and nicotine.
	CRHR1	corticotropin releasing hormone receptor 1	The encoded protein is essential for the activation of signal transduction pathways that regulate diverse physiological processes including stress, reproduction, immune response and obesity.
	GRIN2A	glutamate receptor, ionotropic, N-methyl D-aspartate 2A	These receptors have been shown to be involved in long-term potentiation, an activity-dependent increase in the efficiency of synaptic transmission thought to underlie certain kinds of memory and learning.
	KCNJ5	potassium inwardly-rectifying channel, subfamily J, member 5	Potassium channels are present in most mammalian cells, where they participate in a wide range of physiologic responses. The protein encoded by this gene is an integral membrane protein and inward-rectifier type potassium channel.
	KIT	v-kit Hardy-Zuckerman 4 feline sarcoma viral oncogene homolog	This gene encodes the human homolog of the proto-oncogene c-kit. This protein is a type 3 transmembrane receptor for MGF (mast cell growth factor, also known as stem cell factor).
	KRAS	v-Ki-ras2 Kirsten rat sarcoma viral oncogene homolog	This gene, a Kirsten ras oncogene, encodes a protein that is a member of the small GTPase superfamily.The transforming protein that results is implicated in various malignancies, including lung adenocarcinoma, mucinous adenoma, ductal carcinoma of the pancreas and colorectal carcinoma.
	NCDN	neurochondrin	This gene encodes a protein, which is highly similar to a mouse protein that negatively regulates Ca/calmodulin-dependent protein kinase II phosphorylation and may be essential for spatial learning processes.
	NF1	neurofibromin 1	This gene product appears to function as a negative regulator of the ras signal transduction pathway.
	NLGN3	neuroligin 3	This gene encodes a member of a family of neuronal cell surface proteins. Members of this family may act as splice site-specific ligands for beta-neurexins and may be involved in the formation and remodeling of central nervous system synapses.
	NTRK2	neurotrophic tyrosine kinase, receptor, type 2	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation.

	PDE1B	phosphodiesterase 1B, calmodulin-dependent	
	PTPRD	protein tyrosine phosphatase, receptor type, D	PTPs like this one are known to be signaling molecules that regulate a variety of cellular processes including cell growth, differentiation, mitotic cycle, and oncogenic transformation. This PTP may also promote neurite growth, and regulate neurons axon guidance.
Tissue Development: Development: Development of Tissue (4.58E-07), *including* Development of Cartilage Tissue (4.09E-04), Development of Nerves (see also Nervous System Development and Function) (5.09E-04), Development of Placode (4.86E-03), Development of Muscle (5.47E-03), Development of Metanephros (5.58E-03), Development of Epithelial Tissue (7.42E-03), Development of Fetal Membranes (7.64E-03), Development of Connective Tissue (8.33E-03), Development of Nervous Tissue (see also Nervous System Development and Function) (1.46E-02,) Development of Allantois (1.65E-02)	ACVRL1	activin A receptor type II-like 1	The encoded protein, sometimes termed ALK1, shares similar domain structures with other closely related ALK or activin receptor-like kinase proteins that form a subfamily of receptor serine/threonine kinases.
	ADAM12	ADAM metallopeptidase domain 12	This protein has been implicated in a variety of biological processes involving cell-cell and cell-matrix interactions, including fertilization, muscle development, and neurogenesis.
	AGTR2	angiotensin II receptor, type 2	AGTR2 plays a role in the central nervous system and cardiovascular functions that are mediated by the renin-angiotensin system. This receptor mediates programmed cell death (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.
ANGPT1	angiopoietin 1	This protein plays a role in mediating reciprocal interactions between the endothelium and surrounding matrix and mesenchyme. It also contributes to blood vessel maturation and stability, and may be involved in early development of the heart.
ARSB	arylsulfatase B	The arylsulfatase B homodimer hydrolyzes sulfate groups of N-Acetyl-D-galactosamine, chondriotin sulfate, and dermatan sulfate. The protein is targetted to the lysozyme.
ASCL1	achaete-scute complex homolog 1 (Drosophila)	The protein activates transcription by binding to the E box. This protein plays a role in the neuronal commitment and differentiation and in the generation of olfactory and autonomic neurons.
B4GALNT1	beta-1,4-N-acetyl-galactosaminyl transferase 1	GalNAc-T is the enzyme involved in the biosynthesis of G(M2) and G(D2) glycosphingolipids. GalNAc-T catalyzes the transfer of GalNAc into G(M3) and G(D3) by a beta-1,4 linkage, resulting in the synthesis of G(M2) and G(D2), respectively.
BACE1	beta-site APP-cleaving enzyme 1	The encoded protein, a member of the peptidase A1 protein family, is a type I integral membrane glycoprotein and aspartic protease that is found mainly in the Golgi.
BCL2	B-cell CLL/lymphoma 2	This gene encodes an integral outer mitochondrial membrane protein that blocks the apoptotic death of some cells such as lymphocytes.
BMP5	bone morphogenetic protein 5	This protein may act as signaling molecule within the trabecular meshwork and optic nerve head, and may play a potential role in glaucoma pathogenesis. This gene is differentially regulated during the formation of various tumors.
BMP7	bone morphogenetic protein 7	Based on its expression early in embryogenesis, the BMP encoded by this gene has a proposed role in early development and possible bone inductive activity.
BMPR1B	bone morphogenetic protein receptor, type IB	The ligands of this receptor are BMPs, which are members of the TGF-beta superfamily. BMPs are involved in endochondral bone formation and embryogenesis.
BMX	BMX non-receptor tyrosine kinase	One family of nonreceptor TKs includes the genes TEC (MIM 600583), TXK (MIM 600058), ITK (MIM 186973), and BTK (MIM 300300).
CDON	Cdon homolog (mouse)	CDON and BOC (MIM 608708) are cell surface receptors of the immunoglobulin (Ig)/fibronectin type III (FNIII; see MIM 135600) repeat family involved in myogenic differentiation. CDON and BOC are coexpressed during development.
CHRNB2	cholinergic receptor, nicotinic, beta 2 (neuronal)	The protein encoded by this gene belongs to a superfamily of ligand-gated ion channels which allow the flow of sodium and potassium across the plasma membrane in response to ligands such as acetylcholine and nicotine.
COL10A1	collagen, type X, alpha 1	This gene encodes the alpha chain of type X collagen, a short chain collagen expressed by hypertrophic chondrocytes during endochondral ossification. Unlike type VIII collagen, the other short chain collagen, type X collagen is a homotrimer.
COL11A1	collagen, type XI, alpha 1	This gene encodes one of the two alpha chains of type XI collagen, a minor fibrillar collagen. Type XI collagen is a heterotrimer but the third alpha chain is a post-translationally modified alpha 1 type II chain.
COL5A3	collagen, type V, alpha 3	Type V collagen is found in tissues containing type I collagen and appears to regulate the assembly of heterotypic fibers composed of both type I and type V collagen.
COL9A1	collagen, type IX, alpha 1	This gene encodes one of the three alpha chains of type IX collagen, which is a minor (5-20%) collagen component of hyaline cartilage. Type IX collagen is usually found in tissues containing type II collagen, a fibrillar collagen.

CRYGS	crystallin, gamma S	This gene encodes the most significant gamma-crystallin in adult eye lens tissue. Whether due to aging or mutations in specific genes, gamma-crystallins have been involved in cataract formation.
CTF1	cardiotrophin 1	The protein encoded by this gene is a secreted cytokine that induces cardiac myocyte hypertrophy in vitro. It has been shown to bind and activate the ILST/gp130 receoptor.
CXCL13	chemokine (C-X-C motif) ligand 13	B lymphocyte chemoattractant is a CXC chemokine strongly expressed in the follicles of the spleen, lymph nodes, and Peyer's patches. It promotes the migration of B lymphocytes (compared to T cells and macrophages), apparently by stimulating calcium influx into, and chemotaxis of, cells expressing Burkitt's lymphoma receptor 1 (BLR-1). It may therefore function in the homing of B lymphocytes to follicles.
CYP27B1	cytochrome P450, family 27, subfamily B, polypeptide 1	This enzyme regulates the level of biologically active vitamin D and plays an important role in calcium homeostasis.
DLL3	delta-like 3 (Drosophila)	This gene encodes a member of the delta protein ligand family. This family functions as Notch ligands that are characterized by a DSL domain, EGF repeats, and a transmembrane domain.
DLX1	distal-less homeobox 1	This protein may function as a transcriptional regulator of signals from multiple TGF-{beta} superfamily members. It may play a role in the control of craniofacial patterning and the differentiation and survival of inhibitory neurons in the forebrain.
DMD	dystrophin	Dystrophin is part of the dystrophin-glycoprotein complex (DGC), which bridges the inner cytoskeleton (F-actin) and the extra-cellular matrix.
E2F1	E2F transcription factor 1	The protein encoded by this gene is a member of the E2F family of transcription factors which plays a crucial role in the control of cell cycle and action of tumor suppressor proteins and is also a target of the transforming proteins of small DNA tumor viruses. It can mediate both cell proliferation and p53-dependent/independent apoptosis.
ECE2	endothelin converting enzyme 2	Endothelin-converting enzymes, such as ECE2 (EC 3.4.24.71), are type II metalloproteases that generate functionally pleiotropic members of the endothelin vasoactive peptide family.
EDA	ectodysplasin A	The encoded protein, which belongs to the tumor necrosis factor family, acts as a homotrimer and may be involved in cell-cell signaling during the development of ectodermal organs.
EDIL3	EGF-like repeats and discoidin I-like domains 3	The protein encoded by this gene is an integrin ligand. It plays an important role in mediating angiogenesis and may be important in vessel wall remodeling and development. It also influences endothelial cell behavior.
EDNRA	endothelin receptor type A	
EFNB3	ephrin-B3	EFNB3, a member of the ephrin gene family, is important in brain development as well as in its maintenance. It may play a pivotal role in forebrain function. The EPH and EPH-related receptors comprise the largest subfamily of receptor protein-tyrosine kinases and have been implicated in mediating developmental events, particularly in the nervous system.
ENAH	enabled homolog (Drosophila)	
ENPP1	ectonucleotide pyrophosphatase/phosphodiesterase 1	This protein cleaves many substrates, including phosphodiester bonds of nucleotides and nucleotide sugars and pyrophosphate bonds of nucleotides and nucleotide sugars. It may function to hydrolyze nucleoside 5' triphosphates to their corresponding monophosphates and diadenosine polyphosphates.
EPHA7	EPH receptor A7	EPH and EPH-related receptors have been implicated in mediating developmental events, particularly in the nervous system.

EPOR	erythropoietin receptor	This erythropoietin receptor activates Jak2 tyrosine kinase which activates different intracellular pathways including: Ras/MAP kinase, phosphatidylinositol 3-kinase and STAT transcription factors. The stimulated erythropoietin receptor appears to have a role in erythroid cell survival.
ERBB4	v-erb-a erythroblastic leukemia viral oncogene homolog 4 (avian)	This gene encodes a protein which binds to and is activated by neuregulins and other factors and induces a variety of cellular responses including mitogenesis and differentiation.
ESR1	estrogen receptor 1	This gene encodes an estrogen receptor which are essential for sexual development and reproductive function, but also play a role in other tissues such as bone.
ESRRB	estrogen-related receptor beta	This protein is similar to the estrogen receptor. Its function is unknown; however, a similar protein in mouse plays a key role in placental development.
EVI1	ecotropic viral integration site 1	
EYA1	eyes absent homolog 1 (Drosophila)	The encoded protein may play a role in the developing kidney, branchial arches, eye, and ear.
FASLG	Fas ligand (TNF superfamily, member 6)	Interaction of FAS with this ligand is critical in triggering apoptosis of some types of cells such as lymphocytes.
FGF1	fibroblast growth factor 1 (acidic)	This protein functions as a modifier of endothelial cell migration and proliferation, as well as an angiogenic factor. It acts as a mitogen for a variety of mesoderm- and neuroectoderm-derived cells in vitro, thus is thought to be involved in organogenesis.
FGF2	fibroblast growth factor 2 (basic)	The CUG-initiated isoforms of this gene are localized in the nucleus and are responsible for the intracrine effect, whereas, the AUG-initiated form is mostly cytosolic and is responsible for the paracrine and autocrine effects of this FGF.
FGF4	fibroblast growth factor 4	This gene was identified by its oncogenic transforming activity.Studies on the mouse homolog suggested a function in bone morphogenesis and limb development through the sonic hedgehog (SHH) signaling pathway.
FGF7	fibroblast growth factor 7 (keratinocyte growth factor)	This protein is an epithelial cell-specific growth factor, whose mitogenic activity is exhibited in keratinocytes but not in fibroblasts and endothelial cells. It may also be implicated roles in morphogenesis of epithelium, reepithelialization of wounds, hair development and early lung organogenesis.
FGF10	fibroblast growth factor 10	This protein exhibits mitogenic activity for keratinizing epidermal cells, but essentially no activity for fibroblasts. It may be required for embryonic epidermal morphogenesis including brain development, lung morphogenesis, and initiation of lim bud formation. It is also implicated to be a primary factor in wound healing.
FGF13	fibroblast growth factor 13	This gene is a possible candidate gene for familial cases of the BFLS, and for other syndromal and nonspecific forms of X-linked mental retardation, due to its chromosomal location.
FGF17	fibroblast growth factor 17	This gene is predominately expressed in the cerebellum and cortex. In mice it is localized to specific sites in the midline structures of the forebrain, the midbrain-hindbrain junction, developing skeleton and developing arteries, which suggests a role in CNS, bone and vascular development.
FGF18	fibroblast growth factor 18	This protein may be a pleiotropic growth factor that stimulates proliferation in many tissues, notably the liver and small intestine. Knockout studies in mice implied the its role in regulating proliferation and differentiation of midline cerebellar structures.
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.

FKTN	fukutin	The protein encoded by this gene may be involved in the glycosylation of alpha-dystroglycan in skeletal muscle. The encoded protein is thought to be a glycosyltransferase and could play a role in brain development.
FN1	fibronectin 1	Fibronectin is involved in cell adhesion and migration processes including embryogenesis, wound healing, blood coagulation, host defense, and metastasis.
FOXA1	forkhead box A1	These hepatocyte nuclear factors are transcriptional activators for liver-specific transcripts such as albumin and transthyretin, and they also interact with chromatin. Similar family members in mice have roles in the regulation of metabolism and in the differentiation of the pancreas and liver.
FOXA2	forkhead box A2	These hepatocyte nuclear factors are transcriptional activators for liver-specific genes such as albumin and transthyretin, and they also interact with chromatin. Similar family members have roles in the regulation of metabolism and in the differentiation of the pancreas and liver.
FRAS1	Fraser syndrome 1	The FRAS1 gene encodes a putative extracellular matrix (ECM) protein and is mutated in Fraser syndrome (MIM 219000).
FREM2	FRAS1 related extracellular matrix protein 2	This extracellular matrix protein is thought to be required for maintaining the integrity of the skin epithelium and the differentiated state of renal epithelia. The protein localizes to the basement membrane, forming a ternary complex that plays a role in epidermal-dermal interactions during morphogenetic processes.
FXR1	fragile X mental retardation, autosomal homolog 1	The protein encoded by this gene is an RNA binding protein that shuttles between the nucleus and cytoplasm and associate with polyribosomes, predominantly with the 60S ribosomal subunit.
GAB1	GRB2-associated binding protein 1	The protein encoded by this gene is an important mediator of branching tubulogenesis and plays a central role in cellular growth response, transformation and apoptosis.
GATA4	GATA binding protein 4	This protein is thought to regulate genes involved in embryogenesis and in myocardial differentiation and function.
GDNF	glial cell derived neurotrophic factor	The recombinant form of this protein was shown to promote the survival and differentiation of dopaminergic neurons in culture, and was able to prevent apoptosis of motor neurons induced by axotomy.
GJB2	gap junction protein, beta 2, 26kDa	This gene encodes a member of the gap junction protein family. These structures were shown to consist of cell-to-cell channels that facilitate the transfer of ions and small molecules between cells.
GJC1	gap junction protein, gamma 1, 45kDa	The encoded protein is a component of gap junctions, which are composed of arrays of intercellular channels that provide a route for the diffusion of low molecular weight materials from cell to cell.
GLI3	GLI family zinc finger 3	The protein encoded by this gene localizes in the cytoplasm and activates patched Drosophila homolog (PTCH) gene expression. It is also thought to play a role during embryogenesis.
GNAS	GNAS complex locus	This protein is associated with the classical signal transduction pathway linking receptor-ligand interactions with the activation of adenylyl cyclase and a variety of cellular reponses.
HDAC9	histone deacetylase 9	Histone acetylation/deacetylation alters chromosome structure and affects transcription factor access to DNA. The protein encoded by this gene has sequence homology to members of the histone deacetylase family. This encoded protein may play a role in hematopoiesis.
HES1	hairy and enhancer of split 1, (Drosophila)	It is a transcriptional repressor of genes that require a bHLH protein for their transcription. The protein has a particular type of basic domain that contains a helix interrupting protein that binds to the N-box rather than the canonical E-box.
HES7	hairy and enhancer of split 7 (Drosophila)	In mouse, Hes7 expression is associated with somitogenesis and is controlled by Notch (see MIM 190198) signaling.

HEY1	hairy/enhancer-of-split related with YRPW motif 1	This gene encodes a transcriptional repressor. Two similar and redundant genes in mouse are required for embryonic cardiovascular development, and are also implicated in neurogenesis and somitogenesis.
HGF	hepatocyte growth factor (hepapoietin A; scatter factor)	Hepatocyte growth factor regulates cell growth, cell motility, and morphogenesis by activating a tyrosine kinase signaling cascade after binding to the proto-oncogenic c-Met receptor. Its ability to stimulate mitogenesis, cell motility, and matrix invasion gives it a central role in angiogenesis, tumorogenesis, and tissue regeneration.
HMGA2	high mobility group AT-hook 2	This gene encodes a protein that belongs to the non-histone chromosomal high mobility group (HMG) protein family. HMG proteins function as architectural factors and are essential components of the enhancesome. This protein contains structural DNA-binding domains and may act as a transcriptional regulating factor.
HMX2	H6 family homeobox 2	
HOXA2	homeobox A2	This gene is a DNA-binding transcription factor which may regulate gene expression, morphogenesis, and differentiation. It may be involved in the placement of hindbrain segments in the proper location along the anterior-posterior axis during development.
HOXB2	homeobox B2	The encoded protein functions as a sequence-specific transcription factor that is involved in development.
HOXB3	homeobox B3	The encoded protein functions as a sequence-specific transcription factor that is involved in development.
HOXB13	homeobox B13	This gene has been implicated to play a role in fetal skin development and cutaneous regeneration. Studies have exhibited temporal and spatial colinearity in the main body axis of the embryo, but it was not expressed in the secondary axes, which suggests functions in body patterning along the axis.
HOXC4	homeobox C4	Homeobox transcription factors play an important role in morphogenesis in all multicellular organisms.This gene, HOXC4, is one of several homeobox HOXC genes located in a cluster on chromosome 12.
HOXC10	homeobox C10	The homeobox transcription factors play an important role in morphogenesis in all multicellular organisms. The protein level is controlled during cell differentiation and proliferation, which may indicate this protein has a role in origin activation.
HOXD3	homeobox D3	The protein encoded by this gene may play a role in the regulation of cell adhesion processes.
HOXD8	homeobox D8	In addition to effects during embryogenesis, this particular gene may also play a role in adult urogenital tract function.
HOXD9	homeobox D9	This gene belongs to the homeobox family of genes. The homeobox genes encode a highly conserved family of transcription factors that play an important role in morphogenesis in all multicellular organisms. The exact role of this gene has not been determined.
HSPB2	heat shock 27kDa protein 2	
IGF1	insulin-like growth factor 1 (somatomedin C)	The protein encoded by this gene is similar to insulin in function and structure and is a member of a family of proteins involved in mediating growth and development.
IGFBP5	insulin-like growth factor binding protein 5	
IHH	Indian hedgehog homolog (Drosophila)	
IKZF3	IKAROS family zinc finger 3 (Aiolos)	This gene product is a transcription factor that is important in the regulation of B lymphocyte proliferation and differentiation. Both Ikaros and Aiolos can participate in chromatin remodeling.

IL11	interleukin 11	This cytokine is shown to stimulate the T-cell-dependent development of immunoglobulin-producing B cells. It is also found to support the proliferation of hematopoietic stem cells and megakaryocyte progenitor cells.
ITGA7	integrin, alpha 7	This protein functions as a receptor for the basement membrane protein laminin-1. It is mainly expressed in skeletal and cardiac muscles and may be involved in differentiation and migration processes during myogenesis.
ITGA9	integrin, alpha 9	The protein encoded by this gene, when bound to the beta 1 chain, forms an integrin that is a receptor for VCAM1, cytotactin and osteopontin.
ITGB1	integrin, beta 1 (fibronectin receptor, beta polypeptide, antigen CD29 includes MDF2, MSK12)	Integrin family members are membrane receptors involved in cell adhesion and recognition in a variety of processes including embryogenesis, hemostasis, tissue repair, immune response and metastatic diffusion of tumor cells.
JAG2	jagged 2	Members of the Notch gene family encode transmembrane receptors that are critical for various cell fate decisions. The protein encoded by this gene is one of several ligands that activate Notch and related receptors.
JPH1	junctophilin 1	The protein encoded by this gene is a component of junctional complexes and is composed of a C-terminal hydrophobic segment spanning the endoplasmic/sarcoplasmic reticulum membrane and a remaining cytoplasmic domain that shows specific affinity for the plasma membrane.
LAMA2	laminin, alpha 2	Laminin, an extracellular protein, is a major component of the basement membrane. It is thought to mediate the attachment, migration, and organization of cells into tissues during embryonic development by interacting with other extracellular matrix components.
LAMA4	laminin, alpha 4	Laminins, a family of extracellular matrix glycoproteins, are the major noncollagenous constituent of basement membranes. They have been implicated in a wide variety of biological processes including cell adhesion, differentiation, migration, signaling, neurite outgrowth and metastasis. This gene encodes the alpha chain isoform laminin, alpha 4.
LAMA5	laminin, alpha 5	The protein encoded by this gene belongs to the alpha subfamily of laminin chains and is a major component of basement membranes.
LEF1	lymphoid enhancer-binding factor 1	LEF1 is a nuclear protein that is expressed in pre-B and T cells. It binds to a functionally important site in the T-cell receptor-alpha (TCRA; MIM 186880) enhancer and confers maximal enhancer activity.
LRP8	low density lipoprotein receptor-related protein 8, apolipoprotein e receptor	This apolipoprotein E receptor is involved in cellular recognition and internalization of these lipoproteins.
LUM	lumican	Lumican is the major keratan sulfate proteoglycan of the cornea but is also distributed in interstitial collagenous matrices throughout the body. Lumican may regulate collagen fibril organization and circumferential growth, corneal transparency, and epithelial cell migration and tissue repair.
MAF	v-maf musculoaponeurotic fibrosarcoma oncogene homolog (avian)	
MAPK8	mitogen-activated protein kinase 8	This kinase mediates immediate-early gene expression in response to cell stimuli and is related to cytochrome c-mediated cell death pathway. The mouse counterpart plays a key role in T cell proliferation, apoptosis and differentiation.

MEF2B	myocyte enhancer factor 2B	The protein is thought to regulate gene expression, including expression of the smooth muscle myosin heavy chain gene.
MESP1	mesoderm posterior 1 homolog (mouse)	
MET	met proto-oncogene (hepatocyte growth factor receptor)	The proto-oncogene MET product is the hepatocyte growth factor receptor and encodes tyrosine-kinase activity.
METTL8	methyltransferase like 8	
MMP13	matrix metallopeptidase 13 (collagenase 3)	The protein encoded by this gene cleaves type II collagen more efficiently than types I and III. It may be involved in articular cartilage turnover and cartilage pathophysiology associated with osteoarthritis.
MNX1	motor neuron and pancreas homeobox 1	
MSX1	msh homeobox 1	This protein functions as a transcriptional repressor during embryogenesis through interactions with components of the core transcription complex and other homeoproteins. It may also have roles in limb-pattern formation, craniofacial development, particularly odontogenesis, and tumor growth inhibition.
MUSK	muscle, skeletal, receptor tyrosine kinase	This kinase activity is regulated by the binding of a cognate ligand to the extracellular portion of the receptor. DeChiara et al. (1996) [PubMed 8653786] noted that the RTKs, known to be expressed in cell type-specific fashions, play a role critical for the growth and differentiation of those cell types.
MYF5	myogenic factor 5	
MYF6	myogenic factor 6 (herculin)	
MYO5A	myosin VA (heavy chain 12, myoxin)	Myosin V is a class of actin-based motor proteins involved in cytoplasmic vesicle transport and anchorage, spindle-pole alignment and mRNA translocation. The protein encoded by this gene is abundant in melanocytes and nerve cells.
MYOD1	myogenic differentiation 1	This gene encodes a nuclear protein that regulates muscle cell differentiation by inducing cell cycle arrest, a prerequisite for myogenic initiation. The protein is also involved in muscle regeneration. It activates its own transcription which may stabilize commitment to myogenesis.
MYOG	myogenin (myogenic factor 4)	Myogenin is a muscle-specific transcription factor that can induce myogenesis in a variety of cell types in tissue culture. It is essential for the development of functional skeletal muscle.
NF1	neurofibromin 1	This gene product appears to function as a negative regulator of the ras signal transduction pathway.
NFIX	nuclear factor I/X (CCAAT-binding transcription factor)	
NKX2-1	NK2 homeobox 1	
NOG	noggin	This protein may have a principal role in creating morphogenic gradients, and in numerous developmental processes, such as neural tube fusion and joint formation.
NOS1	nitric oxide synthase 1 (neuronal)	Nitric oxide is a reactive free radical which mediates neurotransmission and antimicrobial and antitumoral activities. Nitric oxide is synthesized from L-arginine by nitric oxide synthases. This gene encodes a nitric oxide synthase which is highly expressed in skeletal muscle.
NR2F2	nuclear receptor subfamily 2, group F, member 2	
NRG1	neuregulin 1	This protein is a signaling protein that mediates cell-cell interactions and plays critical roles in the growth and development of multiple organ systems.

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.
NRTN	neurturin	Neurturin is a member of the TGF-beta subfamily, TRN. This gene signals through RET and a GPI-linked coreceptor, and promotes survival of neuronal populations.
NTRK2	neurotrophic tyrosine kinase, receptor, type 2	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation.
NTRK3	neurotrophic tyrosine kinase, receptor, type 3	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation and may play a role in the development of proprioceptive neurons that sense body position.
NUP133	nucleoporin 133kDa	The nucleoporin protein encoded by this gene localizes to both sides of the nuclear pore complex at interphase, remains associated with the complex during mitosis and is targeted at early stages to the reforming nuclear envelope. It also localizes to kinetochores of mitotic cells.
PAX2	paired box 2	PAX2 is believed to be a target of transcriptional supression by the tumor supressor gene WT1.
PAX3	paired box 3	Members of the PAX family play critical roles during fetal development.
PAX8	paired box 8	This nuclear protein is involved in thyroid follicular cell development and expression of thyroid-specific genes.
PCDH15	protocadherin 15	This gene encodes an integral membrane protein that mediates calcium-dependent cell-cell adhesion. It plays an essential role in maintenance of normal retinal and cochlear function.
PDGFB	platelet-derived growth factor beta polypeptide (simian sarcoma viral (v-sis) oncogene homolog)	The protein encoded by this gene is a member of the platelet-derived growth factor family. The four members of this family are mitogenic factors for cells of mesenchymal origin and are characterized by a motif of eight cysteines.
PLN	phospholamban	This protein is a major substrate for the cAMP-dependent protein kinase in cardiac muscle. It is an inhibitor of cardiac muscle sarcoplasmic reticulum Ca(2+)-ATPase in the unphosphorylated state, but inhibition is relieved upon phosphorylation. It is a key regulator of cardiac diastolic function.
POU3F1	POU class 3 homeobox 1	
POU6F1	POU class 6 homeobox 1	
PRKACB	protein kinase, cAMP-dependent, catalytic, beta	The protein encoded by this gene is a member of the Ser/Thr protein kinase family and is a catalytic subunit of cAMP-dependent protein kinase.
PROX1	prospero homeobox 1	
PRRX1	paired related homeobox 1	This protein functions as a transcription co-activator, enhancing the DNA-binding activity of serum response factor, a protein required for the induction of genes by growth and differentiation factors. The protein regulates muscle creatine kinase, indicating a role in the establishment of diverse mesodermal muscle types.
PRRX2	paired related homeobox 2	Expression is localized to proliferating fetal fibroblasts and the developing dermal layer, with downregulated expression in adult skin. The expression patterns provide evidence consistent with a role in fetal skin development and a possible role in cellular proliferation.
PTCH1	patched homolog 1 (Drosophila)	The encoded protein is the receptor for sonic hedgehog, a secreted molecule implicated in the formation of embryonic structures and in tumorigenesis, as well as the desert hedgehog and indian hedgehog proteins. This gene functions as a tumor suppressor.

PTEN	phosphatase and tensin homolog	This protein preferentially dephosphorylates phosphoinositide substrates. It negatively regulates intracellular levels of phosphatidylinositol-3,4,5-trisphosphate in cells and functions as a tumor suppressor by negatively regulating AKT/PKB signaling pathway.
PTHLH	parathyroid hormone-like hormone	This hormone regulates endochondral bone development and epithelial-mesenchymal interactions during the formation of the mammary glands and teeth. It is involved in lactation possibly by regulating the mobilization and transfer of calcium to the milk.
PTPRB	protein tyrosine phosphatase, receptor type, B	The extracellular region of this PTP interacts with neuronal receptor and cell adhesion molecules, such as contactin and tenascin C. It also interacts with sodium channels, and may regulate sodium channels by altering tyrosine phosphorylation. The functions of the interaction partners of this protein implicate the roles of this PTP in cell adhesion, neurite growth, and neuronal differentiation.
PYY	peptide YY	
RBL1	retinoblastoma-like 1 (p107)	It is thought that, given the homology to the known tumor suppressor RB1, the protein encoded by this gene may also be a tumor suppressor.
RBPJ	recombination signal binding protein for immunoglobulin kappa J region	
ROBO2	roundabout, axon guidance receptor, homolog 2 (Drosophila)	The encoded protein is a receptor for SLIT2, molecules known to function in axon guidance and cell migration.
ROR2	receptor tyrosine kinase-like orphan receptor 2	The protein may be involved in the early formation of the chondrocytes and may be required for cartilage and growth plate development.
RUNX2	runt-related transcription factor 2	This protein is essential for osteoblastic differentiation and skeletal morphogenesis and acts as a scaffold for nucleic acids and regulatory factors involved in skeletal gene expression.
RYK	RYK receptor-like tyrosine kinase	The protein encoded by this gene is an atypical member of the family of growth factor receptor protein tyrosine kinases, differing from other members at a number of conserved residues in the activation and nucleotide binding domains.
SALL1	sal-like 1 (Drosophila)	The protein encoded by this gene is a zinc finger transcriptional repressor and may be part of the NuRD histone deacetylase complex (HDAC).
SGCD	sarcoglycan, delta (35kDa dystrophin-associated glycoprotein)	The protein encoded by this gene is one of the four known components of the sarcoglycan complex, which is a subcomplex of the dystrophin-glycoprotein complex (DGC).This protein is expressed most abundantly in skeletal and cardiac muscle.
SIX2	SIX homeobox 2	The encoded protein is a transcription factor which, like other members of this gene family, may be involved in limb or eye development.
SLC34A1	solute carrier family 34 (sodium phosphate), member 1	
SLURP1	secreted LY6/PLAUR domain containing 1	It is thought that this secreted protein contains antitumor activity.
SMO	smoothened homolog (Drosophila)	
SMTN	smoothelin	This gene encodes a structural protein that is found exclusively in contractile smooth muscle cells. It associates with stress fibers and constitutes part of the cytoskeleton.

SOX6	SRY (sex determining region Y)-box 6	This protein is a transcriptional activator is required for normal development of the CNS, chondrogenesis and maintenance of cardiac and skeletal muscle cells. It interacts with other family members to cooperatively activate gene expression.
SOX15	SRY (sex determining region Y)-box 15	This SOX family transcription factor is involved in the regulation of embryonic development and in the determination of the cell fate. It may act as a transcriptional regulator after forming a protein complex with other proteins.
SPEG	SPEG complex locus	Expression of this gene is thought to serve as a marker for differentiated vascular smooth muscle cells which may have a role in regulating growth and differentiation of this cell type.
SRI	sorcin	
STIL	SCL/TAL1 interrupting locus	This gene encodes a cytoplasmic protein implicated in regulation of the mitotic spindle checkpoint, a regulatory pathway that monitors chromosome segregation during cell division to ensure the proper distribution of chromosomes to daughter cells.
STX2	syntaxin 2	The product of this gene regulates epithelial-mesenchymal interactions and epithelial cell morphogenesis and activation.
TBX5	T-box 5	This protein may play a role in heart development and specification of limb identity.
TCF4	transcription factor 4	This protein recognizes an Ephrussi-box ('E-box') binding site ('CANNTG') - a motif first identified in immunoglobulin enhancers. It is expressed predominantly in pre-B-cells, although it is found in other tissues as well.
TCF12	transcription factor 12	This protein is expressed in many tissues, among them skeletal muscle, thymus, B- and T-cells, and may participate in regulating lineage-specific gene expression through the formation of heterodimers with other bHLH E-proteins.
TCF21	transcription factor 21	The TCF21 product is mesoderm specific, and expressed in embryonic epicardium, mesenchyme-derived tissues of lung, gut, gonad, and both mesenchymal and glomerular epithelial cells in the kidney.
TCF7L2	transcription factor 7-like 2 (T-cell specific, HMG-box)	This protein has been implicated in blood glucose homeostasis. Genetic variants of this gene are associated with increased risk of type 2 diabetes.
TEK	TEK tyrosine kinase, endothelial	The TEK receptor tyrosine kinase is expressed almost exclusively in endothelial cells, and its ligand is angiopoietin-1. The TEK signaling pathway appears to be critical for endothelial cell-smooth muscle cell communication in venous morphogenesis.
TGFBR3	transforming growth factor, beta receptor III	Transforming growth factor (TGF)-beta is a multifunctional cytokine that modulates several tissue development and repair processes, including cell differentiation, cell cycle progression, cellular migration, adhesion, and extracellular matrix production.
THBS2	thrombospondin 2	This protein mediates cell-to-cell and cell-to-matrix interactions. It has been shown to function as a potent inhibitor of tumor growth and angiogenesis. Studies of the mouse counterpart suggest that this protein may modulate the cell surface properties of mesenchymal cells and be involved in cell adhesion and migration.
THRB	thyroid hormone receptor, beta (erythroblastic leukemia viral (v-erb-a) oncogene homolog 2, avian)	The protein encoded by this gene is a nuclear hormone receptor for triiodothyronine. It is one of the several receptors for thyroid hormone, and has been shown to mediate the biological activities of thyroid hormone.
TINAG	tubulointerstitial nephritis antigen	TINAG is a basement membrane glycoprotein initially identified as a target of antibodies in some forms of immunologically mediated tubulointerstitial nephritis.

	TP63	tumor protein p63	This protein plays a role in the development and maintenance of stratified epithelial tissues. p63 -/- mice have several developmental defects which include the lack of limbs and other tissues, such as teeth and mammary glands, which develop as a result of interactions between mesenchyme and epithelium.
	TRIO	triple functional domain (PTPRF interacting)	
	TTN	titin	This gene encodes a large abundant protein of striated muscle. Titin also contains binding sites for muscle associated proteins so it serves as an adhesion template for the assembly of contractile machinery in muscle cells. It has also been identified as a structural protein for chromosomes.
	WT1	Wilms tumor 1	This protein has an essential role in the normal development of the urogenital system, and it is mutated in a small subset of patients with Wilm's tumors.
	ZFPM2	zinc finger protein, multitype 2	Proteins which modulate the activity of GATA family proteins are important regulators of hematopoiesis and cardiogenesis. This protein can both activate and down-regulate expression of GATA-target genes.
	ZIC2	Zic family member 2 (odd-paired homolog, Drosophila)	This protein functions as a transcriptional repressor and may regulate tissue specific expression of dopamine receptor D1.
	ZIC3	Zic family member 3 (odd-paired homolog, Drosophila)	This nuclear protein probably functions as a transcription factor in early stages of left-right body axis formation.
Tissue Development: Development: Development of Bone Marrow (1.65E-02)	BCL2	B-cell CLL/lymphoma 2	This gene encodes an integral outer mitochondrial membrane protein that blocks the apoptotic death of some cells such as lymphocytes.
	IL5	interleukin 5 (colony-stimulating factor, eosinophil)	The protein encoded by this gene is a cytokine that acts as a growth and differentiation factor for both B cells and eosinophils. This cytokine is a main regulator of eosinopoiesis, eosinophil maturation and activation.
	NOS1	nitric oxide synthase 1 (neuronal)	Nitric oxide is a reactive free radical which mediates neurotransmission and antimicrobial and antitumoral activities. Nitric oxide is synthesized from L-arginine by nitric oxide synthases. This gene encodes a nitric oxide synthase which is highly expressed in skeletal muscle.
	SELE	selectin E	The protein encoded by this gene is found in cytokine-stimulated endothelial cells and is thought to be responsible for the accumulation of blood leukocytes at sites of inflammation by mediating the adhesion of cells to the vascular lining. It exhibits st
	TEK	TEK tyrosine kinase, endothelial	The TEK receptor tyrosine kinase is expressed almost exclusively in endothelial cells, and its ligand is angiopoietin-1. The TEK signaling pathway appears to be critical for endothelial cell-smooth muscle cell communication in venous morphogenesis.
Tissue Development, Nervous System Development and Function: Development: Development of Olfactory Bulb (1.65E-02)	ARX	aristaless related homeobox	This gene is a homeobox-containing gene expressed during development, and is thought to be involved in CNS development.

	EBF2	early B-cell factor 2	EBF2 belongs to the conserved Olf/EBF family (see MIM 164343) of helix-loop-helix transcription factors.
	EBF3	early B-cell factor 3	
	NR2E1	nuclear receptor subfamily 2, group E, member 1	
	TRIO	triple functional domain (PTPRF interacting)	
Tissue Development: Developmental Process: Developmental Process of Tissue (4.50E-05) *including* Developmental Process of Nerves (1.17E-04), Developmental Process of Cartilage Tissue (3.27E-04), Developmental Process of Muscle (2.17E-03), Developmental Process of Epithelial Tissue (3.24E-03), Developmental Process of Placode (3.56E-03), Developmental Process of Nervous Tissue (4.48E-03), Developmental Process of Atrioventricular Canal Cushion (1.70E-02), Developmental Process of Flexor Muscle (3.56E-03)	ACVRL1	activin A receptor type II-like 1	The encoded protein, sometimes termed ALK1, shares similar domain structures with other closely related ALK or activin receptor-like kinase proteins that form a subfamily of receptor serine/threonine kinases.
	ADAM12	ADAM metallopeptidase domain 12	This protein has been implicated in a variety of biological processes involving cell-cell and cell-matrix interactions, including fertilization, muscle development, and neurogenesis.
	ADIPOQ	adiponectin, C1Q and collagen domain containing	This gene is expressed in adipose tissue exclusively. The encoded protein circulates in the plasma and is involved with metabolic and hormonal processes.

AGTR2	angiotensin II receptor, type 2	AGTR2 plays a role in the central nervous system and cardiovascular functions that are mediated by the renin-angiotensin system. This receptor mediates programmed cell death (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.
ALDH1A3	aldehyde dehydrogenase 1 family, member A3	Aldehyde dehydrogenase isozymes are thought to play a major role in the detoxification of aldehydes generated by alcohol metabolism and lipid peroxidation.
ANGPT1	angiopoietin 1	This protein plays a role in mediating reciprocal interactions between the endothelium and surrounding matrix and mesenchyme. It also contributes to blood vessel maturation and stability, and may be involved in early development of the heart.
AR	androgen receptor	This protein functions as a steroid-hormone activated transcription factor.
ARSB	arylsulfatase B	The arylsulfatase B homodimer hydrolyzes sulfate groups of N-Acetyl-D-galactosamine, chondriotin sulfate, and dermatan sulfate. The protein is targetted to the lysozyme.
ASCL1	achaete-scute complex homolog 1 (Drosophila)	The protein activates transcription by binding to the E box. This protein plays a role in the neuronal commitment and differentiation and in the generation of olfactory and autonomic neurons.
B4GALNT1	beta-1,4-N-acetyl-galactosaminyl transferase 1	GalNAc-T is the enzyme involved in the biosynthesis of G(M2) and G(D2) glycosphingolipids. GalNAc-T catalyzes the transfer of GalNAc into G(M3) and G(D3) by a beta-1,4 linkage, resulting in the synthesis of G(M2) and G(D2), respectively.
BACE1	beta-site APP-cleaving enzyme 1	The encoded protein, a member of the peptidase A1 protein family, is a type I integral membrane glycoprotein and aspartic protease that is found mainly in the Golgi.
BCL2	B-cell CLL/lymphoma 2	This gene encodes an integral outer mitochondrial membrane protein that blocks the apoptotic death of some cells such as lymphocytes.
BMP5	bone morphogenetic protein 5	This protein may act as signaling molecule within the trabecular meshwork and optic nerve head, and may play a potential role in glaucoma pathogenesis. This gene is differentially regulated during the formation of various tumors.
BMP7	bone morphogenetic protein 7	Based on its expression early in embryogenesis, the BMP encoded by this gene has a proposed role in early development and possible bone inductive activity.
BMPR1B	bone morphogenetic protein receptor, type IB	The ligands of this receptor are BMPs, which are members of the TGF-beta superfamily. BMPs are involved in endochondral bone formation and embryogenesis.
BMX	BMX non-receptor tyrosine kinase	One family of nonreceptor TKs includes the genes TEC (MIM 600583), TXK (MIM 600058), ITK (MIM 186973), and BTK (MIM 300300).
CDON	Cdon homolog (mouse)	CDON and BOC (MIM 608708) are cell surface receptors of the immunoglobulin (Ig)/fibronectin type III (FNIII; see MIM 135600) repeat family involved in myogenic differentiation. CDON and BOC are coexpressed during development.
CHRNB2	cholinergic receptor, nicotinic, beta 2 (neuronal)	The protein encoded by this gene belongs to a superfamily of ligand-gated ion channels which allow the flow of sodium and potassium across the plasma membrane in response to ligands such as acetylcholine and nicotine.
COL10A1	collagen, type X, alpha 1	This gene encodes the alpha chain of type X collagen, a short chain collagen expressed by hypertrophic chondrocytes during endochondral ossification. Unlike type VIII collagen, the other short chain collagen, type X collagen is a homotrimer.
COL11A1	collagen, type XI, alpha 1	This gene encodes one of the two alpha chains of type XI collagen, a minor fibrillar collagen. Type XI collagen is a heterotrimer but the third alpha chain is a post-translationally modified alpha 1 type II chain.

COL5A3	collagen, type V, alpha 3	Type V collagen is found in tissues containing type I collagen and appears to regulate the assembly of heterotypic fibers composed of both type I and type V collagen.
COL9A1	collagen, type IX, alpha 1	This gene encodes one of the three alpha chains of type IX collagen, which is a minor (5-20%) collagen component of hyaline cartilage. Type IX collagen is usually found in tissues containing type II collagen, a fibrillar collagen.
CRYGS	crystallin, gamma S	This gene encodes the most significant gamma-crystallin in adult eye lens tissue. Whether due to aging or mutations in specific genes, gamma-crystallins have been involved in cataract formation.
CTF1	cardiotrophin 1	The protein encoded by this gene is a secreted cytokine that induces cardiac myocyte hypertrophy in vitro. It has been shown to bind and activate the ILST/gp130 receoptor.
CXCL13	chemokine (C-X-C motif) ligand 13	B lymphocyte chemoattractant is a CXC chemokine strongly expressed in the follicles of the spleen, lymph nodes, and Peyer's patches. It promotes the migration of B lymphocytes (compared to T cells and macrophages), apparently by stimulating calcium influx into, and chemotaxis of, cells expressing Burkitt's lymphoma receptor 1 (BLR-1). It may therefore function in the homing of B lymphocytes to follicles.
CYP27B1	cytochrome P450, family 27, subfamily B, polypeptide 1	This enzyme regulates the level of biologically active vitamin D and plays an important role in calcium homeostasis.
DLL3	delta-like 3 (Drosophila)	This gene encodes a member of the delta protein ligand family. This family functions as Notch ligands that are characterized by a DSL domain, EGF repeats, and a transmembrane domain.
DLX1	distal-less homeobox 1	This protein may function as a transcriptional regulator of signals from multiple TGF-{beta} superfamily members. It may play a role in the control of craniofacial patterning and the differentiation and survival of inhibitory neurons in the forebrain.
DMD	dystrophin	Dystrophin is part of the dystrophin-glycoprotein complex (DGC), which bridges the inner cytoskeleton (F-actin) and the extra-cellular matrix.
E2F1	E2F transcription factor 1	The protein encoded by this gene is a member of the E2F family of transcription factors which plays a crucial role in the control of cell cycle and action of tumor suppressor proteins and is also a target of the transforming proteins of small DNA tumor viruses. It can mediate both cell proliferation and p53-dependent/independent apoptosis.
ECE2	endothelin converting enzyme 2	Endothelin-converting enzymes, such as ECE2 (EC 3.4.24.71), are type II metalloproteases that generate functionally pleiotropic members of the endothelin vasoactive peptide family.
EDA	ectodysplasin A	The encoded protein, which belongs to the tumor necrosis factor family, acts as a homotrimer and may be involved in cell-cell signaling during the development of ectodermal organs.
EDIL3	EGF-like repeats and discoidin I-like domains 3	The protein encoded by this gene is an integrin ligand. It plays an important role in mediating angiogenesis and may be important in vessel wall remodeling and development. It also influences endothelial cell behavior.
EDNRA	endothelin receptor type A	
EFNB3	ephrin-B3	EFNB3, a member of the ephrin gene family, is important in brain development as well as in its maintenance. It may play a pivotal role in forebrain function. The EPH and EPH-related receptors comprise the largest subfamily of receptor protein-tyrosine kinases and have been implicated in mediating developmental events, particularly in the nervous system.
ENAH	enabled homolog (Drosophila)	

ENPP1	ectonucleotide pyrophosphatase/phosphodiesterase 1	This protein cleaves many substrates, including phosphodiester bonds of nucleotides and nucleotide sugars and pyrophosphate bonds of nucleotides and nucleotide sugars. It may function to hydrolyze nucleoside 5' triphosphates to their corresponding monophosphates and diadenosine polyphosphates.
EPHA7	EPH receptor A7	EPH and EPH-related receptors have been implicated in mediating developmental events, particularly in the nervous system.
EPOR	erythropoietin receptor	This erythropoietin receptor activates Jak2 tyrosine kinase which activates different intracellular pathways including: Ras/MAP kinase, phosphatidylinositol 3-kinase and STAT transcription factors. The stimulated erythropoietin receptor appears to have a role in erythroid cell survival.
ERBB4	v-erb-a erythroblastic leukemia viral oncogene homolog 4 (avian)	This gene encodes a protein which binds to and is activated by neuregulins and other factors and induces a variety of cellular responses including mitogenesis and differentiation.
ESR1	estrogen receptor 1	This gene encodes an estrogen receptor which are essential for sexual development and reproductive function, but also play a role in other tissues such as bone.
ESRRB	estrogen-related receptor beta	This protein is similar to the estrogen receptor. Its function is unknown; however, a similar protein in mouse plays a key role in placental development.
EVI1	ecotropic viral integration site 1	
EYA1	eyes absent homolog 1 (Drosophila)	The encoded protein may play a role in the developing kidney, branchial arches, eye, and ear.
FASLG	Fas ligand (TNF superfamily, member 6)	Interaction of FAS with this ligand is critical in triggering apoptosis of some types of cells such as lymphocytes.
FGF1	fibroblast growth factor 1 (acidic)	This protein functions as a modifier of endothelial cell migration and proliferation, as well as an angiogenic factor. It acts as a mitogen for a variety of mesoderm- and neuroectoderm-derived cells in vitro, thus is thought to be involved in organogenesis.
FGF2	fibroblast growth factor 2 (basic)	The CUG-initiated isoforms of this gene are localized in the nucleus and are responsible for the intracrine effect, whereas, the AUG-initiated form is mostly cytosolic and is responsible for the paracrine and autocrine effects of this FGF.
FGF4	fibroblast growth factor 4	This gene was identified by its oncogenic transforming activity.Studies on the mouse homolog suggested a function in bone morphogenesis and limb development through the sonic hedgehog (SHH) signaling pathway.
FGF7	fibroblast growth factor 7 (keratinocyte growth factor)	This protein is an epithelial cell-specific growth factor, whose mitogenic activity is exhibited in keratinocytes but not in fibroblasts and endothelial cells. It may also be implicated roles in morphogenesis of epithelium, reepithelialization of wounds, hair development and early lung organogenesis.
FGF10	fibroblast growth factor 10	This protein exhibits mitogenic activity for keratinizing epidermal cells, but essentially no activity for fibroblasts. It may be required for embryonic epidermal morphogenesis including brain development, lung morphogenesis, and initiation of lim bud formation. It is also implicated to be a primary factor in wound healing.
FGF13	fibroblast growth factor 13	This gene is a possible candidate gene for familial cases of the BFLS, and for other syndromal and nonspecific forms of X-linked mental retardation, due to its chromosomal location.
FGF17	fibroblast growth factor 17	This gene is predominately expressed in the cerebellum and cortex. In mice it is localized to specific sites in the midline structures of the forebrain, the midbrain-hindbrain junction, developing skeleton and developing arteries, which suggests a role in CNS, bone and vascular development.

FGF18	fibroblast growth factor 18	This protein may be a pleiotropic growth factor that stimulates proliferation in many tissues, notably the liver and small intestine. Knockout studies in mice implied the its role in regulating proliferation and differentiation of midline cerebellar structures.
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.
FKTN	fukutin	The protein encoded by this gene may be involved in the glycosylation of alpha-dystroglycan in skeletal muscle. The encoded protein is thought to be a glycosyltransferase and could play a role in brain development.
FN1	fibronectin 1	Fibronectin is involved in cell adhesion and migration processes including embryogenesis, wound healing, blood coagulation, host defense, and metastasis.
FOXA1	forkhead box A1	These hepatocyte nuclear factors are transcriptional activators for liver-specific transcripts such as albumin and transthyretin, and they also interact with chromatin. Similar family members in mice have roles in the regulation of metabolism and in the differentiation of the pancreas and liver.
FOXA2	forkhead box A2	These hepatocyte nuclear factors are transcriptional activators for liver-specific genes such as albumin and transthyretin, and they also interact with chromatin. Similar family members have roles in the regulation of metabolism and in the differentiation of the pancreas and liver.
FRAS1	Fraser syndrome 1	The FRAS1 gene encodes a putative extracellular matrix (ECM) protein and is mutated in Fraser syndrome (MIM 219000).
FREM2	FRAS1 related extracellular matrix protein 2	This extracellular matrix protein is thought to be required for maintaining the integrity of the skin epithelium and the differentiated state of renal epithelia. The protein localizes to the basement membrane, forming a ternary complex that plays a role in epidermal-dermal interactions during morphogenetic processes.
FXR1	fragile X mental retardation, autosomal homolog 1	The protein encoded by this gene is an RNA binding protein that shuttles between the nucleus and cytoplasm and associate with polyribosomes, predominantly with the 60S ribosomal subunit.
GAB1	GRB2-associated binding protein 1	The protein encoded by this gene is an important mediator of branching tubulogenesis and plays a central role in cellular growth response, transformation and apoptosis.
GATA4	GATA binding protein 4	This protein is thought to regulate genes involved in embryogenesis and in myocardial differentiation and function.
GDNF	glial cell derived neurotrophic factor	The recombinant form of this protein was shown to promote the survival and differentiation of dopaminergic neurons in culture, and was able to prevent apoptosis of motor neurons induced by axotomy.
GJB2	gap junction protein, beta 2, 26kDa	This gene encodes a member of the gap junction protein family. These structures were shown to consist of cell-to-cell channels that facilitate the transfer of ions and small molecules between cells.
GJC1	gap junction protein, gamma 1, 45kDa	The encoded protein is a component of gap junctions, which are composed of arrays of intercellular channels that provide a route for the diffusion of low molecular weight materials from cell to cell.
GLI3	GLI family zinc finger 3	The protein encoded by this gene localizes in the cytoplasm, activates patched Drosophila homolog (PTCH) gene expression and plays a role during embryogenesis.
GLP1R	glucagon-like peptide 1 receptor	
GNAS	GNAS complex locus	This protein is associated with the classical signal transduction pathway linking receptor-ligand interactions with the activation of adenylyl cyclase and a variety of cellular reponses.

HDAC9	histone deacetylase 9	Histone acetylation/deacetylation alters chromosome structure and affects transcription factor access to DNA. The protein encoded by this gene has sequence homology to members of the histone deacetylase family. This encoded protein may play a role in hematopoiesis.
HES1	hairy and enhancer of split 1, (Drosophila)	It is a transcriptional repressor of genes that require a bHLH protein for their transcription. The protein has a particular type of basic domain that contains a helix interrupting protein that binds to the N-box rather than the canonical E-box.
HES7	hairy and enhancer of split 7 (Drosophila)	In mouse, Hes7 expression is associated with somitogenesis and is controlled by Notch (see MIM 190198) signaling.
HEY1	hairy/enhancer-of-split related with YRPW motif 1	This gene encodes a transcriptional repressor. Two similar and redundant genes in mouse are required for embryonic cardiovascular development, and are also implicated in neurogenesis and somitogenesis.
HGF	hepatocyte growth factor (hepapoietin A; scatter factor)	Hepatocyte growth factor regulates cell growth, cell motility, and morphogenesis by activating a tyrosine kinase signaling cascade after binding to the proto-oncogenic c-Met receptor. Its ability to stimulate mitogenesis, cell motility, and matrix invasion gives it a central role in angiogenesis, tumorogenesis, and tissue regeneration.
HMGA2	high mobility group AT-hook 2	This gene encodes a protein that belongs to the non-histone chromosomal high mobility group (HMG) protein family. HMG proteins function as architectural factors and are essential components of the enhancesome. This protein contains structural DNA-binding domains and may act as a transcriptional regulating factor.
HMX2	H6 family homeobox 2	
HOXA2	homeobox A2	This gene is a DNA-binding transcription factor which may regulate gene expression, morphogenesis, and differentiation. It may be involved in the placement of hindbrain segments in the proper location along the anterior-posterior axis during development.
HOXB2	homeobox B2	The encoded protein functions as a sequence-specific transcription factor that is involved in development.
HOXB3	homeobox B3	The encoded protein functions as a sequence-specific transcription factor that is involved in development.
HOXB13	homeobox B13	This gene has been implicated to play a role in fetal skin development and cutaneous regeneration. Studies have exhibited temporal and spatial colinearity in the main body axis of the embryo, but it was not expressed in the secondary axes, which suggests functions in body patterning along the axis.
HOXC4	homeobox C4	Homeobox transcription factors play an important role in morphogenesis in all multicellular organisms.This gene, HOXC4, is one of several homeobox HOXC genes located in a cluster on chromosome 12.
HOXC10	homeobox C10	The homeobox transcription factors play an important role in morphogenesis in all multicellular organisms. The protein level is controlled during cell differentiation and proliferation, which may indicate this protein has a role in origin activation.
HOXD3	homeobox D3	The protein encoded by this gene may play a role in the regulation of cell adhesion processes.
HOXD8	homeobox D8	In addition to effects during embryogenesis, this particular gene may also play a role in adult urogenital tract function.
HOXD9	homeobox D9	This gene belongs to the homeobox family of genes. The homeobox genes encode a highly conserved family of transcription factors that play an important role in morphogenesis in all multicellular organisms. The exact role of this gene has not been determined.
HSPB2	heat shock 27kDa protein 2	

IGF1	insulin-like growth factor 1 (somatomedin C)	The protein encoded by this gene is similar to insulin in function and structure and is a member of a family of proteins involved in mediating growth and development.
IGFBP5	insulin-like growth factor binding protein 5	
IHH	Indian hedgehog homolog (Drosophila)	
IKZF3	IKAROS family zinc finger 3 (Aiolos)	This gene product is a transcription factor that is important in the regulation of B lymphocyte proliferation and differentiation. Both Ikaros and Aiolos can participate in chromatin remodeling.
IL11	interleukin 11	This cytokine is shown to stimulate the T-cell-dependent development of immunoglobulin-producing B cells. It is also found to support the proliferation of hematopoietic stem cells and megakaryocyte progenitor cells.
IL17A	interleukin 17A	This protein is a proinflammatory cytokine produced by activated T cells that regulates the activities of NF-kappaB and mitogen-activated protein kinases. It can stimulate the expression of IL6 and cyclooxygenase-2 (PTGS2/COX-2), and enhance the production of nitric oxide (NO).
IL1RN	interleukin 1 receptor antagonist	This protein inhibits the activities of interleukin 1, alpha (IL1A) and interleukin 1, beta (IL1B), and modulates a variety of interleukin 1 related immune and inflammatory responses.
ITGA7	integrin, alpha 7	This protein functions as a receptor for the basement membrane protein laminin-1. It is mainly expressed in skeletal and cardiac muscles and may be involved in differentiation and migration processes during myogenesis.
ITGA9	integrin, alpha 9	The protein encoded by this gene, when bound to the beta 1 chain, forms an integrin that is a receptor for VCAM1, cytotactin and osteopontin.
ITGB1	integrin, beta 1 (fibronectin receptor, beta polypeptide, antigen CD29 includes MDF2, MSK12)	Integrin family members are membrane receptors involved in cell adhesion and recognition in a variety of processes including embryogenesis, hemostasis, tissue repair, immune response and metastatic diffusion of tumor cells.
JAG2	jagged 2	Members of the Notch gene family encode transmembrane receptors that are critical for various cell fate decisions. The protein encoded by this gene is one of several ligands that activate Notch and related receptors.
JPH1	junctophilin 1	The protein encoded by this gene is a component of junctional complexes and is composed of a C-terminal hydrophobic segment spanning the endoplasmic/sarcoplasmic reticulum membrane and a remaining cytoplasmic domain that shows specific affinity for the plasma membrane.
LAMA2	laminin, alpha 2	Laminin, an extracellular protein, is a major component of the basement membrane. It is thought to mediate the attachment, migration, and organization of cells into tissues during embryonic development by interacting with other extracellular matrix components.
LAMA4	laminin, alpha 4	Laminins, a family of extracellular matrix glycoproteins, are the major noncollagenous constituent of basement membranes. They have been implicated in a wide variety of biological processes including cell adhesion, differentiation, migration, signaling, neurite outgrowth and metastasis. This gene encodes the alpha chain isoform laminin, alpha 4.
LAMA5	laminin, alpha 5	The protein encoded by this gene belongs to the alpha subfamily of laminin chains and is a major component of basement membranes.
LEF1	lymphoid enhancer-binding factor 1	LEF1 is a nuclear protein that is expressed in pre-B and T cells. It binds to a functionally important site in the T-cell receptor-alpha (TCRA; MIM 186880) enhancer and confers maximal enhancer activity.

LRP8	low density lipoprotein receptor-related protein 8, apolipoprotein e receptor	This apolipoprotein E receptor is involved in cellular recognition and internalization of these lipoproteins.
LUM	lumican	Lumican is the major keratan sulfate proteoglycan of the cornea but is also distributed in interstitial collagenous matrices throughout the body. Lumican may regulate collagen fibril organization and circumferential growth, corneal transparency, and epithelial cell migration and tissue repair.
MAF	v-maf musculoaponeurotic fibrosarcoma oncogene homolog (avian)	
MAPK8	mitogen-activated protein kinase 8	This kinase mediates immediate-early gene expression in response to cell stimuli and is related to cytochrome c-mediated cell death pathway. The mouse counterpart plays a key role in T cell proliferation, apoptosis and differentiation.
MEF2B	myocyte enhancer factor 2B	The protein is thought to regulate gene expression, including expression of the smooth muscle myosin heavy chain gene.
MESP1	mesoderm posterior 1 homolog (mouse)	
MET	met proto-oncogene (hepatocyte growth factor receptor)	The proto-oncogene MET product is the hepatocyte growth factor receptor and encodes tyrosine-kinase activity.
METTL8	methyltransferase like 8	
MMP13	matrix metallopeptidase 13 (collagenase 3)	The protein encoded by this gene cleaves type II collagen more efficiently than types I and III. It may be involved in articular cartilage turnover and cartilage pathophysiology associated with osteoarthritis.
MNX1	motor neuron and pancreas homeobox 1	
MSX1	msh homeobox 1	This protein functions as a transcriptional repressor during embryogenesis through interactions with components of the core transcription complex and other homeoproteins. It may also have roles in limb-pattern formation, craniofacial development, particularly odontogenesis, and tumor growth inhibition.
MUSK	muscle, skeletal, receptor tyrosine kinase	This kinase activity is regulated by the binding of a cognate ligand to the extracellular portion of the receptor. DeChiara et al. (1996) [PubMed 8653786] noted that the RTKs, known to be expressed in cell type-specific fashions, play a role critical for the growth and differentiation of those cell types.
MYF5	myogenic factor 5	
MYF6	myogenic factor 6 (herculin)	
MYO5A	myosin VA (heavy chain 12, myoxin)	Myosin V is a class of actin-based motor proteins involved in cytoplasmic vesicle transport and anchorage, spindle-pole alignment and mRNA translocation. The protein encoded by this gene is abundant in melanocytes and nerve cells.
MYOD1	myogenic differentiation 1	This gene encodes a nuclear protein that regulates muscle cell differentiation by inducing cell cycle arrest, a prerequisite for myogenic initiation. The protein is also involved in muscle regeneration. It activates its own transcription which may stabilize commitment to myogenesis.
MYOG	myogenin (myogenic factor 4)	Myogenin is a muscle-specific transcription factor that can induce myogenesis in a variety of cell types in tissue culture. It is essential for the development of functional skeletal muscle.
NANOG	Nanog homeobox	

NCDN	neurochondrin	This gene encodes a protein, which is highly similar to a mouse protein that negatively regulates Ca/calmodulin-dependent protein kinase II phosphorylation and may be essential for spatial learning processes.
NF1	neurofibromin 1	This gene product appears to function as a negative regulator of the ras signal transduction pathway.
NFIX	nuclear factor I/X (CCAAT-binding transcription factor)	
NKX2-1	NK2 homeobox 1	
NOG	noggin	This protein may have a principal role in creating morphogenic gradients, and in numerous developmental processes, such as neural tube fusion and joint formation.
NOS1	nitric oxide synthase 1 (neuronal)	Nitric oxide is a reactive free radical which mediates neurotransmission and antimicrobial and antitumoral activities. Nitric oxide is synthesized from L-arginine by nitric oxide synthases. This gene encodes a nitric oxide synthase which is highly expressed in skeletal muscle.
NOX4	NADPH oxidase 4	This protein is localized to non-phagocytic cells where it acts as an oxygen sensor and catalyzes the reduction of molecular oxygen to various reactive oxygen species (ROS). The functions of these include signal transduction, cell differentiation and tumor cell growth.
NPY2R	neuropeptide Y receptor Y2	
NR2F2	nuclear receptor subfamily 2, group F, member 2	
NRG1	neuregulin 1	This protein is a signaling protein that mediates cell-cell interactions and plays critical roles in the growth and development of multiple organ systems.
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.
NRTN	neurturin	Neurturin is a member of the TGF-beta subfamily, TRN. This gene signals through RET and a GPI-linked coreceptor, and promotes survival of neuronal populations.
NTRK2	neurotrophic tyrosine kinase, receptor, type 2	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation.
NTRK3	neurotrophic tyrosine kinase, receptor, type 3	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation and may play a role in the development of proprioceptive neurons that sense body position.
NUP133	nucleoporin 133kDa	The nucleoporin protein encoded by this gene localizes to both sides of the nuclear pore complex at interphase, remains associated with the complex during mitosis and is targeted at early stages to the reforming nuclear envelope. It also localizes to kinetochores of mitotic cells.
PAX2	paired box 2	PAX2 is believed to be a target of transcriptional supression by the tumor supressor gene WT1.
PAX3	paired box 3	Members of the PAX family play critical roles during fetal development.
PAX8	paired box 8	This nuclear protein is involved in thyroid follicular cell development and expression of thyroid-specific genes.
PCDH15	protocadherin 15	This gene encodes an integral membrane protein that mediates calcium-dependent cell-cell adhesion. It plays an essential role in maintenance of normal retinal and cochlear function.

PCGF2	polycomb group ring finger 2	This protein was shown to act as a negative regulator of transcription and has tumor suppressor activity. It may negatively regulate the expression of different cytokines, chemokines, and chemokine receptors, and thus plays an important role in lymphocyte differentiation and migration, as well as in immune responses.
PDGFB	platelet-derived growth factor beta polypeptide (simian sarcoma viral (v-sis) oncogene homolog)	The protein encoded by this gene is a member of the platelet-derived growth factor family. The four members of this family are mitogenic factors for cells of mesenchymal origin and are characterized by a motif of eight cysteines.
PDK4	pyruvate dehydrogenase kinase, isozyme 4	This protein is located in the matrix of the mitrochondria and inhibits the pyruvate dehydrogenase complex by phosphorylating one of its subunits, thereby contributing to the regulation of glucose metabolism. Expression of this gene is regulated by glucocorticoids, retinoic acid and insulin.
PEG3	paternally expressed 3	
PLN	phospholamban	This protein is a major substrate for the cAMP-dependent protein kinase in cardiac muscle. It is an inhibitor of cardiac muscle sarcoplasmic reticulum Ca(2+)-ATPase in the unphosphorylated state, but inhibition is relieved upon phosphorylation. It is a key regulator of cardiac diastolic function.
POU3F1	POU class 3 homeobox 1	
POU6F1	POU class 6 homeobox 1	
PRKACB	protein kinase, cAMP-dependent, catalytic, beta	The protein encoded by this gene is a member of the Ser/Thr protein kinase family and is a catalytic subunit of cAMP-dependent protein kinase.
PRKG2	protein kinase, cGMP-dependent, type II	
PROX1	prospero homeobox 1	
PRRX1	paired related homeobox 1	This protein functions as a transcription co-activator, enhancing the DNA-binding activity of serum response factor, a protein required for the induction of genes by growth and differentiation factors. The protein regulates muscle creatine kinase, indicating a role in the establishment of diverse mesodermal muscle types.
PRRX2	paired related homeobox 2	Expression is localized to proliferating fetal fibroblasts and the developing dermal layer, with downregulated expression in adult skin. The expression patterns provide evidence consistent with a role in fetal skin development and a possible role in cellular proliferation.
PTCH1	patched homolog 1 (Drosophila)	The encoded protein is the receptor for sonic hedgehog, a secreted molecule implicated in the formation of embryonic structures and in tumorigenesis, as well as the desert hedgehog and indian hedgehog proteins. This gene functions as a tumor suppressor.
PTEN	phosphatase and tensin homolog	This protein preferentially dephosphorylates phosphoinositide substrates. It negatively regulates intracellular levels of phosphatidylinositol-3,4,5-trisphosphate in cells and functions as a tumor suppressor by negatively regulating AKT/PKB signaling pathway.
PTHLH	parathyroid hormone-like hormone	This hormone regulates endochondral bone development and epithelial-mesenchymal interactions during the formation of the mammary glands and teeth. It is involved in lactation possibly by regulating the mobilization and transfer of calcium to the milk.
PTPRB	protein tyrosine phosphatase, receptor type, B	The extracellular region of this PTP interacts with neuronal receptor and cell adhesion molecules, such as contactin and tenascin C. It also interacts with sodium channels, and may regulate sodium channels by altering tyrosine phosphorylation. The functions of the interaction partners of this protein implicate the roles of this PTP in cell adhesion, neurite growth, and neuronal differentiation.

PYY	peptide YY	
RAB7A	RAB7A, member RAS oncogene family	This gene encodes a RAB family member that regulates vesicle traffic in the late endosomes and also from late endosomes to lysosomes.
RBL1	retinoblastoma-like 1 (p107)	It is thought that, given the homology to the known tumor suppressor RB1, the protein encoded by this gene may also be a tumor suppressor.
RBPJ	recombination signal binding protein for immunoglobulin kappa J region	
ROBO2	roundabout, axon guidance receptor, homolog 2 (Drosophila)	The encoded protein is a receptor for SLIT2, molecules known to function in axon guidance and cell migration.
ROR2	receptor tyrosine kinase-like orphan receptor 2	The protein may be involved in the early formation of the chondrocytes and may be required for cartilage and growth plate development.
RUNX2	runt-related transcription factor 2	This protein is essential for osteoblastic differentiation and skeletal morphogenesis and acts as a scaffold for nucleic acids and regulatory factors involved in skeletal gene expression.
RYK	RYK receptor-like tyrosine kinase	The protein encoded by this gene is an atypical member of the family of growth factor receptor protein tyrosine kinases, differing from other members at a number of conserved residues in the activation and nucleotide binding domains.
SALL1	sal-like 1 (Drosophila)	The protein encoded by this gene is a zinc finger transcriptional repressor and may be part of the NuRD histone deacetylase complex (HDAC).
SGCD	sarcoglycan, delta (35kDa dystrophin-associated glycoprotein)	The protein encoded by this gene is one of the four known components of the sarcoglycan complex, which is a subcomplex of the dystrophin-glycoprotein complex (DGC).This protein is expressed most abundantly in skeletal and cardiac muscle.
SIX2	SIX homeobox 2	The encoded protein is a transcription factor which, like other members of this gene family, may be involved in limb or eye development.
SLC34A1	solute carrier family 34 (sodium phosphate), member 1	
SLURP1	secreted LY6/PLAUR domain containing 1	It is thought that this secreted protein contains antitumor activity.
SMO	smoothened homolog (Drosophila)	
SMTN	smoothelin	This gene encodes a structural protein that is found exclusively in contractile smooth muscle cells. It associates with stress fibers and constitutes part of the cytoskeleton.
SNAI2	snail homolog 2 (Drosophila)	The encoded protein acts as a transcriptional repressor that binds to E-box motifs. This protein is involved in epithelial-mesenchymal transitions and has antiapoptotic activity.
SOX6	SRY (sex determining region Y)-box 6	This protein is a transcriptional activator is required for normal development of the CNS, chondrogenesis and maintenance of cardiac and skeletal muscle cells. It interacts with other family members to cooperatively activate gene expression.
SOX15	SRY (sex determining region Y)-box 15	This SOX family transcription factor is involved in the regulation of embryonic development and in the determination of the cell fate. It may act as a transcriptional regulator after forming a protein complex with other proteins.

SPEG	SPEG complex locus	Expression of this gene is thought to serve as a marker for differentiated vascular smooth muscle cells which may have a role in regulating growth and differentiation of this cell type.
SRI	sorcin	
STC1	stanniocalcin 1	This gene encodes a secreted, homodimeric glycoprotein that is expressed in a wide variety of tissues and may have autocrine or paracrine functions. The protein may play a role in the regulation of renal and intestinal calcium and phosphate transport, cell metabolism, or cellular calcium/phosphate homeostasis.
STIL	SCL/TAL1 interrupting locus	This gene encodes a cytoplasmic protein implicated in regulation of the mitotic spindle checkpoint, a regulatory pathway that monitors chromosome segregation during cell division to ensure the proper distribution of chromosomes to daughter cells.
STX2	syntaxin 2	The product of this gene regulates epithelial-mesenchymal interactions and epithelial cell morphogenesis and activation.
TBX5	T-box 5	This protein may play a role in heart development and specification of limb identity.
TCF4	transcription factor 4	This protein recognizes an Ephrussi-box ('E-box') binding site ('CANNTG') - a motif first identified in immunoglobulin enhancers. It is expressed predominantly in pre-B-cells, although it is found in other tissues as well.
TCF12	transcription factor 12	This protein is expressed in many tissues, among them skeletal muscle, thymus, B- and T-cells, and may participate in regulating lineage-specific gene expression through the formation of heterodimers with other bHLH E-proteins.
TCF21	transcription factor 21	The TCF21 product is mesoderm specific, and expressed in embryonic epicardium, mesenchyme-derived tissues of lung, gut, gonad, and both mesenchymal and glomerular epithelial cells in the kidney.
TCF7L2	transcription factor 7-like 2 (T-cell specific, HMG-box)	This protein has been implicated in blood glucose homeostasis. Genetic variants of this gene are associated with increased risk of type 2 diabetes.
TEK	TEK tyrosine kinase, endothelial	The TEK receptor tyrosine kinase is expressed almost exclusively in endothelial cells, and its ligand is angiopoietin-1. The TEK signaling pathway appears to be critical for endothelial cell-smooth muscle cell communication in venous morphogenesis.
TGFBR3	transforming growth factor, beta receptor III	Transforming growth factor (TGF)-beta is a multifunctional cytokine that modulates several tissue development and repair processes, including cell differentiation, cell cycle progression, cellular migration, adhesion, and extracellular matrix production.
THBS2	thrombospondin 2	This protein mediates cell-to-cell and cell-to-matrix interactions. It has been shown to function as a potent inhibitor of tumor growth and angiogenesis. Studies of the mouse counterpart suggest that this protein may modulate the cell surface properties of mesenchymal cells and be involved in cell adhesion and migration.
THRB	thyroid hormone receptor, beta (erythroblastic leukemia viral (v-erb-a) oncogene homolog 2, avian)	The protein encoded by this gene is a nuclear hormone receptor for triiodothyronine. It is one of the several receptors for thyroid hormone, and has been shown to mediate the biological activities of thyroid hormone.
TINAG	tubulointerstitial nephritis antigen	TINAG is a basement membrane glycoprotein initially identified as a target of antibodies in some forms of immunologically mediated tubulointerstitial nephritis.
TP63	tumor protein p63	This protein plays a role in the development and maintenance of stratified epithelial tissues. p63 -/- mice have several developmental defects which include the lack of limbs and other tissues, such as teeth and mammary glands, which develop as a result of interactions between mesenchyme and epithelium.

	TRIO	triple functional domain (PTPRF interacting)	
	TTN	titin	This gene encodes a large abundant protein of striated muscle. Titin also contains binding sites for muscle associated proteins so it serves as an adhesion template for the assembly of contractile machinery in muscle cells. It has also been identified as a structural protein for chromosomes.
	VSX1	visual system homeobox 1	The encoded protein may regulate expression of the cone opsin genes early in development.
	WT1	Wilms tumor 1	This protein has an essential role in the normal development of the urogenital system, and it is mutated in a small subset of patients with Wilm's tumors.
	ZFPM2	zinc finger protein, multitype 2	Proteins which modulate the activity of GATA family proteins are important regulators of hematopoiesis and cardiogenesis. This protein can both activate and down-regulate expression of GATA-target genes.
	ZIC2	Zic family member 2 (odd-paired homolog, Drosophila)	This protein functions as a transcriptional repressor and may regulate tissue specific expression of dopamine receptor D1.
	ZIC3	Zic family member 3 (odd-paired homolog, Drosophila)	This nuclear protein probably functions as a transcription factor in early stages of left-right body axis formation.
Tissue Development: Growth: Growth of Metatarsal Bone (3.56E-03)	FGF2	fibroblast growth factor 2 (basic)	The CUG-initiated isoforms of this gene are localized in the nucleus and are responsible for the intracrine effect, whereas, the AUG-initiated form is mostly cytosolic and is responsible for the paracrine and autocrine effects of this FGF.
	IGF1	insulin-like growth factor 1 (somatomedin C)	The protein encoded by this gene is similar to insulin in function and structure and is a member of a family of proteins involved in mediating growth and development.
	NOG	noggin	This protein may have a principal role in creating morphogenic gradients, and in numerous developmental processes, such as neural tube fusion and joint formation.
	STC1	stanniocalcin 1	This gene encodes a secreted, homodimeric glycoprotein that is expressed in a wide variety of tissues and may have autocrine or paracrine functions. The protein may play a role in the regulation of renal and intestinal calcium and phosphate transport, cell metabolism, or cellular calcium/phosphate homeostasis.
Tissue Development: Growth: Growth of Nervous Tissue (4.86E-03)	IGF1	insulin-like growth factor 1 (somatomedin C)	The protein encoded by this gene is similar to insulin in function and structure and is a member of a family of proteins involved in mediating growth and development.
	NF1	neurofibromin 1	This gene product appears to function as a negative regulator of the ras signal transduction pathway.
	NRG1	neuregulin 1	This protein is a signaling protein that mediates cell-cell interactions and plays critical roles in the growth and development of multiple organ systems.
Tissue Development: Myelination: Myelination of Nerves (4.51E-03)	B4GALNT1	beta-1,4-N-acetyl-galactosaminyl transferase 1	GalNAc-T is the enzyme involved in the biosynthesis of G(M2) and G(D2) glycosphingolipids. GalNAc-T catalyzes the transfer of GalNAc into G(M3) and G(D3) by a beta-1,4 linkage, resulting in the synthesis of G(M2) and G(D2), respectively.
	BACE1	beta-site APP-cleaving enzyme 1	The encoded protein, a member of the peptidase A1 protein family, is a type I integral membrane glycoprotein and aspartic protease that is found mainly in the Golgi.

	MYO5A	myosin VA (heavy chain 12, myoxin)	Myosin V is a class of actin-based motor proteins involved in cytoplasmic vesicle transport and anchorage, spindle-pole alignment and mRNA translocation. The protein encoded by this gene is abundant in melanocytes and nerve cells.
	NTRK2	neurotrophic tyrosine kinase, receptor, type 2	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation.
	NTRK3	neurotrophic tyrosine kinase, receptor, type 3	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation and may play a role in the development of proprioceptive neurons that sense body position.
	POU3F1	POU class 3 homeobox 1	
	THRB	thyroid hormone receptor, beta (erythroblastic leukemia viral (v-erb-a) oncogene homolog 2, avian)	The protein encoded by this gene is a nuclear hormone receptor for triiodothyronine. It is one of the several receptors for thyroid hormone, and has been shown to mediate the biological activities of thyroid hormone.
Tissue Development: Adhesion: Adhesion of Muscle Cells (4.86E-03)	ADAM12	ADAM metallopeptidase domain 12	This protein has been implicated in a variety of biological processes involving cell-cell and cell-matrix interactions, including fertilization, muscle development, and neurogenesis.
	ITGA9	integrin, alpha 9	The protein encoded by this gene, when bound to the beta 1 chain, forms an integrin that is a receptor for VCAM1, cytotactin and osteopontin.
	ITGB1	integrin, beta 1 (fibronectin receptor, beta polypeptide, antigen CD29 includes MDF2, MSK12)	Integrin family members are membrane receptors involved in cell adhesion and recognition in a variety of processes including embryogenesis, hemostasis, tissue repair, immune response and metastatic diffusion of tumor cells.
Tissue Development: Adhesion: Adhesion of Beta Islet Cells (9.23E-03)	FGF1	fibroblast growth factor 1 (acidic)	This protein functions as a modifier of endothelial cell migration and proliferation, as well as an angiogenic factor. It acts as a mitogen for a variety of mesoderm- and neuroectoderm-derived cells in vitro, thus is thought to be involved in organogenesis.
	FGF2	fibroblast growth factor 2 (basic)	The CUG-initiated isoforms of this gene are localized in the nucleus and are responsible for the intracrine effect, whereas, the AUG-initiated form is mostly cytosolic and is responsible for the paracrine and autocrine effects of this FGF.
	ITGB1	integrin, beta 1 (fibronectin receptor, beta polypeptide, antigen CD29 includes MDF2, MSK12)	Integrin family members are membrane receptors involved in cell adhesion and recognition in a variety of processes including embryogenesis, hemostasis, tissue repair, immune response and metastatic diffusion of tumor cells.
	NCAM1	neural cell adhesion molecule 1	

Tissue Development: Formation: Formation of Tissue (7.44E-03) *Including* Formation of Cortical Bone (4.86E-03), Formation of Mammory Placode 3 (4.86E-03), Formation of Connective Tissue (4.89E-03), Formation of Bone (4.97E-03), Formation of Trabecular Bone (9.60E-03)	ADAM12	ADAM metallopeptidase domain 12	This protein has been implicated in a variety of biological processes involving cell-cell and cell-matrix interactions, including fertilization, muscle development, and neurogenesis.
	ARHGAP24	Rho GTPase activating protein 24	ARHGAPs, such as ARHGAP24, encode negative regulators of Rho GTPases (see ARHA; MIM 165390), which are implicated in actin remodeling, cell polarity, and cell migration.
	BMP7	bone morphogenetic protein 7	Based on its expression early in embryogenesis, the BMP encoded by this gene has a proposed role in early development and possible bone inductive activity.
	BMPR1B	bone morphogenetic protein receptor, type IB	The ligands of this receptor are BMPs, which are members of the TGF-beta superfamily. BMPs are involved in endochondral bone formation and embryogenesis.
	CBX2	chromobox homolog 2 (Pc class homolog, Drosophila)	
	CEBPA	CCAAT/enhancer binding protein (C/EBP), alpha	The encoded protein has been shown to bind to the promoter and modulate the expression of the gene encoding leptin, a protein that plays an important role in body weight homeostasis.
	DCN	decorin	This protein is a component of connective tissue, plays a role in matrix assemblyand is capable of suppressing the growth of various tumor cell lines.
	DLL3	delta-like 3 (Drosophila)	This gene encodes a member of the delta protein ligand family. This family functions as Notch ligands that are characterized by a DSL domain, EGF repeats, and a transmembrane domain.
	DMP1	dentin matrix acidic phosphoprotein 1	This protein, which is critical for proper mineralization of bone and dentin, is present in diverse cells of bone and tooth tissues.
	EDNRA	endothelin receptor type A	
	ESR1	estrogen receptor 1	This gene encodes an estrogen receptor which are essential for sexual development and reproductive function, but also play a role in other tissues such as bone.
	FEN1	flap structure-specific endonuclease 1	The protein encoded by this gene removes 5' overhanging flaps in DNA repair and processes the 5' ends of Okazaki fragments in lagging strand DNA synthesis.
	FGF1	fibroblast growth factor 1 (acidic)	This protein functions as a modifier of endothelial cell migration and proliferation, as well as an angiogenic factor. It acts as a mitogen for a variety of mesoderm- and neuroectoderm-derived cells in vitro, thus is thought to be involved in organogenesis.
	FGF2	fibroblast growth factor 2 (basic)	The CUG-initiated isoforms of this gene are localized in the nucleus and are responsible for the intracrine effect, whereas, the AUG-initiated form is mostly cytosolic and is responsible for the paracrine and autocrine effects of this FGF.

FGF4	fibroblast growth factor 4	This gene was identified by its oncogenic transforming activity.Studies on the mouse homolog suggested a function in bone morphogenesis and limb development through the sonic hedgehog (SHH) signaling pathway.
FGF5	fibroblast growth factor 5	This gene was identified as an oncogene, which confers transforming potential when transfected into mammalian cells.
FGF7	fibroblast growth factor 7 (keratinocyte growth factor)	This protein is an epithelial cell-specific growth factor, whose mitogenic activity is exhibited in keratinocytes but not in fibroblasts and endothelial cells. It may also be implicated roles in morphogenesis of epithelium, reepithelialization of wounds, hair development and early lung organogenesis.
FGF10	fibroblast growth factor 10	This protein exhibits mitogenic activity for keratinizing epidermal cells, but essentially no activity for fibroblasts. It may be required for embryonic epidermal morphogenesis including brain development, lung morphogenesis, and initiation of lim bud formation. It is also implicated to be a primary factor in wound healing.
FGF13	fibroblast growth factor 13	This gene is a possible candidate gene for familial cases of the BFLS, and for other syndromal and nonspecific forms of X-linked mental retardation, due to its chromosomal location.
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.
FLT1	fms-related tyrosine kinase 1 (vascular endothelial growth factor/vascular permeability factor receptor)	This protein binds to VEGFR-A, VEGFR-B and placental growth factor and plays an important role in angiogenesis and vasculogenesis. Expression of this receptor is found in vascular endothelial cells, placental trophoblast cells and peripheral blood monocytes.
FN1	fibronectin 1	Fibronectin is involved in cell adhesion and migration processes including embryogenesis, wound healing, blood coagulation, host defense, and metastasis.
FOXA2	forkhead box A2	These hepatocyte nuclear factors are transcriptional activators for liver-specific genes such as albumin and transthyretin, and they also interact with chromatin. Similar family members have roles in the regulation of metabolism and in the differentiation of the pancreas and liver.
HAS2	hyaluronan synthase 2	The functions of this protein include space filling, lubrication of joints, and provision of a matrix through which cells can migrate. It is actively produced during wound healing and tissue repair to provide a framework for ingrowth of blood vessels and fibroblasts.
HGF	hepatocyte growth factor (hepapoietin A; scatter factor)	Hepatocyte growth factor regulates cell growth, cell motility, and morphogenesis by activating a tyrosine kinase signaling cascade after binding to the proto-oncogenic c-Met receptor. Its ability to stimulate mitogenesis, cell motility, and matrix invasion gives it a central role in angiogenesis, tumorogenesis, and tissue regeneration.
HOXA2	homeobox A2	This gene is a DNA-binding transcription factor which may regulate gene expression, morphogenesis, and differentiation. It may be involved in the placement of hindbrain segments in the proper location along the anterior-posterior axis during development.
HOXD3	homeobox D3	The protein encoded by this gene may play a role in the regulation of cell adhesion processes.
IGF1	insulin-like growth factor 1 (somatomedin C)	The protein encoded by this gene is similar to insulin in function and structure and is a member of a family of proteins involved in mediating growth and development.
IGFBP5	insulin-like growth factor binding protein 5	

IHH	Indian hedgehog homolog (Drosophila)	
IL11	interleukin 11	This cytokine is shown to stimulate the T-cell-dependent development of immunoglobulin-producing B cells. It is also found to support the proliferation of hematopoietic stem cells and megakaryocyte progenitor cells.
IL1RN	interleukin 1 receptor antagonist	This protein inhibits the activities of interleukin 1, alpha (IL1A) and interleukin 1, beta (IL1B), and modulates a variety of interleukin 1 related immune and inflammatory responses.
ITGB1	integrin, beta 1 (fibronectin receptor, beta polypeptide, antigen CD29 includes MDF2, MSK12)	Integrin family members are membrane receptors involved in cell adhesion and recognition in a variety of processes including embryogenesis, hemostasis, tissue repair, immune response and metastatic diffusion of tumor cells.
LEF1	lymphoid enhancer-binding factor 1	LEF1 is a nuclear protein that is expressed in pre-B and T cells. It binds to a functionally important site in the T-cell receptor-alpha (TCRA; MIM 186880) enhancer and confers maximal enhancer activity.
LHCGR	luteinizing hormone/choriogonadotropin receptor	This gene encodes the receptor for both luteinizing hormone and choriogonadotropin.
LRP8	low density lipoprotein receptor-related protein 8, apolipoprotein e receptor	This apolipoprotein E receptor is involved in cellular recognition and internalization of these lipoproteins.
MACF1	microtubule-actin crosslinking factor 1	This protein stabilizes actin at sites where microtubules and microfilaments meet, and may function in microtubule dynamics to facilitate actin-microtubule interactions at the cell periphery and to couple the microtubule network to cellular junctions.
MYF6	myogenic factor 6 (herculin)	
NCAM1	neural cell adhesion molecule 1	
NKX2-1	NK2 homeobox 1	
NOG	noggin	This protein may have a principal role in creating morphogenic gradients, and in numerous developmental processes, such as neural tube fusion and joint formation.
NOS1	nitric oxide synthase 1 (neuronal)	Nitric oxide is a reactive free radical which mediates neurotransmission and antimicrobial and antitumoral activities. Nitric oxide is synthesized from L-arginine by nitric oxide synthases. This gene encodes a nitric oxide synthase which is highly expressed in skeletal muscle.
NPY1R	neuropeptide Y receptor Y1	Neuropeptide Y exhibits a diverse range of important physiologic activities, including effects on psychomotor activity, food intake, regulation of central endocrine secretion, and potent vasoactive effects on the cardiovascular system.
NPY2R	neuropeptide Y receptor Y2	
NRG1	neuregulin 1	This protein is a signaling protein that mediates cell-cell interactions and plays critical roles in the growth and development of multiple organ systems.
PAX3	paired box 3	Members of the PAX family play critical roles during fetal development.
PTCH1	patched homolog 1 (Drosophila)	The encoded protein is the receptor for sonic hedgehog, a secreted molecule implicated in the formation of embryonic structures and in tumorigenesis, as well as the desert hedgehog and indian hedgehog proteins. This gene functions as a tumor suppressor.

	PTEN	phosphatase and tensin homolog	This protein preferentially dephosphorylates phosphoinositide substrates. It negatively regulates intracellular levels of phosphatidylinositol-3,4,5-trisphosphate in cells and functions as a tumor suppressor by negatively regulating AKT/PKB signaling pathway.
	PTHLH	parathyroid hormone-like hormone	This hormone regulates endochondral bone development and epithelial-mesenchymal interactions during the formation of the mammary glands and teeth. It is involved in lactation possibly by regulating the mobilization and transfer of calcium to the milk.
	PTN	pleiotrophin	
	RBL1	retinoblastoma-like 1 (p107)	It is thought that, given the homology to the known tumor suppressor RB1, the protein encoded by this gene may also be a tumor suppressor.
	RECK	reversion-inducing-cysteine-rich protein with kazal motifs	This membrane-anchored glycoprotein may serve as a negative regulator for matrix metalloproteinase-9, a key enzyme involved in tumor invasion and metastasis.
	RGS4	regulator of G-protein signaling 4	This protein negatively regulates signaling upstream or at the level of the heterotrimeric G protein and is localized in the cytoplasm.
	RUNX2	runt-related transcription factor 2	This protein is essential for osteoblastic differentiation and skeletal morphogenesis and acts as a scaffold for nucleic acids and regulatory factors involved in skeletal gene expression.
	SELE	selectin E	The protein encoded by this gene is found in cytokine-stimulated endothelial cells and is thought to be responsible for the accumulation of blood leukocytes at sites of inflammation by mediating the adhesion of cells to the vascular lining. It exhibits st
	SOX2	SRY (sex determining region Y)-box 2	This protein is required for stem-cell maintenance in the central nervous system, and also regulates gene expression in the stomach.
	SOX6	SRY (sex determining region Y)-box 6	This protein is a transcriptional activator is required for normal development of the CNS, chondrogenesis and maintenance of cardiac and skeletal muscle cells. It interacts with other family members to cooperatively activate gene expression.
	SOX8	SRY (sex determining region Y)-box 8	This protein may act as a transcriptional activator after forming a protein complex with other proteins. This protein may be involved in brain development and function.
	STAB2	stabilin 2	This gene encodes a large, transmembrane receptor protein which may function in angiogenesis, lymphocyte homing, cell adhesion, or receptor scavenging.
	STC1	stanniocalcin 1	This gene encodes a secreted, homodimeric glycoprotein that is expressed in a wide variety of tissues and may have autocrine or paracrine functions. The protein may play a role in the regulation of renal and intestinal calcium and phosphate transport, cell metabolism, or cellular calcium/phosphate homeostasis.
	TBX5	T-box 5	This protein may play a role in heart development and specification of limb identity.
	TINAG	tubulointerstitial nephritis antigen	TINAG is a basement membrane glycoprotein initially identified as a target of antibodies in some forms of immunologically mediated tubulointerstitial nephritis.
	TRIO	triple functional domain (PTPRF interacting)	
	WT1	Wilms tumor 1	This protein has an essential role in the normal development of the urogenital system, and it is mutated in a small subset of patients with Wilm's tumors.
Tissue Development: Branching: Branching of Tissue (5.75E-03)	BCL2	B-cell CLL/lymphoma 2	This gene encodes an integral outer mitochondrial membrane protein that blocks the apoptotic death of some cells such as lymphocytes.

	EYA1	eyes absent homolog 1 (Drosophila)	The encoded protein may play a role in the developing kidney, branchial arches, eye, and ear.
	FGF1	fibroblast growth factor 1 (acidic)	This protein functions as a modifier of endothelial cell migration and proliferation, as well as an angiogenic factor. It acts as a mitogen for a variety of mesoderm- and neuroectoderm-derived cells in vitro, thus is thought to be involved in organogenesis.
	FGF7	fibroblast growth factor 7 (keratinocyte growth factor)	This protein is an epithelial cell-specific growth factor, whose mitogenic activity is exhibited in keratinocytes but not in fibroblasts and endothelial cells. It may also be implicated roles in morphogenesis of epithelium, reepithelialization of wounds, hair development and early lung organogenesis.
	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.
	GDNF	glial cell derived neurotrophic factor	The recombinant form of this protein was shown to promote the survival and differentiation of dopaminergic neurons in culture, and was able to prevent apoptosis of motor neurons induced by axotomy.
	GLI3	GLI family zinc finger 3	The protein encoded by this gene localizes in the cytoplasm, activates patched Drosophila homolog (PTCH) gene expression and plays a role during embryogenesis.
	HGF	hepatocyte growth factor (hepapoietin A; scatter factor)	Hepatocyte growth factor regulates cell growth, cell motility, and morphogenesis by activating a tyrosine kinase signaling cascade after binding to the proto-oncogenic c-Met receptor. Its ability to stimulate mitogenesis, cell motility, and matrix invasion gives it a central role in angiogenesis, tumorogenesis, and tissue regeneration.
	ITGB1	integrin, beta 1 (fibronectin receptor, beta polypeptide, antigen CD29 includes MDF2, MSK12)	Integrin family members are membrane receptors involved in cell adhesion and recognition in a variety of processes including embryogenesis, hemostasis, tissue repair, immune response and metastatic diffusion of tumor cells.
	LAMA5	laminin, alpha 5	The protein encoded by this gene belongs to the alpha subfamily of laminin chains and is a major component of basement membranes.
	NRG1	neuregulin 1	This protein is a signaling protein that mediates cell-cell interactions and plays critical roles in the growth and development of multiple organ systems.
	PAX2	paired box 2	PAX2 is believed to be a target of transcriptional supression by the tumor supressor gene WT1.
	PGF	placental growth factor	
	TCF21	transcription factor 21	The TCF21 product is mesoderm specific, and expressed in embryonic epicardium, mesenchyme-derived tissues of lung, gut, gonad, and both mesenchymal and glomerular epithelial cells in the kidney.
Tissue Development; Morphogenesis: Morphogenesis of Epithelial Tissue (7.30E-03)	BMP7	bone morphogenetic protein 7	Based on its expression early in embryogenesis, the BMP encoded by this gene has a proposed role in early development and possible bone inductive activity.
	CRYGS	crystallin, gamma S	This gene encodes the most significant gamma-crystallin in adult eye lens tissue. Whether due to aging or mutations in specific genes, gamma-crystallins have been involved in cataract formation.
	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.

	FOXA1	forkhead box A1	These hepatocyte nuclear factors are transcriptional activators for liver-specific transcripts such as albumin and transthyretin, and they also interact with chromatin. Similar family members in mice have roles in the regulation of metabolism and in the differentiation of the pancreas and liver.
	FRAS1	Fraser syndrome 1	The FRAS1 gene encodes a putative extracellular matrix (ECM) protein and is mutated in Fraser syndrome (MIM 219000).
	FREM2	FRAS1 related extracellular matrix protein 2	This extracellular matrix protein is thought to be required for maintaining the integrity of the skin epithelium and the differentiated state of renal epithelia. The protein localizes to the basement membrane, forming a ternary complex that plays a role in epidermal-dermal interactions during morphogenetic processes.
	GAB1	GRB2-associated binding protein 1	The protein encoded by this gene is an important mediator of branching tubulogenesis and plays a central role in cellular growth response, transformation and apoptosis.
	HOXB2	homeobox B2	The encoded protein functions as a sequence-specific transcription factor that is involved in development.
	HOXB13	homeobox B13	This gene has been implicated to play a role in fetal skin development and cutaneous regeneration. Studies have exhibited temporal and spatial colinearity in the main body axis of the embryo, but it was not expressed in the secondary axes, which suggests functions in body patterning along the axis.
	JAG2	jagged 2	Members of the Notch gene family encode transmembrane receptors that are critical for various cell fate decisions. The protein encoded by this gene is one of several ligands that activate Notch and related receptors.
	LAMA5	laminin, alpha 5	The protein encoded by this gene belongs to the alpha subfamily of laminin chains and is a major component of basement membranes.
	MET	met proto-oncogene (hepatocyte growth factor receptor)	The proto-oncogene MET product is the hepatocyte growth factor receptor and encodes tyrosine-kinase activity.
	PCDH15	protocadherin 15	This gene encodes an integral membrane protein that mediates calcium-dependent cell-cell adhesion. It plays an essential role in maintenance of normal retinal and cochlear function.
	TBX5	T-box 5	This protein may play a role in heart development and specification of limb identity.
Tissue Development: Angiogenesis: Angiogenesis of Extraembryonic Tissue (1.00E-02)	ANGPT1	angiopoietin 1	This protein plays a role in mediating reciprocal interactions between the endothelium and surrounding matrix and mesenchyme. It also contributes to blood vessel maturation and stability, and may be involved in early development of the heart.
	EDIL3	EGF-like repeats and discoidin I-like domains 3	The protein encoded by this gene is an integrin ligand. It plays an important role in mediating angiogenesis and may be important in vessel wall remodeling and development. It also influences endothelial cell behavior.
	FGF2	fibroblast growth factor 2 (basic)	The CUG-initiated isoforms of this gene are localized in the nucleus and are responsible for the intracrine effect, whereas, the AUG-initiated form is mostly cytosolic and is responsible for the paracrine and autocrine effects of this FGF.
	FGF13	fibroblast growth factor 13	This gene is a possible candidate gene for familial cases of the BFLS, and for other syndromal and nonspecific forms of X-linked mental retardation, due to its chromosomal location.
	FN1	fibronectin 1	Fibronectin is involved in cell adhesion and migration processes including embryogenesis, wound healing, blood coagulation, host defense, and metastasis.

	HGF	hepatocyte growth factor (hepapoietin A; scatter factor)	Hepatocyte growth factor regulates cell growth, cell motility, and morphogenesis by activating a tyrosine kinase signaling cascade after binding to the proto-oncogenic c-Met receptor. Its ability to stimulate mitogenesis, cell motility, and matrix invasion gives it a central role in angiogenesis, tumorogenesis, and tissue regeneration.
	ITGA9	integrin, alpha 9	The protein encoded by this gene, when bound to the beta 1 chain, forms an integrin that is a receptor for VCAM1, cytotactin and osteopontin.
	NRG1	neuregulin 1	This protein is a signaling protein that mediates cell-cell interactions and plays critical roles in the growth and development of multiple organ systems.
	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.
	PTPRB	protein tyrosine phosphatase, receptor type, B	The extracellular region of this PTP interacts with neuronal receptor and cell adhesion molecules, such as contactin and tenascin C. It also interacts with sodium channels, and may regulate sodium channels by altering tyrosine phosphorylation. The functions of the interaction partners of this protein implicate the roles of this PTP in cell adhesion, neurite growth, and neuronal differentiation.
	SLURP1	secreted LY6/PLAUR domain containing 1	It is thought that this secreted protein contains antitumor activity.
Tissue Development: Differentiation: Differentiation of Epithelial Tissue (1.37E-02)	ADIPOQ	adiponectin, C1Q and collagen domain containing	This gene is expressed in adipose tissue exclusively. The encoded protein circulates in the plasma and is involved with metabolic and hormonal processes.
	AR	androgen receptor	This protein functions as a steroid-hormone activated transcription factor.
	FGF7	fibroblast growth factor 7 (keratinocyte growth factor)	This protein is an epithelial cell-specific growth factor, whose mitogenic activity is exhibited in keratinocytes but not in fibroblasts and endothelial cells. It may also be implicated roles in morphogenesis of epithelium, reepithelialization of wounds, hair development and early lung organogenesis.
	PAX2	paired box 2	PAX2 is believed to be a target of transcriptional supression by the tumor supressor gene WT1.
	THRB	thyroid hormone receptor, beta (erythroblastic leukemia viral (v-erb-a) oncogene homolog 2, avian)	The protein encoded by this gene is a nuclear hormone receptor for triiodothyronine. It is one of the several receptors for thyroid hormone, and has been shown to mediate the biological activities of thyroid hormone.
	TP63	tumor protein p63	This protein plays a role in the development and maintenance of stratified epithelial tissues. p63 -/- mice have several developmental defects which include the lack of limbs and other tissues, such as teeth and mammary glands, which develop as a result of interactions between mesenchyme and epithelium.
Tissue Development: Aggregation: Aggregation of Thymocytes (1.70E-02)	LCK	lymphocyte-specific protein tyrosine kinase	The encoded protein is a key signaling molecule in the selection and maturation of developing T-cells.

	PLCB1	phospholipase C, beta 1 (phosphoinositide-specific)	This protein encoded catalyzes the formation of inositol 1,4,5-trisphosphate and diacylglycerol from phosphatidylinositol 4,5-bisphosphate.
	RAG1	recombination activating gene 1	The protein encoded by this gene is involved in activation of immunoglobulin V-D-J recombination.
Organ Development: Development: Development of Organ (6.00E-6) *including* Development of Testis (1.47E-04), Development of Gonad (3.32E-04), Development of Brain (see also Category Nervous System Development and Function) (7.36E-04), Development of Heart (4.48E-03), Development of Prostate Gland (5.00E-03), Development of Metanephros (5.58E-03), Development of Kidney (6.58E-03), Development of Ovary (6.82E-03), Development of Forebrain (see also Category Nervous System Development and Function) (1.53E-02), Development of Lung (1.58E-02)	ABI2	abl interactor 2	
	ACADM	acyl-Coenzyme A dehydrogenase, C-4 to C-12 straight chain	The homotetramer enzyme catalyzes the initial step of the mitochondrial fatty acid beta-oxidation pathway.
	ACE	angiotensin I converting enzyme (peptidyl-dipeptidase A) 1	This gene encodes an enzyme involved in catalyzing the conversion of angiotensin I into a physiologically active peptide angiotensin II. This enzyme plays a key role in the renin-angiotensin system.
	ADRA1A	adrenergic, alpha-1A-, receptor	This gene activates mitogenic responses and regulates growth and proliferation of many cells.

AFF2	AF4/FMR2 family, member 2	
AGTR1	angiotensin II receptor, type 1	Angiotensin II is a potent vasopressor hormone and a primary regulator of aldosterone secretion. It is an important effector controlling blood pressure and volume in the cardiovascular system.
AGTR2	angiotensin II receptor, type 2	AGTR2 plays a role in the central nervous system and cardiovascular functions that are mediated by the renin-angiotensin system. This receptor mediates programmed cell death (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.
ALDH1A3	aldehyde dehydrogenase 1 family, member A3	Aldehyde dehydrogenase isozymes are thought to play a major role in the detoxification of aldehydes generated by alcohol metabolism and lipid peroxidation.
ANKRD7	ankyrin repeat domain 7	
AQP11	aquaporin 11	
AR	androgen receptor	This protein functions as a steroid-hormone activated transcription factor.
ARX	aristaless related homeobox	This gene is a homeobox-containing gene expressed during development, and is thought to be involved in CNS development.
ATM	ataxia telangiectasia mutated	This protein functions as a regulator of a wide variety of downstream proteins, including tumor suppressor proteins p53 and BRCA1, checkpoint kinase CHK2, checkpoint proteins RAD17 and RAD9, and DNA repair protein NBS1. This protein and the closely related kinase ATR are thought to be master controllers of cell cycle checkpoint signaling pathways that are required for cell response to DNA damage and for genome stability.
BCL2	B-cell CLL/lymphoma 2	This gene encodes an integral outer mitochondrial membrane protein that blocks the apoptotic death of some cells such as lymphocytes.
BCL11B	B-cell CLL/lymphoma 11B (zinc finger protein)	The specific function of this gene has not yet been determined.
BMP5	bone morphogenetic protein 5	This protein may act as signaling molecule within the trabecular meshwork and optic nerve head, and may play a potential role in glaucoma pathogenesis. This gene is differentially regulated during the formation of various tumors.
BMP7	bone morphogenetic protein 7	Based on its expression early in embryogenesis, the BMP encoded by this gene has a proposed role in early development and possible bone inductive activity.
BMP15	bone morphogenetic protein 15	This protein may be involved in oocyte maturation and follicular development as a homodimer or by forming heterodimers with a related protein, Gdf9.
BMPR1B	bone morphogenetic protein receptor, type IB	The ligands of this receptor are BMPs, which are members of the TGF-beta superfamily. BMPs are involved in endochondral bone formation and embryogenesis.
BMX	BMX non-receptor tyrosine kinase	One family of nonreceptor TKs includes the genes TEC (MIM 600583), TXK (MIM 600058), ITK (MIM 186973), and BTK (MIM 300300).
CADM1	cell adhesion molecule 1	
CALCRL	calcitonin receptor-like	
CCKAR	cholecystokinin A receptor	This receptor is a major physiologic mediator of pancreatic enzyme secretion and smooth muscle contraction of the gallbladder and stomach. In the central and peripheral nervous system this receptor regulates satiety and the release of beta-endorphin and dopamine.
CCNB2	cyclin B2	Cyclin B2 plays in transforming growth factor beta-mediated cell cycle control.

CDK5RAP2	CDK5 regulatory subunit associated protein 2	This protein may be involved in neuronal differentiation.
CEBPA	CCAAT/enhancer binding protein (C/EBP), alpha	The encoded protein has been shown to bind to the promoter and modulate the expression of the gene encoding leptin, a protein that plays an important role in body weight homeostasis.
CFTR	cystic fibrosis transmembrane conductance regulator (ATP-binding cassette sub-family C, member 7)	The encoded protein functions as a chloride channel and controls the regulation of other transport pathways.
CHD7	chromodomain helicase DNA binding protein 7	This gene encodes a protein that contains several helicase family domains.
COL11A1	collagen, type XI, alpha 1	This gene encodes one of the two alpha chains of type XI collagen, a minor fibrillar collagen. Type XI collagen is a heterotrimer but the third alpha chain is a post-translationally modified alpha 1 type II chain.
COL3A1	collagen, type III, alpha 1	This gene encodes the pro-alpha1 chains of type III collagen, a fibrillar collagen that is found in extensible connective tissues such as skin, lung, uterus, intestine and the vascular system.
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.
CRH	corticotropin releasing hormone	CRH is secreted by the paraventricular nucleus (PVN) of the hypothalamus in response to stress. In the placenta CRH is a marker that determines the length of gestation and the timing of parturition and delivery. CRH may also act as a trigger for parturition.
CRYGB	crystallin, gamma B	Whether due to aging or mutations in specific genes, gamma-crystallins have been involved in cataract formation.
CSF3	colony stimulating factor 3 (granulocyte)	The protein encoded by this gene is a cytokine that controls the production, differentiation, and function of granulocytes.
CTNNA2	catenin (cadherin-associated protein), alpha 2	
CYP19A1	cytochrome P450, family 19, subfamily A, polypeptide 1	This protein localizes to the endoplasmic reticulum and catalyzes the last steps of estrogen biosynthesis, three successive hydroxylations of the A ring of androgens.
DCLK1	doublecortin-like kinase 1	DCAMKL1 is a microtubule-associated protein that phosphorylates itself and myelin basic protein (MBP; MIM 159430).
DLC1	deleted in liver cancer 1	It is suggested that this gene is a candidate tumor suppressor gene for human liver cancer, as well as for prostate, lung, colorectal, and breast cancers.
DMRT2	doublesex and mab-3 related transcription factor 2	
E2F1	E2F transcription factor 1	The protein encoded by this gene is a member of the E2F family of transcription factors which plays a crucial role in the control of cell cycle and action of tumor suppressor proteins and is also a target of the transforming proteins of small DNA tumor viruses. It can mediate both cell proliferation and p53-dependent/independent apoptosis.
ECE2	endothelin converting enzyme 2	Endothelin-converting enzymes, such as ECE2 (EC 3.4.24.71), are type II metalloproteases that generate functionally pleiotropic members of the endothelin vasoactive peptide family.

EDA	ectodysplasin A	The encoded protein, which belongs to the tumor necrosis factor family, acts as a homotrimer and may be involved in cell-cell signaling during the development of ectodermal organs.
EDNRA	endothelin receptor type A	
EDNRB	endothelin receptor type B	The protein encoded by this gene is a G protein-coupled receptor which activates a phosphatidylinositol-calcium second messenger system.
EMX2	empty spiracles homeobox 2	The homeodomain transcription factor EMX2 is critical for central nervous system and urogenital development.
EPOR	erythropoietin receptor	This erythropoietin receptor activates Jak2 tyrosine kinase which activates different intracellular pathways including: Ras/MAP kinase, phosphatidylinositol 3-kinase and STAT transcription factors. The stimulated erythropoietin receptor appears to have a role in erythroid cell survival.
ERBB4	v-erb-a erythroblastic leukemia viral oncogene homolog 4 (avian)	This gene encodes a protein which binds to and is activated by neuregulins and other factors and induces a variety of cellular responses including mitogenesis and differentiation.
ESR1	estrogen receptor 1	This gene encodes an estrogen receptor which are essential for sexual development and reproductive function, but also play a role in other tissues such as bone.
ESRRB	estrogen-related receptor beta	This protein is similar to the estrogen receptor. Its function is unknown; however, a similar protein in mouse plays a key role in placental development.
EVI1	ecotropic viral integration site 1	
EYA1	eyes absent homolog 1 (Drosophila)	The encoded protein may play a role in the developing kidney, branchial arches, eye, and ear.
FANCA	Fanconi anemia, complementation group A	Fanconi anemia complementation group members are related by assembly into a common nuclear protein complex.
FBN1	fibrillin 1	This protein is a structural component of 10-12 nm calcium-binding microfibrils, which provide force bearing structural support in elastic and nonelastic connective tissue throughout the body.
FBXW8	F-box and WD repeat domain containing 8	The F-box proteins constitute one of the four subunits of ubiquitin protein ligase complex called SCFs (SKP1-cullin-F-box), which function in phosphorylation-dependent ubiquitination.
FGF1	fibroblast growth factor 1 (acidic)	This protein functions as a modifier of endothelial cell migration and proliferation, as well as an angiogenic factor. It acts as a mitogen for a variety of mesoderm- and neuroectoderm-derived cells in vitro, thus is thought to be involved in organogenesis.
FGF2	fibroblast growth factor 2 (basic)	The CUG-initiated isoforms of this gene are localized in the nucleus and are responsible for the intracrine effect, whereas, the AUG-initiated form is mostly cytosolic and is responsible for the paracrine and autocrine effects of this FGF.
FGF4	fibroblast growth factor 4	This gene was identified by its oncogenic transforming activity.Studies on the mouse homolog suggested a function in bone morphogenesis and limb development through the sonic hedgehog (SHH) signaling pathway.
FGF7	fibroblast growth factor 7 (keratinocyte growth factor)	This protein is an epithelial cell-specific growth factor, whose mitogenic activity is exhibited in keratinocytes but not in fibroblasts and endothelial cells. It may also be implicated roles in morphogenesis of epithelium, reepithelialization of wounds, hair development and early lung organogenesis.

FGF10	fibroblast growth factor 10	This protein exhibits mitogenic activity for keratinizing epidermal cells, but essentially no activity for fibroblasts. It may be required for embryonic epidermal morphogenesis including brain development, lung morphogenesis, and initiation of lim bud formation. It is also implicated to be a primary factor in wound healing.
FGF18	fibroblast growth factor 18	This protein may be a pleiotropic growth factor that stimulates proliferation in many tissues, notably the liver and small intestine. Knockout studies in mice implied the its role in regulating proliferation and differentiation of midline cerebellar structures.
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.
FN1	fibronectin 1	Fibronectin is involved in cell adhesion and migration processes including embryogenesis, wound healing, blood coagulation, host defense, and metastasis.
FOXA1	forkhead box A1	These hepatocyte nuclear factors are transcriptional activators for liver-specific transcripts such as albumin and transthyretin, and they also interact with chromatin. Similar family members in mice have roles in the regulation of metabolism and in the differentiation of the pancreas and liver.
FOXA2	forkhead box A2	These hepatocyte nuclear factors are transcriptional activators for liver-specific genes such as albumin and transthyretin, and they also interact with chromatin. Similar family members have roles in the regulation of metabolism and in the differentiation of the pancreas and liver.
FRAS1	Fraser syndrome 1	The FRAS1 gene encodes a putative extracellular matrix (ECM) protein and is mutated in Fraser syndrome (MIM 219000).
FZD4	frizzled homolog 4 (Drosophila)	This protein may play a role as a positive regulator of the Wingless type MMTV integration site signaling pathway.
GATA4	GATA binding protein 4	This protein is thought to regulate genes involved in embryogenesis and in myocardial differentiation and function.
GDF9	growth differentiation factor 9	Growth differentiation factor-9 (GDF9) is expressed in oocytes and is thought to be required for ovarian folliculogenesis.
GDNF	glial cell derived neurotrophic factor	The recombinant form of this protein was shown to promote the survival and differentiation of dopaminergic neurons in culture, and was able to prevent apoptosis of motor neurons induced by axotomy.
GJB6	gap junction protein, beta 6, 30kDa	This gene encodes one of the connexin proteins.
GJC1	gap junction protein, gamma 1, 45kDa	The encoded protein is a component of gap junctions, which are composed of arrays of intercellular channels that provide a route for the diffusion of low molecular weight materials from cell to cell.
GLI3	GLI family zinc finger 3	The protein encoded by this gene localizes in the cytoplasm, activates patched Drosophila homolog (PTCH) gene expression and plays a role during embryogenesis.
HAS2	hyaluronan synthase 2	The functions of this protein include space filling, lubrication of joints, and provision of a matrix through which cells can migrate. It is actively produced during wound healing and tissue repair to provide a framework for ingrowth of blood vessels and fibroblasts.
HDAC9	histone deacetylase 9	Histone acetylation/deacetylation alters chromosome structure and affects transcription factor access to DNA. The protein encoded by this gene has sequence homology to members of the histone deacetylase family. This encoded protein may play a role in hematopoiesis.

HES1	hairy and enhancer of split 1, (Drosophila)	It is a transcriptional repressor of genes that require a bHLH protein for their transcription. The protein has a particular type of basic domain that contains a helix interrupting protein that binds to the N-box rather than the canonical E-box.
HESX1	HESX homeobox 1	This gene encodes a conserved homeobox protein that is a transcriptional repressor in the developing forebrain and pituitary gland.
HGF	hepatocyte growth factor (hepapoietin A; scatter factor)	Hepatocyte growth factor regulates cell growth, cell motility, and morphogenesis by activating a tyrosine kinase signaling cascade after binding to the proto-oncogenic c-Met receptor. Its ability to stimulate mitogenesis, cell motility, and matrix invasion gives it a central role in angiogenesis, tumorogenesis, and tissue regeneration.
HHIP	hedgehog interacting protein	This protein similar to the mouse hedgehog-interacting protein, which is involved in many fundamental processes in embryonic development, including anteroposterior patterns of limbs and regulation of left-right asymmetry.
HMX2	H6 family homeobox 2	
HOXA5	homeobox A5	This protein regulates gene expression, morphogenesis, and differentiation, and plays a role in tumorigenesis.
HOXB3	homeobox B3	The encoded protein functions as a sequence-specific transcription factor that is involved in development.
HOXB13	homeobox B13	This gene has been implicated to play a role in fetal skin development and cutaneous regeneration. Studies have exhibited temporal and spatial colinearity in the main body axis of the embryo, but it was not expressed in the secondary axes, which suggests functions in body patterning along the axis.
HOXC4	homeobox C4	Homeobox transcription factors play an important role in morphogenesis in all multicellular organisms.This gene, HOXC4, is one of several homeobox HOXC genes located in a cluster on chromosome 12.
HOXD3	homeobox D3	The protein encoded by this gene may play a role in the regulation of cell adhesion processes.
HTRA2	HtrA serine peptidase 2	This gene encodes a serine protease. The protein is thought to induce apoptosis by binding the apoptosis inhibitory protein baculoviral IAP repeat-containing 4. Nuclear localization of this protein has also been observed.
ID4	inhibitor of DNA binding 4, dominant negative helix-loop-helix protein	Consequently, Id proteins inhibit binding to DNA and transcriptional transactivation by heterodimerization with bHLH proteins.
IFT57	intraflagellar transport 57 homolog (Chlamydomonas)	
IGF1	insulin-like growth factor 1 (somatomedin C)	The protein encoded by this gene is similar to insulin in function and structure and is a member of a family of proteins involved in mediating growth and development.
IGF2BP1	insulin-like growth factor 2 mRNA binding protein 1	This protein functions by binding to the mRNAs of certain genes, including insulin-like growth factor 2, beta-actin and beta-transducin repeat-containing protein, and regulating their translation.
IHH	Indian hedgehog homolog (Drosophila)	
IL3	interleukin 3 (colony-stimulating factor, multiple)	This protein is a potent growth promoting cytokine, especially with hematopoietic cell types. It is involved in cell growth, differentiation and apoptosis, and also possesses neurotrophic activity.
IL11	interleukin 11	This cytokine is shown to stimulate the T-cell-dependent development of immunoglobulin-producing B cells. It is also found to support the proliferation of hematopoietic stem cells and megakaryocyte progenitor cells.

IL17A	interleukin 17A	This protein is a proinflammatory cytokine produced by activated T cells that regulates the activities of NF-kappaB and mitogen-activated protein kinases. It can stimulate the expression of IL6 and cyclooxygenase-2 (PTGS2/COX-2), and enhance the production of nitric oxide (NO).
INHA	inhibin, alpha	Inhibin has been shown to regulate gonadal stromal cell proliferation negatively and to have tumour-suppressor activity, and it is proposed that inhibin may be both a growth/differentiation factor and a hormone.
ITGB1	integrin, beta 1 (fibronectin receptor, beta polypeptide, antigen CD29 includes MDF2, MSK12)	Integrin family members are membrane receptors involved in cell adhesion and recognition in a variety of processes including embryogenesis, hemostasis, tissue repair, immune response and metastatic diffusion of tumor cells.
ITGB3	integrin, beta 3 (platelet glycoprotein IIIa, antigen CD61)	Integrins are known to participate in cell adhesion as well as cell-surface mediated signalling.
KRAS	v-Ki-ras2 Kirsten rat sarcoma viral oncogene homolog	This gene, a Kirsten ras oncogene, encodes a protein that is a member of the small GTPase superfamily.The transforming protein that results is implicated in various malignancies, including lung adenocarcinoma, mucinous adenoma, ductal carcinoma of the pancreas and colorectal carcinoma.
LAMA5	laminin, alpha 5	The protein encoded by this gene belongs to the alpha subfamily of laminin chains and is a major component of basement membranes.
LEF1	lymphoid enhancer-binding factor 1	LEF1 is a nuclear protein that is expressed in pre-B and T cells. It binds to a functionally important site in the T-cell receptor-alpha (TCRA; MIM 186880) enhancer and confers maximal enhancer activity.
LHB	luteinizing hormone beta polypeptide	This gene encodes the beta subunit of luteinizing hormone (LH), which is expressed in the pituitary gland and promotes spermatogenesis and ovulation by stimulating the testes and ovaries to synthesize steroids.
LHCGR	luteinizing hormone/choriogonadotropin receptor	This gene encodes the receptor for both luteinizing hormone and choriogonadotropin.
LHX8	LIM homeobox 8	Members of the LIM homeobox gene family, such as LHX8, encode transcription regulators that share common structural features Members of the LIM homeobox gene family are required for the patterning or the specification and differentiation of different cell types during embryonic development.
LHX9	LIM homeobox 9	This protein is highly similar to a mouse protein that causes gonadal agenesis when inactivated, suggesting a role in gonadal development.
LLGL1	lethal giant larvae homolog 1 (Drosophila)	This gene encodes a protein that is similar to a tumor suppressor in Drosophila.
MAB21L1	mab-21-like 1 (C. elegans)	This protein may be involved in eye and cerebellum development.
MAB21L2	mab-21-like 2 (C. elegans)	This gene may be involved in neural development.
MAP2K5	mitogen-activated protein kinase kinase 5	The signal cascade mediated by this kinase is involved in growth factor stimulated cell proliferation and muscle cell differentiation.
MAP3K7IP1	mitogen-activated protein kinase kinase kinase 7 interacting protein 1	This protein was identified as a regulator of the MAP kinase kinase kinase MAP3K7/TAK1, which is known to mediate various intracellular signaling pathways, such as those induced by TGF beta, interleukin 1, and WNT-1

MAPK8	mitogen-activated protein kinase 8	This kinase mediates immediate-early gene expression in response to cell stimuli and is related to cytochrome c-mediated cell death pathway. The mouse counterpart plays a key role in T cell proliferation, apoptosis and differentiation.
MAPT	microtubule-associated protein tau	MAPT transcripts are differentially expressed in the nervous system, depending on stage of neuronal maturation and neuron type.
MESP1	mesoderm posterior 1 homolog (mouse)	
MET	met proto-oncogene (hepatocyte growth factor receptor)	The proto-oncogene MET product is the hepatocyte growth factor receptor and encodes tyrosine-kinase activity.
MNX1	motor neuron and pancreas homeobox 1	
MSX1	msh homeobox 1	This protein functions as a transcriptional repressor during embryogenesis through interactions with components of the core transcription complex and other homeoproteins. It may also have roles in limb-pattern formation, craniofacial development, particularly odontogenesis, and tumor growth inhibition.
MYCN	v-myc myelocytomatosis viral related oncogene, neuroblastoma derived (avian)	This gene is a member of the MYC family and encodes a protein with a basic helix-loop-helix (bHLH) domain. This protein is located in the nucleus and must dimerize with another bHLH protein in order to bind DNA. Amplification of this gene is associated with a variety of tumors, most notably neuroblastomas.
MYL7	myosin, light chain 7, regulatory	
MYO5A	myosin VA (heavy chain 12, myoxin)	Myosin V is a class of actin-based motor proteins involved in cytoplasmic vesicle transport and anchorage, spindle-pole alignment and mRNA translocation. The protein encoded by this gene is abundant in melanocytes and nerve cells.
MYOCD	myocardin	Myocardin can induce smooth muscle differentiation by its association with serum response factor (SRF; MIM 600589).
NDUFS4	NADH dehydrogenase (ubiquinone) Fe-S protein 4, 18kDa (NADH-coenzyme Q reductase)	This accessory subunit of the mitochondrial membrane respiratory chain NADH dehydrogenase (Complex I) plays a vital role in cellular ATP production, the primary source of energy for many crucial processes in living cells.
NF1	neurofibromin 1	This gene product appears to function as a negative regulator of the ras signal transduction pathway.
NKX2-1	NK2 homeobox 1	
NNAT	neuronatin	This protein is a proteolipid that may be involved in the regulation of ion channels during brain development. The encoded protein may also play a role in forming and maintaining the structure of the nervous system.
NOG	noggin	This protein may have a principal role in creating morphogenic gradients, and in numerous developmental processes, such as neural tube fusion and joint formation.
NR2E1	nuclear receptor subfamily 2, group E, member 1	
NR2F2	nuclear receptor subfamily 2, group F, member 2	

NRG1	neuregulin 1	This protein is a signaling protein that mediates cell-cell interactions and plays critical roles in the growth and development of multiple organ systems.
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.
NTRK3	neurotrophic tyrosine kinase, receptor, type 3	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation and may play a role in the development of proprioceptive neurons that sense body position.
ONECUT2	one cut homeobox 2	This protein stimulates expression of target genes, including genes involved in melanocyte and hepatocyte differentiation.
PAX2	paired box 2	PAX2 is believed to be a target of transcriptional supression by the tumor supressor gene WT1.
PAX3	paired box 3	Members of the PAX family play critical roles during fetal development.
PAX5	paired box 5	This gene encodes the B-cell lineage specific activator protein that is expressed at early, but not late stages of B-cell differentiation. It may also play a role in neural development and spermatogenesis.
PAX8	paired box 8	This nuclear protein is involved in thyroid follicular cell development and expression of thyroid-specific genes.
PDGFB	platelet-derived growth factor beta polypeptide (simian sarcoma viral (v-sis) oncogene homolog)	The protein encoded by this gene is a member of the platelet-derived growth factor family. The four members of this family are mitogenic factors for cells of mesenchymal origin and are characterized by a motif of eight cysteines.
PGF	placental growth factor	
PKHD1	polycystic kidney and hepatic disease 1 (autosomal recessive)	The protein encoded by this gene is predicted to have a single transmembrane (TM)-spanning domain and multiple copies of an immunoglobulin-like plexin-transcription-factor domain.
PLCE1	phospholipase C, epsilon 1	The products of the PLCE1 cascade initiate intracellular responses that result in cell growth and differentiation and gene expression.
POU6F1	POU class 6 homeobox 1	
PRDX2	peroxiredoxin 2	This protein may play an antioxidant protective role in cells, and may contribute to the antiviral activity of CD8(+) T-cells. This protein may have a proliferative effect and play a role in cancer development or progression.
PRKACG	protein kinase, cAMP-dependent, catalytic, gamma	This gene is thought to be a retrotransposon derived from the gene for the alpha form of the PKA catalytic subunit.
PRKG1	protein kinase, cGMP-dependent, type I	
PRKRA	protein kinase, interferon-inducible double stranded RNA dependent activator	This protein is a protein kinase activated by double-stranded RNA which mediates the effects of interferon in response to viral infection.
PTEN	phosphatase and tensin homolog	This protein preferentially dephosphorylates phosphoinositide substrates. It negatively regulates intracellular levels of phosphatidylinositol-3,4,5-trisphosphate in cells and functions as a tumor suppressor by negatively regulating AKT/PKB signaling pathway.

PTHLH	parathyroid hormone-like hormone	This hormone regulates endochondral bone development and epithelial-mesenchymal interactions during the formation of the mammary glands and teeth. It is involved in lactation possibly by regulating the mobilization and transfer of calcium to the milk.
PYGO2	pygopus homolog 2 (Drosophila)	
RBL1	retinoblastoma-like 1 (p107)	It is thought that, given the homology to the known tumor suppressor RB1, the protein encoded by this gene may also be a tumor suppressor.
RBPJ	recombination signal binding protein for immunoglobulin kappa J region	
RFX4	regulatory factor X, 4 (influences HLA class II expression)	This protein may be a transcriptional repressor rather than a transcriptional activator.
ROBO2	roundabout, axon guidance receptor, homolog 2 (Drosophila)	The encoded protein is a receptor for SLIT2, molecules known to function in axon guidance and cell migration.
RPS6	ribosomal protein S6	This gene encodes a cytoplasmic ribosomal protein that may contribute to the control of cell growth and proliferation through the selective translation of particular classes of mRNA.
RXFP2	relaxin/insulin-like family peptide receptor 2	This is a receptor for glycoprotein hormones such as follicle-stimulating hormone (FSH; see MIM 136530) and thyroid-stimulating hormone (TSH; see MIM 188540).
SALL1	sal-like 1 (Drosophila)	The protein encoded by this gene is a zinc finger transcriptional repressor and may be part of the NuRD histone deacetylase complex (HDAC).
SELE	selectin E	The protein encoded by this gene is found in cytokine-stimulated endothelial cells and is thought to be responsible for the accumulation of blood leukocytes at sites of inflammation by mediating the adhesion of cells to the vascular lining. It exhibits st
SFTPB	surfactant protein B	The SFTPB gene encodes the pulmonary-associated surfactant B protein (SPB), an amphipathic surfactant protein essential for lung function and homeostasis after birth.
SHOX2	short stature homeobox 2	SHOX is a pseudoautosomal homeo box gene that is thought to be responsible for idiopathic short stature and implicated to play a role in the short stature phenotype of Turner syndrome patients.
SIX2	SIX homeobox 2	The encoded protein is a transcription factor which, like other members of this gene family, may be involved in limb or eye development.
SLC1A2	solute carrier family 1 (glial high affinity glutamate transporter), member 2	The membrane-bound protein is the principal transporter that clears the excitatory neurotransmitter glutamate from the extracellular space at synapses in the central nervous system. Glutamate clearance is necessary for proper synaptic activation and to prevent neuronal damage from excessive activation of glutamate receptors.
SMO	smoothened homolog (Drosophila)	
SNAI2	snail homolog 2 (Drosophila)	The encoded protein acts as a transcriptional repressor that binds to E-box motifs. This protein is involved in epithelial-mesenchymal transitions and has antiapoptotic activity.
SOX1	SRY (sex determining region Y)-box 1	This protein is involved in the regulation of embryonic development and in the determination of the cell fate, and may be essential for lens development.

SOX2	SRY (sex determining region Y)-box 2	This protein is required for stem-cell maintenance in the central nervous system, and also regulates gene expression in the stomach.
SOX15	SRY (sex determining region Y)-box 15	This SOX family transcription factor is involved in the regulation of embryonic development and in the determination of the cell fate. It may act as a transcriptional regulator after forming a protein complex with other proteins.
SPTBN1	spectrin, beta, non-erythrocytic 1	Spectrin is an actin crosslinking and molecular scaffold protein that links the plasma membrane to the actin cytoskeleton, and functions in the determination of cell shape, arrangement of transmembrane proteins, and organization of organelles.
SRI	sorcin	
STIL	SCL/TAL1 interrupting locus	This gene encodes a cytoplasmic protein implicated in regulation of the mitotic spindle checkpoint, a regulatory pathway that monitors chromosome segregation during cell division to ensure the proper distribution of chromosomes to daughter cells.
STX2	syntaxin 2	The product of this gene regulates epithelial-mesenchymal interactions and epithelial cell morphogenesis and activation.
SYCP3	synaptonemal complex protein 3	
TAL2	T-cell acute lymphocytic leukemia 2	Translocations between this gene on chromosome 9 and the T-cell receptor beta-chain locus on chromosome 7 have been associated with activation of the T-cell acute lymphocytic leukemia 2 gene and T-cell acute lymphoblastic leukemia.
TBX5	T-box 5	This protein may play a role in heart development and specification of limb identity.
TCF21	transcription factor 21	The TCF21 product is mesoderm specific, and expressed in embryonic epicardium, mesenchyme-derived tissues of lung, gut, gonad, and both mesenchymal and glomerular epithelial cells in the kidney.
TCF7L2	transcription factor 7-like 2 (T-cell specific, HMG-box)	This protein has been implicated in blood glucose homeostasis. Genetic variants of this gene are associated with increased risk of type 2 diabetes.
TGFBR3	transforming growth factor, beta receptor III	Transforming growth factor (TGF)-beta is a multifunctional cytokine that modulates several tissue development and repair processes, including cell differentiation, cell cycle progression, cellular migration, adhesion, and extracellular matrix production.
TH	tyrosine hydroxylase	The protein encoded by this gene is involved in the conversion of tyrosine to dopamine. It is the rate-limiting enzyme in the synthesis of catecholamines, hence plays a key role in the physiology of adrenergic neurons.
THBS2	thrombospondin 2	This protein mediates cell-to-cell and cell-to-matrix interactions. It has been shown to function as a potent inhibitor of tumor growth and angiogenesis. Studies of the mouse counterpart suggest that this protein may modulate the cell surface properties of mesenchymal cells and be involved in cell adhesion and migration.
TINAG	tubulointerstitial nephritis antigen	TINAG is a basement membrane glycoprotein initially identified as a target of antibodies in some forms of immunologically mediated tubulointerstitial nephritis.
TP63	tumor protein p63	This protein plays a role in the development and maintenance of stratified epithelial tissues. p63 -/- mice have several developmental defects which include the lack of limbs and other tissues, such as teeth and mammary glands, which develop as a result of interactions between mesenchyme and epithelium.
TTN	titin	This gene encodes a large abundant protein of striated muscle. Titin also contains binding sites for muscle associated proteins so it serves as an adhesion template for the assembly of contractile machinery in muscle cells. It has also been identified as a structural protein for chromosomes.

	UNC5C	unc-5 homolog C (C. elegans)	The UNC-5 family of receptors mediate the repellent response to netrin.
	UPK3A	uroplakin 3A	The asymmetric unit membrane (AUM) forms the apical plaques of urothelium and is believed to strengthen the urothelial apical surface and prevent the cells from rupturing during bladder distention.
	WT1	Wilms tumor 1	This protein has an essential role in the normal development of the urogenital system, and it is mutated in a small subset of patients with Wilm's tumors.
	ZFPM2	zinc finger protein, multitype 2	Proteins which modulate the activity of GATA family proteins are important regulators of hematopoiesis and cardiogenesis. This protein can both activate and down-regulate expression of GATA-target genes.
	ZIC1	Zic family member 1 (odd-paired homolog, Drosophila)	This gene encodes a transcription factor that can bind and transactivate the apolipoprotein E gene.
	ZIC2	Zic family member 2 (odd-paired homolog, Drosophila)	This protein functions as a transcriptional repressor and may regulate tissue specific expression of dopamine receptor D1.
	ZIC3	Zic family member 3 (odd-paired homolog, Drosophila)	This nuclear protein probably functions as a transcription factor in early stages of left-right body axis formation.
Organ Development, Nervous System Development and Function: Development: Development of Dentate Gyrus (7.18E-04)	CNR1	cannabinoid receptor 1 (brain)	This gene encodes one of two cannabinoid receptors, which have been found to be involved in the cannabinoid-induced CNS effects (including alterations in mood and cognition) experienced by users of marijuana.
	EMX2	empty spiracles homeobox 2	The homeodomain transcription factor EMX2 is critical for central nervous system and urogenital development.
	FGF2	fibroblast growth factor 2 (basic)	The CUG-initiated isoforms of this gene are localized in the nucleus and are responsible for the intracrine effect, whereas, the AUG-initiated form is mostly cytosolic and is responsible for the paracrine and autocrine effects of this FGF.
	LEF1	lymphoid enhancer-binding factor 1	LEF1 is a nuclear protein that is expressed in pre-B and T cells. It binds to a functionally important site in the T-cell receptor-alpha (TCRA; MIM 186880) enhancer and confers maximal enhancer activity.
	LMX1A	LIM homeobox transcription factor 1, alpha	LMX1 is a homeodomain protein that stimulates transcription of insulin.
Organ Development: Development: Development of Ovarian Follicle (9.30E-04)	ANGPT1	angiopoietin 1	This protein plays a role in mediating reciprocal interactions between the endothelium and surrounding matrix and mesenchyme. It also contributes to blood vessel maturation and stability, and may be involved in early development of the heart.
	ATM	ataxia telangiectasia mutated	This protein functions as a regulator of a wide variety of downstream proteins, including tumor suppressor proteins p53 and BRCA1, checkpoint kinase CHK2, checkpoint proteins RAD17 and RAD9, and DNA repair protein NBS1. This protein and the closely related kinase ATR are thought to be master controllers of cell cycle checkpoint signaling pathways that are required for cell response to DNA damage and for genome stability.

BCL2	B-cell CLL/lymphoma 2	This gene encodes an integral outer mitochondrial membrane protein that blocks the apoptotic death of some cells such as lymphocytes.
BMP15	bone morphogenetic protein 15	This protein may be involved in oocyte maturation and follicular development as a homodimer or by forming heterodimers with a related protein, Gdf9.
CYP19A1	cytochrome P450, family 19, subfamily A, polypeptide 1	This protein localizes to the endoplasmic reticulum and catalyzes the last steps of estrogen biosynthesis, three successive hydroxylations of the A ring of androgens.
DMC1	DMC1 dosage suppressor of mck1 homolog, meiosis-specific homologous recombination (yeast)	This protein is essential for meiotic homologous recombination.
ESR1	estrogen receptor 1	This gene encodes an estrogen receptor which are essential for sexual development and reproductive function, but also play a role in other tissues such as bone.
FGF7	fibroblast growth factor 7 (keratinocyte growth factor)	This protein is an epithelial cell-specific growth factor, whose mitogenic activity is exhibited in keratinocytes but not in fibroblasts and endothelial cells. It may also be implicated roles in morphogenesis of epithelium, reepithelialization of wounds, hair development and early lung organogenesis.
GDF9	growth differentiation factor 9	Growth differentiation factor-9 (GDF9) is expressed in oocytes and is thought to be required for ovarian folliculogenesis.
IGF1	insulin-like growth factor 1 (somatomedin C)	The protein encoded by this gene is similar to insulin in function and structure and is a member of a family of proteins involved in mediating growth and development.
INHA	inhibin, alpha	Inhibin has been shown to regulate gonadal stromal cell proliferation negatively and to have tumour-suppressor activity, and it is proposed that inhibin may be both a growth/differentiation factor and a hormone.
KIT	v-kit Hardy-Zuckerman 4 feline sarcoma viral oncogene homolog	This gene encodes the human homolog of the proto-oncogene c-kit. This protein is a type 3 transmembrane receptor for MGF (mast cell growth factor, also known as stem cell factor).
LEPR	leptin receptor	Leptin (LEP; MIM 164160), an adipocyte-specific hormone that regulates adipose-tissue mass through hypothalamic effects on satiety and energy expenditure, acts through the leptin receptor (LEPR).
LHB	luteinizing hormone beta polypeptide	This gene encodes the beta subunit of luteinizing hormone (LH), which is expressed in the pituitary gland and promotes spermatogenesis and ovulation by stimulating the testes and ovaries to synthesize steroids.
LHCGR	luteinizing hormone/choriogonadotropin receptor	This gene encodes the receptor for both luteinizing hormone and choriogonadotropin.
SPO11	SPO11 meiotic protein covalently bound to DSB homolog (S. cerevisiae)	The protein encoded by this gene is similar in sequence and conserved features to the yeast meiotic recombination protein.
TAF4B	TAF4b RNA polymerase II, TATA box binding protein (TBP)-associated factor, 105kDa	TATA-binding protein associated factors are involved in the initiation of gene transcription by RNA polymerase II (see MIM 180660).

	TF	transferrin	The function of this encoded protein is to transport iron from the intestine, reticuloendothelial system, and liver parenchymal cells to all proliferating cells in the body. It may also be involved in the removal of certain organic matter/allergins from serum.
	VGF	VGF nerve growth factor inducible	This gene is specifically expressed in a subpopulation of neuroendocrine cells, and is upregulated by nerve growth factor.
Organ Development: Organogenesis: Organogenesis (7.46E-06)	ABI2	abl interactor 2	
	ACADM	acyl-Coenzyme A dehydrogenase, C-4 to C-12 straight chain	The homotetramer enzyme catalyzes the initial step of the mitochondrial fatty acid beta-oxidation pathway.
	ADRA1A	adrenergic, alpha-1A-, receptor	This gene activates mitogenic responses and regulates growth and proliferation of many cells.
	ALDH1A3	aldehyde dehydrogenase 1 family, member A3	Aldehyde dehydrogenase isozymes are thought to play a major role in the detoxification of aldehydes generated by alcohol metabolism and lipid peroxidation.
	ANKRD7	ankyrin repeat domain 7	
	AR	androgen receptor	This protein functions as a steroid-hormone activated transcription factor.
	ASCL1	achaete-scute complex homolog 1 (Drosophila)	The protein activates transcription by binding to the E box. This protein plays a role in the neuronal commitment and differentiation and in the generation of olfactory and autonomic neurons.
	ATM	ataxia telangiectasia mutated	This protein functions as a regulator of a wide variety of downstream proteins, including tumor suppressor proteins p53 and BRCA1, checkpoint kinase CHK2, checkpoint proteins RAD17 and RAD9, and DNA repair protein NBS1. This protein and the closely related kinase ATR are thought to be master controllers of cell cycle checkpoint signaling pathways that are required for cell response to DNA damage and for genome stability.
	BCL2	B-cell CLL/lymphoma 2	This gene encodes an integral outer mitochondrial membrane protein that blocks the apoptotic death of some cells such as lymphocytes.
	BMP5	bone morphogenetic protein 5	This protein may act as signaling molecule within the trabecular meshwork and optic nerve head, and may play a potential role in glaucoma pathogenesis. This gene is differentially regulated during the formation of various tumors.
	BMP7	bone morphogenetic protein 7	Based on its expression early in embryogenesis, the BMP encoded by this gene has a proposed role in early development and possible bone inductive activity.
	BMP15	bone morphogenetic protein 15	This protein may be involved in oocyte maturation and follicular development as a homodimer or by forming heterodimers with a related protein, Gdf9.
	BMPR1B	bone morphogenetic protein receptor, type IB	The ligands of this receptor are BMPs, which are members of the TGF-beta superfamily. BMPs are involved in endochondral bone formation and embryogenesis.
	CALCRL	calcitonin receptor-like	
	CHD7	chromodomain helicase DNA binding protein 7	This gene encodes a protein that contains several helicase family domains.
	COL11A1	collagen, type XI, alpha 1	This gene encodes one of the two alpha chains of type XI collagen, a minor fibrillar collagen. Type XI collagen is a heterotrimer but the third alpha chain is a post-translationally modified alpha 1 type II chain.

COL3A1	collagen, type III, alpha 1	This gene encodes the pro-alpha1 chains of type III collagen, a fibrillar collagen that is found in extensible connective tissues such as skin, lung, uterus, intestine and the vascular system.
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.
COL5A3	collagen, type V, alpha 3	Type V collagen is found in tissues containing type I collagen and appears to regulate the assembly of heterotypic fibers composed of both type I and type V collagen.
COL9A1	collagen, type IX, alpha 1	This gene encodes one of the three alpha chains of type IX collagen, which is a minor (5-20%) collagen component of hyaline cartilage. Type IX collagen is usually found in tissues containing type II collagen, a fibrillar collagen.
CRH	corticotropin releasing hormone	CRH is secreted by the paraventricular nucleus (PVN) of the hypothalamus in response to stress. In the placenta CRH is a marker that determines the length of gestation and the timing of parturition and delivery. CRH may also act as a trigger for parturition.
CRYGB	crystallin, gamma B	Whether due to aging or mutations in specific genes, gamma-crystallins have been involved in cataract formation.
CXCL13	chemokine (C-X-C motif) ligand 13	B lymphocyte chemoattractant is a CXC chemokine strongly expressed in the follicles of the spleen, lymph nodes, and Peyer's patches. It promotes the migration of B lymphocytes (compared to T cells and macrophages), apparently by stimulating calcium influx into, and chemotaxis of, cells expressing Burkitt's lymphoma receptor 1 (BLR-1). It may therefore function in the homing of B lymphocytes to follicles.
CYP19A1	cytochrome P450, family 19, subfamily A, polypeptide 1	This protein localizes to the endoplasmic reticulum and catalyzes the last steps of estrogen biosynthesis, three successive hydroxylations of the A ring of androgens.
DCN	decorin	This protein is a component of connective tissue, plays a role in matrix assemblyand is capable of suppressing the growth of various tumor cell lines.
DLC1	deleted in liver cancer 1	It is suggested that this gene is a candidate tumor suppressor gene for human liver cancer, as well as for prostate, lung, colorectal, and breast cancers.
DLX1	distal-less homeobox 1	This protein may function as a transcriptional regulator of signals from multiple TGF-{beta} superfamily members. It may play a role in the control of craniofacial patterning and the differentiation and survival of inhibitory neurons in the forebrain.
DMP1	dentin matrix acidic phosphoprotein 1	This protein, which is critical for proper mineralization of bone and dentin, is present in diverse cells of bone and tooth tissues.
DMRT2	doublesex and mab-3 related transcription factor 2	
ECE2	endothelin converting enzyme 2	Endothelin-converting enzymes, such as ECE2 (EC 3.4.24.71), are type II metalloproteases that generate functionally pleiotropic members of the endothelin vasoactive peptide family.
EDA	ectodysplasin A	The encoded protein, which belongs to the tumor necrosis factor family, acts as a homotrimer and may be involved in cell-cell signaling during the development of ectodermal organs.
EDNRA	endothelin receptor type A	
EPOR	erythropoietin receptor	This erythropoietin receptor activates Jak2 tyrosine kinase which activates different intracellular pathways including: Ras/MAP kinase, phosphatidylinositol 3-kinase and STAT transcription factors. The stimulated erythropoietin receptor appears to have a role in erythroid cell survival.

ERBB4	v-erb-a erythroblastic leukemia viral oncogene homolog 4 (avian)	This gene encodes a protein which binds to and is activated by neuregulins and other factors and induces a variety of cellular responses including mitogenesis and differentiation.
ESR1	estrogen receptor 1	This gene encodes an estrogen receptor which are essential for sexual development and reproductive function, but also play a role in other tissues such as bone.
EYA1	eyes absent homolog 1 (Drosophila)	The encoded protein may play a role in the developing kidney, branchial arches, eye, and ear.
FABP1	fatty acid binding protein 1, liver	FABP1 is the fatty acid binding protein found in liver. It also binds bile acids.
FANCA	Fanconi anemia, complementation group A	Fanconi anemia complementation group members are related by assembly into a common nuclear protein complex.
FBN1	fibrillin 1	This protein is a structural component of 10-12 nm calcium-binding microfibrils, which provide force bearing structural support in elastic and nonelastic connective tissue throughout the body.
FGF1	fibroblast growth factor 1 (acidic)	This protein functions as a modifier of endothelial cell migration and proliferation, as well as an angiogenic factor. It acts as a mitogen for a variety of mesoderm- and neuroectoderm-derived cells in vitro, thus is thought to be involved in organogenesis.
FGF2	fibroblast growth factor 2 (basic)	The CUG-initiated isoforms of this gene are localized in the nucleus and are responsible for the intracrine effect, whereas, the AUG-initiated form is mostly cytosolic and is responsible for the paracrine and autocrine effects of this FGF.
FGF4	fibroblast growth factor 4	This gene was identified by its oncogenic transforming activity.Studies on the mouse homolog suggested a function in bone morphogenesis and limb development through the sonic hedgehog (SHH) signaling pathway.
FGF10	fibroblast growth factor 10	This protein exhibits mitogenic activity for keratinizing epidermal cells, but essentially no activity for fibroblasts. It may be required for embryonic epidermal morphogenesis including brain development, lung morphogenesis, and initiation of lim bud formation. It is also implicated to be a primary factor in wound healing.
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.
FLI1	Friend leukemia virus integration 1	
FN1	fibronectin 1	Fibronectin is involved in cell adhesion and migration processes including embryogenesis, wound healing, blood coagulation, host defense, and metastasis.
GAMT	guanidinoacetate N-methyltransferase	The protein encoded by this gene is a methyltransferase that converts guanidoacetate to creatine.
GATA4	GATA binding protein 4	This protein is thought to regulate genes involved in embryogenesis and in myocardial differentiation and function.
GDF9	growth differentiation factor 9	Growth differentiation factor-9 (GDF9) is expressed in oocytes and is thought to be required for ovarian folliculogenesis.
GDNF	glial cell derived neurotrophic factor	The recombinant form of this protein was shown to promote the survival and differentiation of dopaminergic neurons in culture, and was able to prevent apoptosis of motor neurons induced by axotomy.

GJC1	gap junction protein, gamma 1, 45kDa	The encoded protein is a component of gap junctions, which are composed of arrays of intercellular channels that provide a route for the diffusion of low molecular weight materials from cell to cell.
GLI3	GLI family zinc finger 3	The protein encoded by this gene localizes in the cytoplasm, activates patched Drosophila homolog (PTCH) gene expression and plays a role during embryogenesis.
HAS2	hyaluronan synthase 2	The functions of this protein include space filling, lubrication of joints, and provision of a matrix through which cells can migrate. It is actively produced during wound healing and tissue repair to provide a framework for ingrowth of blood vessels and fibroblasts.
HDAC9	histone deacetylase 9	Histone acetylation/deacetylation alters chromosome structure and affects transcription factor access to DNA. The protein encoded by this gene has sequence homology to members of the histone deacetylase family. This encoded protein may play a role in hematopoiesis.
HES1	hairy and enhancer of split 1, (Drosophila)	It is a transcriptional repressor of genes that require a bHLH protein for their transcription. The protein has a particular type of basic domain that contains a helix interrupting protein that binds to the N-box rather than the canonical E-box.
HEY1	hairy/enhancer-of-split related with YRPW motif 1	This gene encodes a transcriptional repressor. Two similar and redundant genes in mouse are required for embryonic cardiovascular development, and are also implicated in neurogenesis and somitogenesis.
HHIP	hedgehog interacting protein	This protein similar to the mouse hedgehog-interacting protein, which is involved in many fundamental processes in embryonic development, including anteroposterior patterns of limbs and regulation of left-right asymmetry.
HOXA5	homeobox A5	This protein regulates gene expression, morphogenesis, and differentiation, and plays a role in tumorigenesis.
HOXB3	homeobox B3	The encoded protein functions as a sequence-specific transcription factor that is involved in development.
HOXB9	homeobox	This nuclear protein functions as a sequence-specific transcription factor that is involved in cell proliferation and differentiation.
HOXD3	homeobox D3	The protein encoded by this gene may play a role in the regulation of cell adhesion processes.
HOXD9	homeobox D9	This gene belongs to the homeobox family of genes. The homeobox genes encode a highly conserved family of transcription factors that play an important role in morphogenesis in all multicellular organisms. The exact role of this gene has not been determined.
IFT57	intraflagellar transport 57 homolog (Chlamydomonas)	
IGF1	insulin-like growth factor 1 (somatomedin C)	The protein encoded by this gene is similar to insulin in function and structure and is a member of a family of proteins involved in mediating growth and development.
IGFBP5	insulin-like growth factor binding protein 5	
IHH	Indian hedgehog homolog (Drosophila)	
INHA	inhibin, alpha	Inhibin has been shown to regulate gonadal stromal cell proliferation negatively and to have tumour-suppressor activity, and it is proposed that inhibin may be both a growth/differentiation factor and a hormone.

ITGB1	integrin, beta 1 (fibronectin receptor, beta polypeptide, antigen CD29 includes MDF2, MSK12)	Integrin family members are membrane receptors involved in cell adhesion and recognition in a variety of processes including embryogenesis, hemostasis, tissue repair, immune response and metastatic diffusion of tumor cells.
JAG2	jagged 2	Members of the Notch gene family encode transmembrane receptors that are critical for various cell fate decisions. The protein encoded by this gene is one of several ligands that activate Notch and related receptors.
LAMA5	laminin, alpha 5	The protein encoded by this gene belongs to the alpha subfamily of laminin chains and is a major component of basement membranes.
LEF1	lymphoid enhancer-binding factor 1	LEF1 is a nuclear protein that is expressed in pre-B and T cells. It binds to a functionally important site in the T-cell receptor-alpha (TCRA; MIM 186880) enhancer and confers maximal enhancer activity.
LHB	luteinizing hormone beta polypeptide	This gene encodes the beta subunit of luteinizing hormone (LH), which is expressed in the pituitary gland and promotes spermatogenesis and ovulation by stimulating the testes and ovaries to synthesize steroids.
LHCGR	luteinizing hormone/choriogonadotropin receptor	This gene encodes the receptor for both luteinizing hormone and choriogonadotropin.
LHX8	LIM homeobox 8	Members of the LIM homeobox gene family, such as LHX8, encode transcription regulators that share common structural features Members of the LIM homeobox gene family are required for the patterning or the specification and differentiation of different cell types during embryonic development.
LHX9	LIM homeobox 9	This protein is highly similar to a mouse protein that causes gonadal agenesis when inactivated, suggesting a role in gonadal development.
MAB21L1	mab-21-like 1 (C. elegans)	This protein may be involved in eye and cerebellum development.
MAB21L2	mab-21-like 2 (C. elegans)	This gene may be involved in neural development.
MAP2K5	mitogen-activated protein kinase kinase 5	The signal cascade mediated by this kinase is involved in growth factor stimulated cell proliferation and muscle cell differentiation.
MAP3K7IP1	mitogen-activated protein kinase kinase kinase 7 interacting protein 1	This protein was identified as a regulator of the MAP kinase kinase kinase MAP3K7/TAK1, which is known to mediate various intracellular signaling pathways, such as those induced by TGF beta, interleukin 1, and WNT-1
MESP1	mesoderm posterior 1 homolog (mouse)	
MSX1	msh homeobox 1	This protein functions as a transcriptional repressor during embryogenesis through interactions with components of the core transcription complex and other homeoproteins. It may also have roles in limb-pattern formation, craniofacial development, particularly odontogenesis, and tumor growth inhibition.
MYL7	myosin, light chain 7, regulatory	
MYO5A	myosin VA (heavy chain 12, myoxin)	Myosin V is a class of actin-based motor proteins involved in cytoplasmic vesicle transport and anchorage, spindle-pole alignment and mRNA translocation. The protein encoded by this gene is abundant in melanocytes and nerve cells.
MYOCD	myocardin	Myocardin can induce smooth muscle differentiation by its association with serum response factor (SRF; MIM 600589).
NF1	neurofibromin 1	This gene product appears to function as a negative regulator of the ras signal transduction pathway.

NKX2-1	NK2 homeobox 1	
NR2E1	nuclear receptor subfamily 2, group E, member 1	
NR2F2	nuclear receptor subfamily 2, group F, member 2	
NRG1	neuregulin 1	This protein is a signaling protein that mediates cell-cell interactions and plays critical roles in the growth and development of multiple organ systems.
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.
NTRK3	neurotrophic tyrosine kinase, receptor, type 3	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation and may play a role in the development of proprioceptive neurons that sense body position.
ONECUT2	one cut homeobox 2	This protein stimulates expression of target genes, including genes involved in melanocyte and hepatocyte differentiation.
PAX2	paired box 2	PAX2 is believed to be a target of transcriptional supression by the tumor supressor gene WT1.
PAX3	paired box 3	Members of the PAX family play critical roles during fetal development.
PAX5	paired box 5	This gene encodes the B-cell lineage specific activator protein that is expressed at early, but not late stages of B-cell differentiation. It may also play a role in neural development and spermatogenesis.
PAX8	paired box 8	This nuclear protein is involved in thyroid follicular cell development and expression of thyroid-specific genes.
PDGFB	platelet-derived growth factor beta polypeptide (simian sarcoma viral (v-sis) oncogene homolog)	The protein encoded by this gene is a member of the platelet-derived growth factor family. The four members of this family are mitogenic factors for cells of mesenchymal origin and are characterized by a motif of eight cysteines.
PGF	placental growth factor	
PGR	progesterone receptor	The encoded protein mediates the physiological effects of progesterone, which plays a central role in reproductive events associated with the establishment and maintenance of pregnancy.
PHLDA2	pleckstrin homology-like domain, family A, member 2	The mouse version of this gene has been shownto regulate placental growth.
PLCE1	phospholipase C, epsilon 1	The products of the PLCE1 cascade initiate intracellular responses that result in cell growth and differentiation and gene expression.
POU6F1	POU class 6 homeobox 1	
PRKACG	protein kinase, cAMP-dependent, catalytic, gamma	This gene is thought to be a retrotransposon derived from the gene for the alpha form of the PKA catalytic subunit.
PRKAR2B	protein kinase, cAMP-dependent, regulatory, type II, beta	Knockout studies in mice suggest that this subunit may play an important role in regulating energy balance and adiposity.
PRLR	prolactin receptor	
PROX1	prospero homeobox 1	

PTCH1	patched homolog 1 (Drosophila)	The encoded protein is the receptor for sonic hedgehog, a secreted molecule implicated in the formation of embryonic structures and in tumorigenesis, as well as the desert hedgehog and indian hedgehog proteins. This gene functions as a tumor suppressor.
PTEN	phosphatase and tensin homolog	This protein preferentially dephosphorylates phosphoinositide substrates. It negatively regulates intracellular levels of phosphatidylinositol-3,4,5-trisphosphate in cells and functions as a tumor suppressor by negatively regulating AKT/PKB signaling pathway.
PTHLH	parathyroid hormone-like hormone	This hormone regulates endochondral bone development and epithelial-mesenchymal interactions during the formation of the mammary glands and teeth. It is involved in lactation possibly by regulating the mobilization and transfer of calcium to the milk.
RBPJ	recombination signal binding protein for immunoglobulin kappa J region	
RUNX2	runt-related transcription factor 2	This protein is essential for osteoblastic differentiation and skeletal morphogenesis and acts as a scaffold for nucleic acids and regulatory factors involved in skeletal gene expression.
RXFP1	relaxin/insulin-like family peptide receptor 1	
RXFP2	relaxin/insulin-like family peptide receptor 2	This is a receptor for glycoprotein hormones such as follicle-stimulating hormone (FSH; see MIM 136530) and thyroid-stimulating hormone (TSH; see MIM 188540).
SFTPB	surfactant protein B	The SFTPB gene encodes the pulmonary-associated surfactant B protein (SPB), an amphipathic surfactant protein essential for lung function and homeostasis after birth.
SHOX2	short stature homeobox 2	SHOX is a pseudoautosomal homeo box gene that is thought to be responsible for idiopathic short stature and implicated to play a role in the short stature phenotype of Turner syndrome patients.
SMO	smoothened homolog (Drosophila)	
SNAI2	snail homolog 2 (Drosophila)	The encoded protein acts as a transcriptional repressor that binds to E-box motifs. This protein is involved in epithelial-mesenchymal transitions and has antiapoptotic activity.
SOSTDC1	sclerostin domain containing 1	This protein functions as a bone morphogenetic protein (BMP) antagonist, prohibiting them from binding their receptors, so regulating BMP signaling during cellular proliferation, differentiation, and programmed cell death.
SOX15	SRY (sex determining region Y)-box 15	This SOX family transcription factor is involved in the regulation of embryonic development and in the determination of the cell fate. It may act as a transcriptional regulator after forming a protein complex with other proteins.
SPTBN1	spectrin, beta, non-erythrocytic 1	Spectrin is an actin crosslinking and molecular scaffold protein that links the plasma membrane to the actin cytoskeleton, and functions in the determination of cell shape, arrangement of transmembrane proteins, and organization of organelles.
SRI	sorcin	
STIL	SCL/TAL1 interrupting locus	This gene encodes a cytoplasmic protein implicated in regulation of the mitotic spindle checkpoint, a regulatory pathway that monitors chromosome segregation during cell division to ensure the proper distribution of chromosomes to daughter cells.
STX2	syntaxin 2	The product of this gene regulates epithelial-mesenchymal interactions and epithelial cell morphogenesis and activation.

SYCP2	synaptonemal complex protein 2	The protein encoded by this gene is a major component of the synaptonemal complex and may bind DNA at scaffold attachment regions.
SYCP3	synaptonemal complex protein 3	
TAF4B	TAF4b RNA polymerase II, TATA box binding protein (TBP)-associated factor, 105kDa	TATA-binding protein associated factors are involved in the initiation of gene transcription by RNA polymerase II (see MIM 180660).
TBX5	T-box 5	This protein may play a role in heart development and specification of limb identity.
TCF21	transcription factor 21	The TCF21 product is mesoderm specific, and expressed in embryonic epicardium, mesenchyme-derived tissues of lung, gut, gonad, and both mesenchymal and glomerular epithelial cells in the kidney.
TH	tyrosine hydroxylase	The protein encoded by this gene is involved in the conversion of tyrosine to dopamine. It is the rate-limiting enzyme in the synthesis of catecholamines, hence plays a key role in the physiology of adrenergic neurons.
THRB	thyroid hormone receptor, beta (erythroblastic leukemia viral (v-erb-a) oncogene homolog 2, avian)	The protein encoded by this gene is a nuclear hormone receptor for triiodothyronine. It is one of the several receptors for thyroid hormone, and has been shown to mediate the biological activities of thyroid hormone.
TMEM176B	transmembrane protein 176B	
TP63	tumor protein p63	This protein plays a role in the development and maintenance of stratified epithelial tissues. p63 -/- mice have several developmental defects which include the lack of limbs and other tissues, such as teeth and mammary glands, which develop as a result of interactions between mesenchyme and epithelium.
TTN	titin	This gene encodes a large abundant protein of striated muscle. Titin also contains binding sites for muscle associated proteins so it serves as an adhesion template for the assembly of contractile machinery in muscle cells. It has also been identified as a structural protein for chromosomes.
VSX1	visual system homeobox 1	The encoded protein may regulate expression of the cone opsin genes early in development.
WNT6	wingless-type MMTV integration site family, member 6	The WNT proteins have been implicated in oncogenesis and in several developmental processes, including regulation of cell fate and patterning during embryogenesis.
WNT11	wingless-type MMTV integration site family, member 11	This gene may play roles in the development of skeleton, kidney and lung, and is a plausible candidate gene for High Bone Mass Syndrome.
WT1	Wilms tumor 1	This protein has an essential role in the normal development of the urogenital system, and it is mutated in a small subset of patients with Wilm's tumors.
ZFPM2	zinc finger protein, multitype 2	Proteins which modulate the activity of GATA family proteins are important regulators of hematopoiesis and cardiogenesis. This protein can both activate and down-regulate expression of GATA-target genes.
ZIC3	Zic family member 3 (odd-paired homolog, Drosophila)	This nuclear protein probably functions as a transcription factor in early stages of left-right body axis formation.

Organ Development: Folliculogenesis: Folliculogenesis of Ovarian Follicle (2.16E-03)	ATM	ataxia telangiectasia mutated	This protein functions as a regulator of a wide variety of downstream proteins, including tumor suppressor proteins p53 and BRCA1, checkpoint kinase CHK2, checkpoint proteins RAD17 and RAD9, and DNA repair protein NBS1. This protein and the closely related kinase ATR are thought to be master controllers of cell cycle checkpoint signaling pathways that are required for cell response to DNA damage and for genome stability.
	BMP15	bone morphogenetic protein 15	This protein may be involved in oocyte maturation and follicular development as a homodimer or by forming heterodimers with a related protein, Gdf9.
	DMC1	DMC1 dosage suppressor of mck1 homolog, meiosis-specific homologous recombination (yeast)	This protein is essential for meiotic homologous recombination.
	GDF9	growth differentiation factor 9	Growth differentiation factor-9 (GDF9) is expressed in oocytes and is thought to be required for ovarian folliculogenesis.
	SPO11	SPO11 meiotic protein covalently bound to DSB homolog (S. cerevisiae)	The protein encoded by this gene is similar in sequence and conserved features to the yeast meiotic recombination protein.
Organ Development: Morphogenesis: Morphogenesis of Organ (2.37E-03)	ABI2	abl interactor 2	
	ALDH1A3	aldehyde dehydrogenase 1 family, member A3	Aldehyde dehydrogenase isozymes are thought to play a major role in the detoxification of aldehydes generated by alcohol metabolism and lipid peroxidation.
	BCL2	B-cell CLL/lymphoma 2	This gene encodes an integral outer mitochondrial membrane protein that blocks the apoptotic death of some cells such as lymphocytes.
	BMP7	bone morphogenetic protein 7	Based on its expression early in embryogenesis, the BMP encoded by this gene has a proposed role in early development and possible bone inductive activity.
	BMPR1B	bone morphogenetic protein receptor, type IB	The ligands of this receptor are BMPs, which are members of the TGF-beta superfamily. BMPs are involved in endochondral bone formation and embryogenesis.
	CHD7	chromodomain helicase DNA binding protein 7	This gene encodes a protein that contains several helicase family domains.
	COL11A1	collagen, type XI, alpha 1	This gene encodes one of the two alpha chains of type XI collagen, a minor fibrillar collagen. Type XI collagen is a heterotrimer but the third alpha chain is a post-translationally modified alpha 1 type II chain.
	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.
	CRYGB	crystallin, gamma B	Whether due to aging or mutations in specific genes, gamma-crystallins have been involved in cataract formation.
	CTNNA2	catenin (cadherin-associated protein), alpha 2	
	DLC1	deleted in liver cancer 1	It is suggested that this gene is a candidate tumor suppressor gene for human liver cancer, as well as for prostate, lung, colorectal, and breast cancers.
	ESR1	estrogen receptor 1	This gene encodes an estrogen receptor which are essential for sexual development and reproductive function, but also play a role in other tissues such as bone.

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.
FN1	fibronectin 1	Fibronectin is involved in cell adhesion and migration processes including embryogenesis, wound healing, blood coagulation, host defense, and metastasis.
FOXA1	forkhead box A1	These hepatocyte nuclear factors are transcriptional activators for liver-specific transcripts such as albumin and transthyretin, and they also interact with chromatin. Similar family members in mice have roles in the regulation of metabolism and in the differentiation of the pancreas and liver.
FOXA2	forkhead box A2	These hepatocyte nuclear factors are transcriptional activators for liver-specific genes such as albumin and transthyretin, and they also interact with chromatin. Similar family members have roles in the regulation of metabolism and in the differentiation of the pancreas and liver.
GATA4	GATA binding protein 4	This protein is thought to regulate genes involved in embryogenesis and in myocardial differentiation and function.
GJB6	gap junction protein, beta 6, 30kDa	This gene encodes one of the connexin proteins.
GLI3	GLI family zinc finger 3	The protein encoded by this gene localizes in the cytoplasm, activates patched Drosophila homolog (PTCH) gene expression and plays a role during embryogenesis.
HOXC4	homeobox C4	Homeobox transcription factors play an important role in morphogenesis in all multicellular organisms.This gene, HOXC4, is one of several homeobox HOXC genes located in a cluster on chromosome 12.
IFT57	intraflagellar transport 57 homolog (Chlamydomonas)	
ITGB1	integrin, beta 1 (fibronectin receptor, beta polypeptide, antigen CD29 includes MDF2, MSK12)	Integrin family members are membrane receptors involved in cell adhesion and recognition in a variety of processes including embryogenesis, hemostasis, tissue repair, immune response and metastatic diffusion of tumor cells.
LHCGR	luteinizing hormone/choriogonadotropin receptor	This gene encodes the receptor for both luteinizing hormone and choriogonadotropin.
MAB21L1	mab-21-like 1 (C. elegans)	This protein may be involved in eye and cerebellum development.
MAB21L2	mab-21-like 2 (C. elegans)	This gene may be involved in neural development.
MAP3K7IP1	mitogen-activated protein kinase kinase kinase 7 interacting protein 1	This protein was identified as a regulator of the MAP kinase kinase kinase MAP3K7/TAK1, which is known to mediate various intracellular signaling pathways, such as those induced by TGF beta, interleukin 1, and WNT-1
MESP1	mesoderm posterior 1 homolog (mouse)	
MSX1	msh homeobox 1	This protein functions as a transcriptional repressor during embryogenesis through interactions with components of the core transcription complex and other homeoproteins. It may also have roles in limb-pattern formation, craniofacial development, particularly odontogenesis, and tumor growth inhibition.
MYL7	myosin, light chain 7, regulatory	
NF1	neurofibromin 1	This gene product appears to function as a negative regulator of the ras signal transduction pathway.
NOG	noggin	This protein may have a principal role in creating morphogenic gradients, and in numerous developmental processes, such as neural tube fusion and joint formation.

	NR2E1	nuclear receptor subfamily 2, group E, member 1	
	PAX2	paired box 2	PAX2 is believed to be a target of transcriptional supression by the tumor supressor gene WT1.
	PTEN	phosphatase and tensin homolog	This protein preferentially dephosphorylates phosphoinositide substrates. It negatively regulates intracellular levels of phosphatidylinositol-3,4,5-trisphosphate in cells and functions as a tumor suppressor by negatively regulating AKT/PKB signaling pathway.
	SMO	smoothened homolog (Drosophila)	
	SOX2	SRY (sex determining region Y)-box 2	This protein is required for stem-cell maintenance in the central nervous system, and also regulates gene expression in the stomach.
	STX2	syntaxin 2	The product of this gene regulates epithelial-mesenchymal interactions and epithelial cell morphogenesis and activation.
	TP63	tumor protein p63	This protein plays a role in the development and maintenance of stratified epithelial tissues. p63 -/- mice have several developmental defects which include the lack of limbs and other tissues, such as teeth and mammary glands, which develop as a result of interactions between mesenchyme and epithelium.
	TTN	titin	This gene encodes a large abundant protein of striated muscle. Titin also contains binding sites for muscle associated proteins so it serves as an adhesion template for the assembly of contractile machinery in muscle cells. It has also been identified as a structural protein for chromosomes.
	WT1	Wilms tumor 1	This protein has an essential role in the normal development of the urogenital system, and it is mutated in a small subset of patients with Wilm's tumors.
	ZIC3	Zic family member 3 (odd-paired homolog, Drosophila)	This nuclear protein probably functions as a transcription factor in early stages of left-right body axis formation.
Organ Development: Growth: Growth of Thymus Gland (9.23E-03)	FGF7	fibroblast growth factor 7 (keratinocyte growth factor)	This protein is an epithelial cell-specific growth factor, whose mitogenic activity is exhibited in keratinocytes but not in fibroblasts and endothelial cells. It may also be implicated roles in morphogenesis of epithelium, reepithelialization of wounds, hair development and early lung organogenesis.
	FGF10	fibroblast growth factor 10	This protein exhibits mitogenic activity for keratinizing epidermal cells, but essentially no activity for fibroblasts. It may be required for embryonic epidermal morphogenesis including brain development, lung morphogenesis, and initiation of lim bud formation. It is also implicated to be a primary factor in wound healing.
	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.
	PIM1	pim-1 oncogene	The protooncogene PIM1 encodes a protein kinase upregulated in prostate cancer.

Nervous System Development and Function: Neurotransmission: Neurotransmission (1.81E-09) *including* Neurotransmission of Cells (2.60E-03), Neurotransmission of Normal Cells (3.37E-03), Neurotransmission of Neurons (1.00E-02), Neurotransmission of Synapse (1.40E-02)	ALS2	amyotrophic lateral sclerosis 2 (juvenile)	The protein functions as a guanine nucleotide exchange factor for the small GTPase RAB5.
	ATXN3	ataxin 3	The protein encoded by this gene contains (CAG)n repeats in the coding region, and the expansion of these repeats from the normal 13-36 to 68-79 is the cause of Machado-Joseph disease.
	BSN	bassoon (presynaptic cytomatrix protein)	The protein encoded by this gene is thought to be a scaffolding protein involved in organizing the presynaptic cytoskeleton, primarily in neurons in the brain.
	CACNA1C	calcium channel, voltage-dependent, L type, alpha 1C subunit	This gene encodes an alpha-1 subunit of a voltage-dependent calcium channel. Calcium channels mediate the influx of calcium ions into the cell upon membrane polarization.
	CACNA1E	calcium channel, voltage-dependent, R type, alpha 1E subunit	This gene encodes an alpha-1 subunit of a voltage-dependent calcium channel.
	CACNB2	calcium channel, voltage-dependent, beta 2 subunit	
	CD24	CD24 molecule	This gene encodes a sialoglycoprotein that is expressed on mature granulocytes and in many B cells.
	CHRM1	cholinergic receptor, muscarinic 1	The muscarinic cholinergic receptor 1 is involved in mediation of vagally-induced bronchoconstriction and in the acid secretion of the gastrointestinal tract.
	CHRM3	cholinergic receptor, muscarinic 3	The muscarinic cholinergic receptor 3 controls smooth muscle contraction and its stimulation causes secretion of glandular tissue.
	CHRNA7	cholinergic receptor, nicotinic, alpha 7	The protein encoded by this gene forms a homo-oligomeric channel, displays marked permeability to calcium ions and is a major component of brain nicotinic receptors that are blocked by, and highly sensitive to, alpha-bungarotoxin.
	CHRNB2	cholinergic receptor, nicotinic, beta 2 (neuronal)	The protein encoded by this gene belongs to a superfamily of ligand-gated ion channels which allow the flow of sodium and potassium across the plasma membrane in response to ligands such as acetylcholine and nicotine.
	CHRNB3	cholinergic receptor, nicotinic, beta 3	

CNR1	cannabinoid receptor 1 (brain)	This gene encodes one of two cannabinoid receptors, which have been found to be involved in the cannabinoid-induced CNS effects (including alterations in mood and cognition) experienced by users of marijuana.
CRH	corticotropin releasing hormone	CRH is secreted by the paraventricular nucleus (PVN) of the hypothalamus in response to stress. In the placenta CRH is a marker that determines the length of gestation and the timing of parturition and delivery. CRH may also act as a trigger for parturition.
DLG4	discs, large homolog 4 (Drosophila)	This MAGUK protein may interact at postsynaptic sites to form a multimeric scaffold for the clustering of receptors, ion channels, and associated signaling proteins.
DLGAP1	discs, large (Drosophila) homolog-associated protein 1	
DRD4	dopamine receptor D4	The D4 subtype of the dopamine receptor inhibits adenylyl cyclase.
DTNA	dystrobrevin, alpha	This protein is a component of the dystrophin-associated protein complex (DPC), which localizes to the sarcolemma and its disruption is associated with various forms of muscular dystrophy.
FGF2	fibroblast growth factor 2 (basic)	The CUG-initiated isoforms of this gene are localized in the nucleus and are responsible for the intracrine effect, whereas, the AUG-initiated form is mostly cytosolic and is responsible for the paracrine and autocrine effects of this FGF.
GABRB2	gamma-aminobutyric acid (GABA) A receptor, beta 2	The gamma-aminobutyric acid (GABA) A receptor is a multisubunit chloride channel that mediates the fastest inhibitory synaptic transmission in the central nervous system.
GABRG1	gamma-aminobutyric acid (GABA) A receptor, gamma 1	The protein is an integral membrane protein and plays an important role in inhibiting neurotransmission by binding to the benzodiazepine receptor and opening an integral chloride channel.
GABRG2	gamma-aminobutyric acid (GABA) A receptor, gamma 2	This gene encodes a gamma-aminobutyric acid (GABA) receptor. GABA is the major inhibitory neurotransmitter in the mammlian brain.
GAD1	glutamate decarboxylase 1 (brain, 67kDa)	The enzyme encoded is responsible for catalyzing the production of gamma-aminobutyric acid from L-glutamic acid.
GAD2	glutamate decarboxylase 2 (pancreatic islets and brain, 65kDa)	This gene encodes one of several forms of glutamic acid decarboxylase, identified as a major autoantigen in insulin-dependent diabetes.
GALR3	galanin receptor 3	The neuropeptide galanin modulates a variety of physiologic processes including cognition/memory, sensory/pain processing, hormone secretion, and feeding behavior.
GJC1	gap junction protein, gamma 1, 45kDa	The encoded protein is a component of gap junctions, which are composed of arrays of intercellular channels that provide a route for the diffusion of low molecular weight materials from cell to cell.
GJD2	gap junction protein, delta 2, 36kDa	This gene is a member of the connexin gene family that is expressed predominantly in mammalian neurons.
GLS	glutaminase	This protein is the major enzyme yielding glutamate from glutamine, and is implicated in behavior disturbances in which glutamate acts as a neurotransmitter (Prusiner, 1981).
GPR176	G protein-coupled receptor 176	Members of the G protein-coupled receptor family, such as GPR176, are cell surface receptors involved in responses to hormones, growth factors, and neurotransmitters.

GRIA2	glutamate receptor, ionotropic, AMPA 2	Glutamate receptors are the predominant excitatory neurotransmitter receptors in the mammalian brain and are activated in a variety of normal neurophysiologic processes. This protein functions as ligand-activated cation channels.
GRIA3	glutamate receptor, ionotrophic, AMPA 3	Glutamate receptors are the predominant excitatory neurotransmitter receptors in the mammalian brain and are activated in a variety of normal neurophysiologic processes.
GRIA4	glutamate receptor, ionotrophic, AMPA 4	Glutamate receptors are the predominant excitatory neurotransmitter receptors in the mammalian brain and are activated in a variety of normal neurophysiologic processes.
GRIK2	glutamate receptor, ionotropic, kainate 2	This gene product belongs to the kainate family of glutamate receptors, which are composed of four subunits and function as ligand-activated ion channels.
GRIK4	glutamate receptor, ionotropic, kainate 4	This gene encodes a protein that belongs to the glutamate-gated ionic channel family. Glutamate functions as the major excitatory neurotransmitter in the CNS.
GRIN2A	glutamate receptor, ionotropic, N-methyl D-aspartate 2A	These receptors have been shown to be involved in long-term potentiation, an activity-dependent increase in the efficiency of synaptic transmission thought to underlie certain kinds of memory and learning.
GRIN2B	glutamate receptor, ionotropic, N-methyl D-aspartate 2B	This NMDA receptor channel has been shown to be involved in long-term potentiation, an activity-dependent increase in the efficiency of synaptic transmission thought to underlie certain kinds of memory and learning.
GRM2	glutamate receptor, metabotropic 2	Glutamatergic neurotransmission is involved in most aspects of normal brain function and can be perturbed in many neuropathologic conditions. GRM2 and GRM3 are linked to the inhibition of the cyclic AMP cascade but differ in their agonist selectivities.
GRM3	glutamate receptor, metabotropic 3	L-glutamate is the major excitatory neurotransmitter in the central nervous system and activates both ionotropic and metabotropic glutamate receptors. GRM3 is linked to the inhibition of the cyclic AMP cascade.
GRM7	glutamate receptor, metabotropic 7	Glutamatergic neurotransmission is involved in most aspects of normal brain function and can be perturbed in many neuropathologic conditions. GRM4, GRM6, GRM7 and GRM8 are linked to the inhibition of the cyclic AMP cascade but differ in their agonist selectivities.
GRM8	glutamate receptor, metabotropic 8	Glutamatergic neurotransmission is involved in most aspects of normal brain function. Group III receptors include GRM8, and are linked to the inhibition of the cyclic AMP cascade.
HCN4	hyperpolarization activated cyclic nucleotide-gated potassium channel 4	This protein shows slow kinetics of activation and inactivation, and is necessary for the cardiac pacemaking process. It may also mediate responses to sour stimuli.
HCRTR2	hypocretin (orexin) receptor 2	The protein encoded by this gene is involved in the regulation of feeding behavior. The encoded protein binds the hypothalamic neuropeptides orexin A and orexin B.
HTR4	5-hydroxytryptamine (serotonin) receptor 4	This gene is a member of the family of serotonin receptors, which stimulate cAMP production in response to serotonin (5-hydroxytryptamine). The gene product is a glycosylated transmembrane protein that functions in both the peripheral and central nervous system to modulate the release of various neurotransmitters.
HTR6	5-hydroxytryptamine (serotonin) receptor 6	
HTR1A	5-hydroxytryptamine (serotonin) receptor 1A	

HTR1D	5-hydroxytryptamine (serotonin) receptor 1D	
HTR2C	5-hydroxytryptamine (serotonin) receptor 2C	Serotonin (5-hydroxytryptamine, 5-HT), a neurotransmitter, elicits a wide array of physiological effects by binding to several receptor subtypes, including the 5-HT2 family of seven-transmembrane-spanning, G-protein-coupled receptors, which activate phospholipase C and D signaling pathways.
HTR3A	5-hydroxytryptamine (serotonin) receptor 3A	This receptor causes fast, depolarizing responses in neurons after activation.
KCNMA1	potassium large conductance calcium-activated channel, subfamily M, alpha member 1	MaxiK channels are large conductance, voltage and calcium-sensitive potassium channels which are fundamental to the control of smooth muscle tone and neuronal excitability.
KCNMB4	potassium large conductance calcium-activated channel, subfamily M, beta member 4	This large conductance, voltage and calcium-sensitive potassium channel protein slows activation kinetics, leads to steeper calcium sensitivity, and shifts the voltage range of current activation to more negative potentials.
KCNQ2	potassium voltage-gated channel, KQT-like subfamily, member 2	The M channel is a slowly activating and deactivating potassium channel that plays a critical role in the regulation of neuronal excitability.
KCNQ5	potassium voltage-gated channel, KQT-like subfamily, member 5	This protein yields currents that activate slowly with depolarization and can form heteromeric channels with the protein encoded by the KCNQ3 gene. Currents expressed from this protein have voltage dependences and inhibitor sensitivities in common with M-currents.
MYO5A	myosin VA (heavy chain 12, myoxin)	Myosin V is a class of actin-based motor proteins involved in cytoplasmic vesicle transport and anchorage, spindle-pole alignment and mRNA translocation. The protein encoded by this gene is abundant in melanocytes and nerve cells.
NLGN1	neuroligin 1	Members of this family may act as splice site-specific ligands for beta-neurexins and may be involved in the formation and remodeling of central nervous system synapses.
NLGN3	neuroligin 3	This gene encodes a member of a family of neuronal cell surface proteins. Members of this family may act as splice site-specific ligands for beta-neurexins and may be involved in the formation and remodeling of central nervous system synapses.
NOVA1	neuro-oncological ventral antigen 1	This gene encodes a neuron-specific RNA-binding protein, a member of the Nova family of paraneoplastic disease antigens, that is recognized and inhibited by paraneoplastic antibodies.
NQO1	NAD(P)H dehydrogenase, quinone 1	This FAD-binding protein forms homodimers and reduces quinones to hydroquinones. This protein's enzymatic activity prevents the one electron reduction of quinones that results in the production of radical species.
NRXN1	neurexin 1	Neurexins function in the vertebrate nervous system as cell adhesion molecules and receptors.
OPRK1	opioid receptor, kappa 1	
P2RX2	purinergic receptor P2X, ligand-gated ion channel, 2	The product of this gene belongs to the family of purinoceptors for ATP. This receptor functions as a ligand-gated ion channel. Binding to ATP mediates synaptic transmission between neurons and from neurons to smooth muscle.

PARK2	Parkinson disease (autosomal recessive, juvenile) 2, parkin	The encoded protein is a component of a multiprotein E3 ubiquitin ligase complex that mediates the targeting of substrate proteins for proteasomal degradation.
PCDHB3	protocadherin beta 3	The specific functions of these neural cadherin-like cell adhesion proteins are unknown but they most likely play a critical role in the establishment and function of specific cell-cell neural connections.
PCDHB5	protocadherin beta 5	The specific functions of these neural cadherin-like cell adhesion proteins are unknown but they most likely play a critical role in the establishment and function of specific cell-cell neural connections.
PCDHB10	protocadherin beta 10	The specific functions of these neural cadherin-like cell adhesion proteins are unknown but they most likely play a critical role in the establishment and function of specific cell-cell neural connections.
PCDHB13	protocadherin beta 13	The specific functions of these neural cadherin-like cell adhesion proteins are unknown but they most likely play a critical role in the establishment and function of specific cell-cell neural connections.
PCDHB11	protocadherin beta 11	The specific functions of these neural cadherin-like cell adhesion proteins are unknown but they most likely play a critical role in the establishment and function of specific cell-cell neural connections.
PCDHB4	protocadherin beta 4	The specific functions of these neural cadherin-like cell adhesion proteins are unknown but they most likely play a critical role in the establishment and function of specific cell-cell neural connections.
PCDHB9	protocadherin beta 9	The specific functions of these neural cadherin-like cell adhesion proteins are unknown but they most likely play a critical role in the establishment and function of specific cell-cell neural connections.
PRPH2	peripherin 2 (retinal degeneration, slow)	This encoded protein is a cell surface glycoprotein found in the outer segment of both rod and cone photoreceptor cells. It may function as an adhesion molecule involved in stabilization and compaction of outer segment disks or in the maintenance of the curvature of the rim.
PTK2	PTK2 protein tyrosine kinase 2	Activation of this gene may be an important early step in cell growth and intracellular signal transduction pathways triggered in response to certain neural peptides or to cell interactions with the extracellular matrix.
PYY	peptide YY	
RIMS1	regulating synaptic membrane exocytosis 1	The RIM family of active zone proteins likely function as protein scaffolds that help regulate vesicle exocytosis during short-term plasticity.
RIT2	Ras-like without CAAX 2	RIN belongs to the RAS (HRAS; MIM 190020) superfamily of small GTPases.
SLC17A1	solute carrier family 17 (sodium phosphate), member 1	
SLC17A7	solute carrier family 17 (sodium-dependent inorganic phosphate cotransporter), member 7	This protein is a vesicle-bound, sodium-dependent phosphate transporter specifically expressed in the neuron-rich regions of the brain. It is associated with the membranes of synaptic vesicles and functions in glutamate transport.
SLC1A2	solute carrier family 1 (glial high affinity glutamate transporter), member 2	The membrane-bound protein is the principal transporter that clears the excitatory neurotransmitter glutamate from the extracellular space at synapses in the central nervous system. Glutamate clearance is necessary for proper synaptic activation and to prevent neuronal damage from excessive activation of glutamate receptors.
SLC1A6	solute carrier family 1 (high affinity aspartate/glutamate transporter), member 6	

	SLC5A7	solute carrier family 5 (choline transporter), member 7	SLC5A7 is a Na(+)- and Cl(-)- dependent high-affinity transporter that mediates the uptake of choline for acetylcholine synthesis in cholinergic neurons.
	SLC6A2	solute carrier family 6 (neurotransmitter transporter, noradrenalin), member 2	The SLC6A2 gene encodes a norepinephrine (noradrenaline) transporter, which is responsible for reuptake of norepinephrine into presynaptic nerve terminals and is a regulator of norepinephrine homeostasis.
	SLC8A3	solute carrier family 8 (sodium/calcium exchanger), member 3	The protein is regulated by intracellular calcium ions and is found in both the plasma membrane and intracellular organellar membranes, where exchange of Na+ for Ca2+ occurs in an electrogenic manner.
	SRI	sorcin	
	SV2A	synaptic vesicle glycoprotein 2A	
	SV2B	synaptic vesicle glycoprotein 2B	
	SYN2	synapsin II	This neuron-specific phosphoprotein selectively binds to small synaptic vesicles in the presynaptic nerve terminal.
	SYP	synaptophysin	Synaptophysin (p38) is an integral membrane protein of small synaptic vesicles in brain and endocrine cells.
	SYT5	synaptotagmin V	
	TH	tyrosine hydroxylase	The protein encoded by this gene is involved in the conversion of tyrosine to dopamine. It is the rate-limiting enzyme in the synthesis of catecholamines, hence plays a key role in the physiology of adrenergic neurons.
	UNC13C	unc-13 homolog C (C. elegans)	
	UTS2	urotensin 2	This gene encodes a mature peptide that is an active cyclic heptapeptide absolutely conserved from lamprey to human. The active peptide acts as a vasoconstrictor and is expressed only in brain tissue.
Nervous System Development and Function: Synaptic Transmission: Synaptic Transmission (2.21E-09) *including* Synaptic Transmission of Cells (1.23E-02), Synaptic Transmission of Normal Cells (1.65E-02)	ALS2	amyotrophic lateral sclerosis 2 (juvenile)	The protein functions as a guanine nucleotide exchange factor for the small GTPase RAB5.
	ATXN3	ataxin 3	The protein encoded by this gene contains (CAG)n repeats in the coding region, and the expansion of these repeats from the normal 13-36 to 68-79 is the cause of Machado-Joseph disease.
	BSN	bassoon (presynaptic cytomatrix protein)	The protein encoded by this gene is thought to be a scaffolding protein involved in organizing the presynaptic cytoskeleton, primarily in neurons in the brain.

CACNA1C	calcium channel, voltage-dependent, L type, alpha 1C subunit	This gene encodes an alpha-1 subunit of a voltage-dependent calcium channel. Calcium channels mediate the influx of calcium ions into the cell upon membrane polarization.
CACNA1E	calcium channel, voltage-dependent, R type, alpha 1E subunit	This gene encodes an alpha-1 subunit of a voltage-dependent calcium channel.
CACNB2	calcium channel, voltage-dependent, beta 2 subunit	
CD24	CD24 molecule	This gene encodes a sialoglycoprotein that is expressed on mature granulocytes and in many B cells.
CHRM1	cholinergic receptor, muscarinic 1	The muscarinic cholinergic receptor 1 is involved in mediation of vagally-induced bronchoconstriction and in the acid secretion of the gastrointestinal tract.
CHRM3	cholinergic receptor, muscarinic 3	The muscarinic cholinergic receptor 3 controls smooth muscle contraction and its stimulation causes secretion of glandular tissue.
CHRNA7	cholinergic receptor, nicotinic, alpha 7	The protein encoded by this gene forms a homo-oligomeric channel, displays marked permeability to calcium ions and is a major component of brain nicotinic receptors that are blocked by, and highly sensitive to, alpha-bungarotoxin.
CHRNB2	cholinergic receptor, nicotinic, beta 2 (neuronal)	The protein encoded by this gene belongs to a superfamily of ligand-gated ion channels which allow the flow of sodium and potassium across the plasma membrane in response to ligands such as acetylcholine and nicotine.
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CRH	corticotropin releasing hormone	CRH is secreted by the paraventricular nucleus (PVN) of the hypothalamus in response to stress. In the placenta CRH is a marker that determines the length of gestation and the timing of parturition and delivery. CRH may also act as a trigger for parturition.
DLG4	discs, large homolog 4 (Drosophila)	This MAGUK protein may interact at postsynaptic sites to form a multimeric scaffold for the clustering of receptors, ion channels, and associated signaling proteins.
DLGAP1	discs, large (Drosophila) homolog-associated protein 1	
DRD4	dopamine receptor D4	The D4 subtype of the dopamine receptor inhibits adenylyl cyclase.
DTNA	dystrobrevin, alpha	This protein is a component of the dystrophin-associated protein complex (DPC), which localizes to the sarcolemma and its disruption is associated with various forms of muscular dystrophy.
FGF2	fibroblast growth factor 2 (basic)	The CUG-initiated isoforms of this gene are localized in the nucleus and are responsible for the intracrine effect, whereas, the AUG-initiated form is mostly cytosolic and is responsible for the paracrine and autocrine effects of this FGF.
GABRB2	gamma-aminobutyric acid (GABA) A receptor, beta 2	The gamma-aminobutyric acid (GABA) A receptor is a multisubunit chloride channel that mediates the fastest inhibitory synaptic transmission in the central nervous system.

GABRG1	gamma-aminobutyric acid (GABA) A receptor, gamma 1	The protein is an integral membrane protein and plays an important role in inhibiting neurotransmission by binding to the benzodiazepine receptor and opening an integral chloride channel.
GABRG2	gamma-aminobutyric acid (GABA) A receptor, gamma 2	This gene encodes a gamma-aminobutyric acid (GABA) receptor. GABA is the major inhibitory neurotransmitter in the mammlian brain.
GAD1	glutamate decarboxylase 1 (brain, 67kDa)	The enzyme encoded is responsible for catalyzing the production of gamma-aminobutyric acid from L-glutamic acid.
GAD2	glutamate decarboxylase 2 (pancreatic islets and brain, 65kDa)	This gene encodes one of several forms of glutamic acid decarboxylase, identified as a major autoantigen in insulin-dependent diabetes.
GALR3	galanin receptor 3	The neuropeptide galanin modulates a variety of physiologic processes including cognition/memory, sensory/pain processing, hormone secretion, and feeding behavior.
GJC1	gap junction protein, gamma 1, 45kDa	The encoded protein is a component of gap junctions, which are composed of arrays of intercellular channels that provide a route for the diffusion of low molecular weight materials from cell to cell.
GJD2	gap junction protein, delta 2, 36kDa	This gene is a member of the connexin gene family that is expressed predominantly in mammalian neurons.
GLS	glutaminase	This protein is the major enzyme yielding glutamate from glutamine, and is implicated in behavior disturbances in which glutamate acts as a neurotransmitter (Prusiner, 1981).
GPR176	G protein-coupled receptor 176	Members of the G protein-coupled receptor family, such as GPR176, are cell surface receptors involved in responses to hormones, growth factors, and neurotransmitters.
GRIA2	glutamate receptor, ionotropic, AMPA 2	Glutamate receptors are the predominant excitatory neurotransmitter receptors in the mammalian brain and are activated in a variety of normal neurophysiologic processes. This protein functions as ligand-activated cation channels.
GRIA3	glutamate receptor, ionotrophic, AMPA 3	Glutamate receptors are the predominant excitatory neurotransmitter receptors in the mammalian brain and are activated in a variety of normal neurophysiologic processes.
GRIA4	glutamate receptor, ionotrophic, AMPA 4	Glutamate receptors are the predominant excitatory neurotransmitter receptors in the mammalian brain and are activated in a variety of normal neurophysiologic processes.
GRIK2	glutamate receptor, ionotropic, kainate 2	This gene product belongs to the kainate family of glutamate receptors, which are composed of four subunits and function as ligand-activated ion channels.
GRIK4	glutamate receptor, ionotropic, kainate 4	This gene encodes a protein that belongs to the glutamate-gated ionic channel family. Glutamate functions as the major excitatory neurotransmitter in the CNS.
GRIN2A	glutamate receptor, ionotropic, N-methyl D-aspartate 2A	These receptors have been shown to be involved in long-term potentiation, an activity-dependent increase in the efficiency of synaptic transmission thought to underlie certain kinds of memory and learning.
GRIN2B	glutamate receptor, ionotropic, N-methyl D-aspartate 2B	This NMDA receptor channel has been shown to be involved in long-term potentiation, an activity-dependent increase in the efficiency of synaptic transmission thought to underlie certain kinds of memory and learning.
GRM2	glutamate receptor, metabotropic 2	Glutamatergic neurotransmission is involved in most aspects of normal brain function and can be perturbed in many neuropathologic conditions. GRM2 and GRM3 are linked to the inhibition of the cyclic AMP cascade but differ in their agonist selectivities.

GRM3	glutamate receptor, metabotropic 3	L-glutamate is the major excitatory neurotransmitter in the central nervous system and activates both ionotropic and metabotropic glutamate receptors. GRM3 is linked to the inhibition of the cyclic AMP cascade.
GRM7	glutamate receptor, metabotropic 7	Glutamatergic neurotransmission is involved in most aspects of normal brain function and can be perturbed in many neuropathologic conditions. GRM4, GRM6, GRM7 and GRM8 are linked to the inhibition of the cyclic AMP cascade but differ in their agonist selectivities.
GRM8	glutamate receptor, metabotropic 8	Glutamatergic neurotransmission is involved in most aspects of normal brain function. Group III receptors include GRM8, and are linked to the inhibition of the cyclic AMP cascade.
HCN4	hyperpolarization activated cyclic nucleotide-gated potassium channel 4	This protein shows slow kinetics of activation and inactivation, and is necessary for the cardiac pacemaking process. It may also mediate responses to sour stimuli.
HCRTR2	hypocretin (orexin) receptor 2	The protein encoded by this gene is involved in the regulation of feeding behavior. The encoded protein binds the hypothalamic neuropeptides orexin A and orexin B.
HTR4	5-hydroxytryptamine (serotonin) receptor 4	This gene is a member of the family of serotonin receptors, which stimulate cAMP production in response to serotonin (5-hydroxytryptamine). The gene product is a glycosylated transmembrane protein that functions in both the peripheral and central nervous system to modulate the release of various neurotransmitters.
HTR6	5-hydroxytryptamine (serotonin) receptor 6	
HTR1A	5-hydroxytryptamine (serotonin) receptor 1A	
HTR1D	5-hydroxytryptamine (serotonin) receptor 1D	
HTR2C	5-hydroxytryptamine (serotonin) receptor 2C	Serotonin (5-hydroxytryptamine, 5-HT), a neurotransmitter, elicits a wide array of physiological effects by binding to several receptor subtypes, including the 5-HT2 family of seven-transmembrane-spanning, G-protein-coupled receptors, which activate phospholipase C and D signaling pathways.
HTR3A	5-hydroxytryptamine (serotonin) receptor 3A	This receptor causes fast, depolarizing responses in neurons after activation.
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KCNQ2	potassium voltage-gated channel, KQT-like subfamily, member 2	The M channel is a slowly activating and deactivating potassium channel that plays a critical role in the regulation of neuronal excitability.

KCNQ5	potassium voltage-gated channel, KQT-like subfamily, member 5	This protein yields currents that activate slowly with depolarization and can form heteromeric channels with the protein encoded by the KCNQ3 gene. Currents expressed from this protein have voltage dependences and inhibitor sensitivities in common with M-currents.
MYO5A	myosin VA (heavy chain 12, myoxin)	Myosin V is a class of actin-based motor proteins involved in cytoplasmic vesicle transport and anchorage, spindle-pole alignment and mRNA translocation. The protein encoded by this gene is abundant in melanocytes and nerve cells.
NLGN1	neuroligin 1	Members of this family may act as splice site-specific ligands for beta-neurexins and may be involved in the formation and remodeling of central nervous system synapses.
NLGN3	neuroligin 3	This gene encodes a member of a family of neuronal cell surface proteins. Members of this family may act as splice site-specific ligands for beta-neurexins and may be involved in the formation and remodeling of central nervous system synapses.
NOVA1	neuro-oncological ventral antigen 1	This gene encodes a neuron-specific RNA-binding protein, a member of the Nova family of paraneoplastic disease antigens, that is recognized and inhibited by paraneoplastic antibodies.
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NRXN1	neurexin 1	Neurexins function in the vertebrate nervous system as cell adhesion molecules and receptors.
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P2RX2	purinergic receptor P2X, ligand-gated ion channel, 2	The product of this gene belongs to the family of purinoceptors for ATP. This receptor functions as a ligand-gated ion channel. Binding to ATP mediates synaptic transmission between neurons and from neurons to smooth muscle.
PARK2	Parkinson disease (autosomal recessive, juvenile) 2, parkin	The encoded protein is a component of a multiprotein E3 ubiquitin ligase complex that mediates the targeting of substrate proteins for proteasomal degradation.
PCDHB3	protocadherin beta 3	The specific functions of these neural cadherin-like cell adhesion proteins are unknown but they most likely play a critical role in the establishment and function of specific cell-cell neural connections.
PCDHB5	protocadherin beta 5	The specific functions of these neural cadherin-like cell adhesion proteins are unknown but they most likely play a critical role in the establishment and function of specific cell-cell neural connections.
PCDHB10	protocadherin beta 10	The specific functions of these neural cadherin-like cell adhesion proteins are unknown but they most likely play a critical role in the establishment and function of specific cell-cell neural connections.
PCDHB13	protocadherin beta 13	The specific functions of these neural cadherin-like cell adhesion proteins are unknown but they most likely play a critical role in the establishment and function of specific cell-cell neural connections.
PCDHB11	protocadherin beta 11	The specific functions of these neural cadherin-like cell adhesion proteins are unknown but they most likely play a critical role in the establishment and function of specific cell-cell neural connections.
PCDHB4	protocadherin beta 4	The specific functions of these neural cadherin-like cell adhesion proteins are unknown but they most likely play a critical role in the establishment and function of specific cell-cell neural connections.
PCDHB9	protocadherin beta 9	The specific functions of these neural cadherin-like cell adhesion proteins are unknown but they most likely play a critical role in the establishment and function of specific cell-cell neural connections.
PRPH2	peripherin 2 (retinal degeneration, slow)	This encoded protein is a cell surface glycoprotein found in the outer segment of both rod and cone photoreceptor cells. It may function as an adhesion molecule involved in stabilization and compaction of outer segment disks or in the maintenance of the curvature of the rim.

PTK2	PTK2 protein tyrosine kinase 2	Activation of this gene may be an important early step in cell growth and intracellular signal transduction pathways triggered in response to certain neural peptides or to cell interactions with the extracellular matrix.
RIMS1	regulating synaptic membrane exocytosis 1	The RIM family of active zone proteins likely function as protein scaffolds that help regulate vesicle exocytosis during short-term plasticity.
RIT2	Ras-like without CAAX 2	RIN belongs to the RAS (HRAS; MIM 190020) superfamily of small GTPases.
SLC1A2	solute carrier family 1 (glial high affinity glutamate transporter), member 2	The membrane-bound protein is the principal transporter that clears the excitatory neurotransmitter glutamate from the extracellular space at synapses in the central nervous system. Glutamate clearance is necessary for proper synaptic activation and to prevent neuronal damage from excessive activation of glutamate receptors.
SLC1A6	solute carrier family 1 (high affinity aspartate/glutamate transporter), member 6	
SLC5A7	solute carrier family 5 (choline transporter), member 7	SLC5A7 is a Na(+)- and Cl(-)- dependent high-affinity transporter that mediates the uptake of choline for acetylcholine synthesis in cholinergic neurons.
SLC6A2	solute carrier family 6 (neurotransmitter transporter, noradrenalin), member 2	The SLC6A2 gene encodes a norepinephrine (noradrenaline) transporter, which is responsible for reuptake of norepinephrine into presynaptic nerve terminals and is a regulator of norepinephrine homeostasis.
SLC8A3	solute carrier family 8 (sodium/calcium exchanger), member 3	The protein is regulated by intracellular calcium ions and is found in both the plasma membrane and intracellular organellar membranes, where exchange of Na+ for Ca2+ occurs in an electrogenic manner.
SV2A	synaptic vesicle glycoprotein 2A	
SV2B	synaptic vesicle glycoprotein 2B	
SYN2	synapsin II	This neuron-specific phosphoprotein selectively binds to small synaptic vesicles in the presynaptic nerve terminal.
SYP	synaptophysin	Synaptophysin (p38) is an integral membrane protein of small synaptic vesicles in brain and endocrine cells.
SYT5	synaptotagmin V	
TH	tyrosine hydroxylase	The protein encoded by this gene is involved in the conversion of tyrosine to dopamine. It is the rate-limiting enzyme in the synthesis of catecholamines, hence plays a key role in the physiology of adrenergic neurons.
UNC13C	unc-13 homolog C (C. elegans)	
UTS2	urotensin 2	This gene encodes a mature peptide that is an active cyclic heptapeptide absolutely conserved from lamprey to human. The active peptide acts as a vasoconstrictor and is expressed only in brain tissue.

Nervous System Development and Function: Neurological Process: Neurological Process of Cells (3.14E-07) *including* Neurological Process of Eukaryotic Cells (5.05E-06), Neurological Process of Normal Cells (4.69E-05), Neurological Process of Neurons (6.05E-04), Neurological Process of Cell Lines (7.36E-03), Neurological Process of Neuroglia (1.65E-02)	ACE	angiotensin I converting enzyme (peptidyl-dipeptidase A) 1	This gene encodes an enzyme involved in catalyzing the conversion of angiotensin I into a physiologically active peptide angiotensin II. This enzyme plays a key role in the renin-angiotensin system.
	ARHGAP5	Rho GTPase activating protein 5	Rho GTPase activating protein 5 negatively regulates RHO GTPases, a family which may mediate cytoskeleton changes by stimulating the hydrolysis of bound GTP. Two transcript variants encoding different isoforms have been found for this gene.
	ASCL1	achaete-scute complex homolog 1 (Drosophila)	The protein activates transcription by binding to the E box. This protein plays a role in the neuronal commitment and differentiation and in the generation of olfactory and autonomic neurons.
	BCL2	B-cell CLL/lymphoma 2	This gene encodes an integral outer mitochondrial membrane protein that blocks the apoptotic death of some cells such as lymphocytes.
	BMP7	bone morphogenetic protein 7	Based on its expression early in embryogenesis, the BMP encoded by this gene has a proposed role in early development and possible bone inductive activity.
	BSN	bassoon (presynaptic cytomatrix protein)	The protein encoded by this gene is thought to be a scaffolding protein involved in organizing the presynaptic cytoskeleton, primarily in neurons in the brain.
	CHRNA7	cholinergic receptor, nicotinic, alpha 7	The protein encoded by this gene forms a homo-oligomeric channel, displays marked permeability to calcium ions and is a major component of brain nicotinic receptors that are blocked by, and highly sensitive to, alpha-bungarotoxin.
	CHRNB2	cholinergic receptor, nicotinic, beta 2 (neuronal)	The protein encoded by this gene belongs to a superfamily of ligand-gated ion channels which allow the flow of sodium and potassium across the plasma membrane in response to ligands such as acetylcholine and nicotine.
	CNR1	cannabinoid receptor 1 (brain)	This gene encodes one of two cannabinoid receptors, which have been found to be involved in the cannabinoid-induced CNS effects (including alterations in mood and cognition) experienced by users of marijuana.
	CRH	corticotropin releasing hormone	CRH is secreted by the paraventricular nucleus (PVN) of the hypothalamus in response to stress. In the placenta CRH is a marker that determines the length of gestation and the timing of parturition and delivery. CRH may also act as a trigger for parturition.

CRHR1	corticotropin releasing hormone receptor 1	The encoded protein is essential for the activation of signal transduction pathways that regulate diverse physiological processes including stress, reproduction, immune response and obesity.
CTF1	cardiotrophin 1	The protein encoded by this gene is a secreted cytokine that induces cardiac myocyte hypertrophy in vitro. It has been shown to bind and activate the ILST/gp130 receoptor.
CYP19A1	cytochrome P450, family 19, subfamily A, polypeptide 1	This protein localizes to the endoplasmic reticulum and catalyzes the last steps of estrogen biosynthesis, three successive hydroxylations of the A ring of androgens.
DGKE	diacylglycerol kinase, epsilon 64kDa	Diacylglycerol kinases are thought to be involved mainly in the regeneration of phosphatidylinositol (PI) from diacylglycerol in the PI-cycle during cell signal transduction.
DLG4	discs, large homolog 4 (Drosophila)	This MAGUK protein may interact at postsynaptic sites to form a multimeric scaffold for the clustering of receptors, ion channels, and associated signaling proteins.
F2R	coagulation factor II (thrombin) receptor	Coagulation factor II receptor is a 7-transmembrane receptor involved in the regulation of thrombotic response.
FGF2	fibroblast growth factor 2 (basic)	The CUG-initiated isoforms of this gene are localized in the nucleus and are responsible for the intracrine effect, whereas, the AUG-initiated form is mostly cytosolic and is responsible for the paracrine and autocrine effects of this FGF.
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.
GABRG1	gamma-aminobutyric acid (GABA) A receptor, gamma 1	The protein is an integral membrane protein and plays an important role in inhibiting neurotransmission by binding to the benzodiazepine receptor and opening an integral chloride channel.
GDNF	glial cell derived neurotrophic factor	The recombinant form of this protein was shown to promote the survival and differentiation of dopaminergic neurons in culture, and was able to prevent apoptosis of motor neurons induced by axotomy.
GJD2	gap junction protein, delta 2, 36kDa	This gene is a member of the connexin gene family that is expressed predominantly in mammalian neurons.
GRIA2	glutamate receptor, ionotropic, AMPA 2	Glutamate receptors are the predominant excitatory neurotransmitter receptors in the mammalian brain and are activated in a variety of normal neurophysiologic processes. This protein functions as ligand-activated cation channels.
GRIA3	glutamate receptor, ionotrophic, AMPA 3	Glutamate receptors are the predominant excitatory neurotransmitter receptors in the mammalian brain and are activated in a variety of normal neurophysiologic processes.
GRIK2	glutamate receptor, ionotropic, kainate 2	This gene product belongs to the kainate family of glutamate receptors, which are composed of four subunits and function as ligand-activated ion channels.
GRIN2A	glutamate receptor, ionotropic, N-methyl D-aspartate 2A	These receptors have been shown to be involved in long-term potentiation, an activity-dependent increase in the efficiency of synaptic transmission thought to underlie certain kinds of memory and learning.
GRIN2B	glutamate receptor, ionotropic, N-methyl D-aspartate 2B	This NMDA receptor channel has been shown to be involved in long-term potentiation, an activity-dependent increase in the efficiency of synaptic transmission thought to underlie certain kinds of memory and learning.
HES1	hairy and enhancer of split 1, (Drosophila)	It is a transcriptional repressor of genes that require a bHLH protein for their transcription. The protein has a particular type of basic domain that contains a helix interrupting protein that binds to the N-box rather than the canonical E-box.

HEY1	hairy/enhancer-of-split related with YRPW motif 1	This gene encodes a transcriptional repressor. Two similar and redundant genes in mouse are required for embryonic cardiovascular development, and are also implicated in neurogenesis and somitogenesis.
HTR4	5-hydroxytryptamine (serotonin) receptor 4	This gene is a member of the family of serotonin receptors, which stimulate cAMP production in response to serotonin (5-hydroxytryptamine). The gene product is a glycosylated transmembrane protein that functions in both the peripheral and central nervous system to modulate the release of various neurotransmitters.
HTR1A	5-hydroxytryptamine (serotonin) receptor 1A	
IGF1	insulin-like growth factor 1 (somatomedin C)	The protein encoded by this gene is similar to insulin in function and structure and is a member of a family of proteins involved in mediating growth and development.
ITGB1	integrin, beta 1 (fibronectin receptor, beta polypeptide, antigen CD29 includes MDF2, MSK12)	Integrin family members are membrane receptors involved in cell adhesion and recognition in a variety of processes including embryogenesis, hemostasis, tissue repair, immune response and metastatic diffusion of tumor cells.
JPH4	junctophilin 4	This gene encodes a member of the junctophilin family of transmembrane proteins that are involved in the formation of the junctional membrane complexes between the plasma membrane and the endoplasmic/sarcoplasmic reticulum in excitable cells.
KCNAB1	potassium voltage-gated channel, shaker-related subfamily, beta member 1	Potassium channels' functions include regulating neurotransmitter release, heart rate, insulin secretion, neuronal excitability, epithelial electrolyte transport, smooth muscle contraction, and cell volume. This gene encodes a member of the potassium channel, voltage-gated, shaker-related subfamily.
KCNJ1	potassium inwardly-rectifying channel, subfamily J, member 1	This protein is activated by internal ATP and probably plays an important role in potassium homeostasis. It has a greater tendency to allow potassium to flow into a cell rather than out of a cell.
KCNJ10	potassium inwardly-rectifying channel, subfamily J, member 10	This protein may form a heterodimer with another potassium channel protein and may be responsible for the potassium buffering action of glial cells in the brain.
KCNMB4	potassium large conductance calcium-activated channel, subfamily M, beta member 4	This large conductance, voltage and calcium-sensitive potassium channel protein slows activation kinetics, leads to steeper calcium sensitivity, and shifts the voltage range of current activation to more negative potentials.
LMNA	lamin A/C	Lamin proteins are thought to be involved in nuclear stability, chromatin structure and gene expression.
NCAM1	neural cell adhesion molecule 1	
NCAN	neurocan	Neurocan is a chondroitin sulfate proteoglycan thought to be involved in the modulation of cell adhesion and migration.
NEUROD2	neurogenic differentiation 2	Expression of this gene can induce transcription from neuron-specific promoters, such as the GAP-43 promoter, which contain a specific DNA sequence known as an E-box. The product of this gene is thought to play a role in the determination and maintenance of neuronal cell fates.
NOG	noggin	This protein may have a principal role in creating morphogenic gradients, and in numerous developmental processes, such as neural tube fusion and joint formation.
NRG1	neuregulin 1	This protein is a signaling protein that mediates cell-cell interactions and plays critical roles in the growth and development of multiple organ systems.

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.
NRTN	neurturin	Neurturin is a member of the TGF-beta subfamily, TRN. This gene signals through RET and a GPI-linked coreceptor, and promotes survival of neuronal populations.
NTRK2	neurotrophic tyrosine kinase, receptor, type 2	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation.
POU4F2	POU class 4 homeobox 2	POU4F2 is found in human retina exclusively within a subpopulation of ganglion cells where it may play a role in determining or maintaining the identities of a small subset of visual system neurons.
PPP2R2C	protein phosphatase 2 (formerly 2A), regulatory subunit B, gamma isoform	Protein phosphatase 2 is one of the four major Ser/Thr phosphatases, and it is implicated in the negative control of cell growth and division
PRKCA	protein kinase C, alpha	This kinase plays roles in many cellular processes, such as cell adhesion, cell transformation, cell cycle checkpoint, and cell volume control. Knockout studies in mice suggest that this kinase may be a fundamental regulator of cardiac contractility and Ca(2+) handling in myocytes.
PRPH2	peripherin 2 (retinal degeneration, slow)	This encoded protein is a cell surface glycoprotein found in the outer segment of both rod and cone photoreceptor cells. It may function as an adhesion molecule involved in stabilization and compaction of outer segment disks or in the maintenance of the curvature of the rim.
PTEN	phosphatase and tensin homolog	This protein preferentially dephosphorylates phosphoinositide substrates. It negatively regulates intracellular levels of phosphatidylinositol-3,4,5-trisphosphate in cells and functions as a tumor suppressor by negatively regulating AKT/PKB signaling pathway.
PTK2	PTK2 protein tyrosine kinase 2	Activation of this gene may be an important early step in cell growth and intracellular signal transduction pathways triggered in response to certain neural peptides or to cell interactions with the extracellular matrix.
PTN	pleiotrophin	
PTPRD	protein tyrosine phosphatase, receptor type, D	PTPs like this one are known to be signaling molecules that regulate a variety of cellular processes including cell growth, differentiation, mitotic cycle, and oncogenic transformation. This PTP may also promote neurite growth, and regulate neurons axon guidance.
PYY	peptide YY	
RBPJ	recombination signal binding protein for immunoglobulin kappa J region	
RIMS1	regulating synaptic membrane exocytosis 1	The RIM family of active zone proteins likely function as protein scaffolds that help regulate vesicle exocytosis during short-term plasticity.
ROBO2	roundabout, axon guidance receptor, homolog 2 (Drosophila)	The encoded protein is a receptor for SLIT2, molecules known to function in axon guidance and cell migration.
SLC17A1	solute carrier family 17 (sodium phosphate), member 1	

	SLC17A7	solute carrier family 17 (sodium-dependent inorganic phosphate cotransporter), member 7	This protein is a vesicle-bound, sodium-dependent phosphate transporter specifically expressed in the neuron-rich regions of the brain. It is associated with the membranes of synaptic vesicles and functions in glutamate transport.
	SRI	sorcin	
	SV2A	synaptic vesicle glycoprotein 2A	
	SV2B	synaptic vesicle glycoprotein 2B	
	SYP	synaptophysin	Synaptophysin (p38) is an integral membrane protein of small synaptic vesicles in brain and endocrine cells.
	THBS2	thrombospondin 2	This protein mediates cell-to-cell and cell-to-matrix interactions. It has been shown to function as a potent inhibitor of tumor growth and angiogenesis. Studies of the mouse counterpart suggest that this protein may modulate the cell surface properties of mesenchymal cells and be involved in cell adhesion and migration.
Nervous System Development and Function: Neurological Process: Neurlogical Process of Tissue (4.22E-04) *including* Neurological Process of Nervous Tissue (6.61E-04), Neurological Process of Nerves (2.05E-03)	ASCL1	achaete-scute complex homolog 1 (Drosophila)	The protein activates transcription by binding to the E box. This protein plays a role in the neuronal commitment and differentiation and in the generation of olfactory and autonomic neurons.
	B4GALNT1	beta-1,4-N-acetyl-galactosaminyl transferase 1	GalNAc-T is the enzyme involved in the biosynthesis of G(M2) and G(D2) glycosphingolipids. GalNAc-T catalyzes the transfer of GalNAc into G(M3) and G(D3) by a beta-1,4 linkage, resulting in the synthesis of G(M2) and G(D2), respectively.
	BACE1	beta-site APP-cleaving enzyme 1	The encoded protein, a member of the peptidase A1 protein family, is a type I integral membrane glycoprotein and aspartic protease that is found mainly in the Golgi.
	CD24	CD24 molecule	This gene encodes a sialoglycoprotein that is expressed on mature granulocytes and in many B cells.
	CTF1	cardiotrophin 1	The protein encoded by this gene is a secreted cytokine that induces cardiac myocyte hypertrophy in vitro. It has been shown to bind and activate the ILST/gp130 receoptor.
	ENAH	enabled homolog (Drosophila)	
	GJD2	gap junction protein, delta 2, 36kDa	This gene is a member of the connexin gene family that is expressed predominantly in mammalian neurons.
	GRIN2B	glutamate receptor, ionotropic, N-methyl D-aspartate 2B	This NMDA receptor channel has been shown to be involved in long-term potentiation, an activity-dependent increase in the efficiency of synaptic transmission thought to underlie certain kinds of memory and learning.

	HES1	hairy and enhancer of split 1, (Drosophila)	It is a transcriptional repressor of genes that require a bHLH protein for their transcription. The protein has a particular type of basic domain that contains a helix interrupting protein that binds to the N-box rather than the canonical E-box.
	IGF1	insulin-like growth factor 1 (somatomedin C)	The protein encoded by this gene is similar to insulin in function and structure and is a member of a family of proteins involved in mediating growth and development.
	MYO5A	myosin VA (heavy chain 12, myoxin)	Myosin V is a class of actin-based motor proteins involved in cytoplasmic vesicle transport and anchorage, spindle-pole alignment and mRNA translocation. The protein encoded by this gene is abundant in melanocytes and nerve cells.
	NRG1	neuregulin 1	This protein is a signaling protein that mediates cell-cell interactions and plays critical roles in the growth and development of multiple organ systems.
	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.
	NRTN	neurturin	Neurturin is a member of the TGF-beta subfamily, TRN. This gene signals through RET and a GPI-linked coreceptor, and promotes survival of neuronal populations.
	NTRK2	neurotrophic tyrosine kinase, receptor, type 2	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation.
	NTRK3	neurotrophic tyrosine kinase, receptor, type 3	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation and may play a role in the development of proprioceptive neurons that sense body position.
	POU3F1	POU class 3 homeobox 1	
	PRKG1	protein kinase, cGMP-dependent, type I	
	SLC17A7	solute carrier family 17 (sodium-dependent inorganic phosphate cotransporter), member 7	This protein is a vesicle-bound, sodium-dependent phosphate transporter specifically expressed in the neuron-rich regions of the brain. It is associated with the membranes of synaptic vesicles and functions in glutamate transport.
	THRB	thyroid hormone receptor, beta (erythroblastic leukemia viral (v-erb-a) oncogene homolog 2, avian)	The protein encoded by this gene is a nuclear hormone receptor for triiodothyronine. It is one of the several receptors for thyroid hormone, and has been shown to mediate the biological activities of thyroid hormone.
Nervous System Development and Function: Neurological Process: Neurological Process of Nervous Tissue (8.10E-04)	ASCL1	achaete-scute complex homolog 1 (Drosophila)	The protein activates transcription by binding to the E box. This protein plays a role in the neuronal commitment and differentiation and in the generation of olfactory and autonomic neurons.
	B4GALNT1	beta-1,4-N-acetyl-galactosaminyl transferase 1	GalNAc-T is the enzyme involved in the biosynthesis of G(M2) and G(D2) glycosphingolipids. GalNAc-T catalyzes the transfer of GalNAc into G(M3) and G(D3) by a beta-1,4 linkage, resulting in the synthesis of G(M2) and G(D2), respectively.
	BACE1	beta-site APP-cleaving enzyme 1	The encoded protein, a member of the peptidase A1 protein family, is a type I integral membrane glycoprotein and aspartic protease that is found mainly in the Golgi.

	GJD2	gap junction protein, delta 2, 36kDa	This gene is a member of the connexin gene family that is expressed predominantly in mammalian neurons.
	GRIN2B	glutamate receptor, ionotropic, N-methyl D-aspartate 2B	This NMDA receptor channel has been shown to be involved in long-term potentiation, an activity-dependent increase in the efficiency of synaptic transmission thought to underlie certain kinds of memory and learning.
	MYO5A	myosin VA (heavy chain 12, myoxin)	Myosin V is a class of actin-based motor proteins involved in cytoplasmic vesicle transport and anchorage, spindle-pole alignment and mRNA translocation. The protein encoded by this gene is abundant in melanocytes and nerve cells.
	NRG1	neuregulin 1	This protein is a signaling protein that mediates cell-cell interactions and plays critical roles in the growth and development of multiple organ systems.
	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.
	NRTN	neurturin	Neurturin is a member of the TGF-beta subfamily, TRN. This gene signals through RET and a GPI-linked coreceptor, and promotes survival of neuronal populations.
	NTRK2	neurotrophic tyrosine kinase, receptor, type 2	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation.
	NTRK3	neurotrophic tyrosine kinase, receptor, type 3	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation and may play a role in the development of proprioceptive neurons that sense body position.
	POU3F1	POU class 3 homeobox 1	
	PRKG1	protein kinase, cGMP-dependent, type I	
	SLC17A7	solute carrier family 17 (sodium-dependent inorganic phosphate cotransporter), member 7	This protein is a vesicle-bound, sodium-dependent phosphate transporter specifically expressed in the neuron-rich regions of the brain. It is associated with the membranes of synaptic vesicles and functions in glutamate transport.
	THRB	thyroid hormone receptor, beta (erythroblastic leukemia viral (v-erb-a) oncogene homolog 2, avian)	The protein encoded by this gene is a nuclear hormone receptor for triiodothyronine. It is one of the several receptors for thyroid hormone, and has been shown to mediate the biological activities of thyroid hormone.
Nervous System Development and Function: Neurological Process: Neurological Process of Brain (2.16E-03)	DLG4	discs, large homolog 4 (Drosophila)	This MAGUK protein may interact at postsynaptic sites to form a multimeric scaffold for the clustering of receptors, ion channels, and associated signaling proteins.
	HES1	hairy and enhancer of split 1, (Drosophila)	It is a transcriptional repressor of genes that require a bHLH protein for their transcription. The protein has a particular type of basic domain that contains a helix interrupting protein that binds to the N-box rather than the canonical E-box.

	MYO5A	myosin VA (heavy chain 12, myoxin)	Myosin V is a class of actin-based motor proteins involved in cytoplasmic vesicle transport and anchorage, spindle-pole alignment and mRNA translocation. The protein encoded by this gene is abundant in melanocytes and nerve cells.
	RBL1	retinoblastoma-like 1 (p107)	It is thought that, given the homology to the known tumor suppressor RB1, the protein encoded by this gene may also be a tumor suppressor.
	THBS2	thrombospondin 2	This protein mediates cell-to-cell and cell-to-matrix interactions. It has been shown to function as a potent inhibitor of tumor growth and angiogenesis. Studies of the mouse counterpart suggest that this protein may modulate the cell surface properties of mesenchymal cells and be involved in cell adhesion and migration.
Nervous System Development and Function: Neurological Process: Neurological Process of Axons(7.31E-03)	ADCY1	adenylate cyclase 1 (brain)	This gene encodes a form of adenylate cyclase expressed in brain.
	ARX	aristaless related homeobox	This gene is a homeobox-containing gene expressed during development, and is thought to be involved in CNS development.
	BMP7	bone morphogenetic protein 7	Based on its expression early in embryogenesis, the BMP encoded by this gene has a proposed role in early development and possible bone inductive activity.
	CHL1	cell adhesion molecule with homology to L1CAM (close homolog of L1)	The protein encoded by this gene is a neural recognition molecule that may be involved in signal transduction pathways.
	CPLX2	complexin 2	The protein product of this gene binds to the SNAP receptor complex and disrupts it, allowing transmitter release.
	DCC	deleted in colorectal carcinoma	
	DPYSL3	dihydropyrimidinase-like 3	
	DPYSL5	dihydropyrimidinase-like 5	Members of the CRMP family, such as DPYSL5, are believed to play a role in growth cone guidance during neural development.
	EFNB3	ephrin-B3	EFNB3, a member of the ephrin gene family, is important in brain development as well as in its maintenance. It may play a pivotal role in forebrain function. The EPH and EPH-related receptors comprise the largest subfamily of receptor protein-tyrosine kinases and have been implicated in mediating developmental events, particularly in the nervous system.
	ENAH	enabled homolog (Drosophila)	
	ERBB4	v-erb-a erythroblastic leukemia viral oncogene homolog 4 (avian)	This gene encodes a protein which binds to and is activated by neuregulins and other factors and induces a variety of cellular responses including mitogenesis and differentiation.
	GDNF	glial cell derived neurotrophic factor	The recombinant form of this protein was shown to promote the survival and differentiation of dopaminergic neurons in culture, and was able to prevent apoptosis of motor neurons induced by axotomy.

GRIA2	glutamate receptor, ionotropic, AMPA 2	Glutamate receptors are the predominant excitatory neurotransmitter receptors in the mammalian brain and are activated in a variety of normal neurophysiologic processes. This protein functions as ligand-activated cation channels.
HGF	hepatocyte growth factor (hepapoietin A; scatter factor)	Hepatocyte growth factor regulates cell growth, cell motility, and morphogenesis by activating a tyrosine kinase signaling cascade after binding to the proto-oncogenic c-Met receptor. Its ability to stimulate mitogenesis, cell motility, and matrix invasion gives it a central role in angiogenesis, tumorogenesis, and tissue regeneration.
HOXA2	homeobox A2	This gene is a DNA-binding transcription factor which may regulate gene expression, morphogenesis, and differentiation. It may be involved in the placement of hindbrain segments in the proper location along the anterior-posterior axis during development.
KAL1	Kallmann syndrome 1 sequence	The encoded protein is similar in sequence to proteins known to function in neural cell adhesion and axonal migration, and may have anti-protease activity.
KIF5C	kinesin family member 5C	
LMX1A	LIM homeobox transcription factor 1, alpha	LMX1 is a homeodomain protein that stimulates transcription of insulin.
NKX2-1	NK2 homeobox 1	
NRG1	neuregulin 1	This protein is a signaling protein that mediates cell-cell interactions and plays critical roles in the growth and development of multiple organ systems.
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.
NRXN1	neurexin 1	Neurexins function in the vertebrate nervous system as cell adhesion molecules and receptors.
NTRK2	neurotrophic tyrosine kinase, receptor, type 2	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation.
PLXNA3	plexin A3	
POU3F1	POU class 3 homeobox 1	
POU4F1	POU class 4 homeobox 1	POU4F1 is a class IV POU domain-containing transcription factor highly expressed in the developing sensory nervous system and in cells of the B- and T-lymphocytic lineages.
POU4F2	POU class 4 homeobox 2	POU4F2 is found in human retina exclusively within a subpopulation of ganglion cells where it may play a role in determining or maintaining the identities of a small subset of visual system neurons.
PRKG1	protein kinase, cGMP-dependent, type I	
ROBO2	roundabout, axon guidance receptor, homolog 2 (Drosophila)	The encoded protein is a receptor for SLIT2, molecules known to function in axon guidance and cell migration.
SEMA4F	sema domain, immunoglobulin domain (Ig), transmembrane domain (TM) and short cytoplasmic domain, (semaphorin) 4F	

	SEMA6C	sema domain, transmembrane domain (TM), and cytoplasmic domain, (semaphorin) 6C	Semaphorins represent important molecular signals controlling multiple aspects of the cellular response that follows CNS injury, and thus may play an important role in neural regeneration.
	UNC5B	unc-5 homolog B (C. elegans)	UNC5B belongs to a family of netrin-1 (MIM 601614) receptors thought to mediate the chemorepulsive effect of netrin-1 on specific axons.
	UNC5C	unc-5 homolog C (C. elegans)	The UNC-5 family of receptors mediate the repellent response to netrin.
Nervous System Development and Function: Neurological Process: Neurological Process of Lines (7.36E-03)	ARHGAP5	Rho GTPase activating protein 5	This protein negatively regulates RHO GTPases, a family which may mediate cytoskeleton changes by stimulating the hydrolysis of bound GTP.
	BCL2	B-cell CLL/lymphoma 2	This gene encodes an integral outer mitochondrial membrane protein that blocks the apoptotic death of some cells such as lymphocytes.
	CRH	corticotropin releasing hormone	CRH is secreted by the paraventricular nucleus (PVN) of the hypothalamus in response to stress. In the placenta CRH is a marker that determines the length of gestation and the timing of parturition and delivery. CRH may also act as a trigger for parturition.
	CRHR1	corticotropin releasing hormone receptor 1	The encoded protein is essential for the activation of signal transduction pathways that regulate diverse physiological processes including stress, reproduction, immune response and obesity.
	FGF2	fibroblast growth factor 2 (basic)	The CUG-initiated isoforms of this gene are localized in the nucleus and are responsible for the intracrine effect, whereas, the AUG-initiated form is mostly cytosolic and is responsible for the paracrine and autocrine effects of this FGF.
	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.
	GDNF	glial cell derived neurotrophic factor	The recombinant form of this protein was shown to promote the survival and differentiation of dopaminergic neurons in culture, and was able to prevent apoptosis of motor neurons induced by axotomy.
	LMNA	lamin A/C	Lamin proteins are thought to be involved in nuclear stability, chromatin structure and gene expression.
	NEUROD2	neurogenic differentiation 2	Expression of this gene can induce transcription from neuron-specific promoters, such as the GAP-43 promoter, which contain a specific DNA sequence known as an E-box. The product of this gene is thought to play a role in the determination and maintenance of neuronal cell fates.
	PPP2R2C	protein phosphatase 2 (formerly 2A), regulatory subunit B, gamma isoform	Protein phosphatase 2 is one of the four major Ser/Thr phosphatases, and it is implicated in the negative control of cell growth and division
Nervous System Development and Function: Neurological Process: Neurological Process of Neuroglia (1.65E-02)	CTF1	cardiotrophin 1	The protein encoded by this gene is a secreted cytokine that induces cardiac myocyte hypertrophy in vitro. It has been shown to bind and activate the ILST/gp130 receoptor.

	FGF2	fibroblast growth factor 2 (basic)	The CUG-initiated isoforms of this gene are localized in the nucleus and are responsible for the intracrine effect, whereas, the AUG-initiated form is mostly cytosolic and is responsible for the paracrine and autocrine effects of this FGF.
	ITGB1	integrin, beta 1 (fibronectin receptor, beta polypeptide, antigen CD29 includes MDF2, MSK12)	Integrin family members are membrane receptors involved in cell adhesion and recognition in a variety of processes including embryogenesis, hemostasis, tissue repair, immune response and metastatic diffusion of tumor cells.
	NRG1	neuregulin 1	This protein is a signaling protein that mediates cell-cell interactions and plays critical roles in the growth and development of multiple organ systems.
	RBPJ	recombination signal binding protein for immunoglobulin kappa J region	
Nervous System Development and Function: Differentiation: Differentiation of Neurons (4.87E-07)	AGTR2	angiotensin II receptor, type 2	AGTR2 plays a role in the central nervous system and cardiovascular functions that are mediated by the renin-angiotensin system. This receptor mediates programmed cell death (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.
	ARX	aristaless related homeobox	This gene is a homeobox-containing gene expressed during development, and is thought to be involved in CNS development.
	ASCL1	achaete-scute complex homolog 1 (Drosophila)	The protein activates transcription by binding to the E box. This protein plays a role in the neuronal commitment and differentiation and in the generation of olfactory and autonomic neurons.
	ATM	ataxia telangiectasia mutated	This protein functions as a regulator of a wide variety of downstream proteins, including tumor suppressor proteins p53 and BRCA1, checkpoint kinase CHK2, checkpoint proteins RAD17 and RAD9, and DNA repair protein NBS1. This protein and the closely related kinase ATR are thought to be master controllers of cell cycle checkpoint signaling pathways that are required for cell response to DNA damage and for genome stability.
	ATP2B2	ATPase, Ca++ transporting, plasma membrane 2	These enzymes remove bivalent calcium ions from eukaryotic cells against very large concentration gradients and play a critical role in intracellular calcium homeostasis.
	BCL2	B-cell CLL/lymphoma 2	This gene encodes an integral outer mitochondrial membrane protein that blocks the apoptotic death of some cells such as lymphocytes.
	BHLHE22	basic helix-loop-helix family, member e22	
	BRSK1	BR serine/threonine kinase 1	
	BRSK2	BR serine/threonine kinase 2	
	BTG4	B-cell translocation gene 4	This encoded protein can induce G1 arrest in the cell cycle.
	CD24	CD24 molecule	This gene encodes a sialoglycoprotein that is expressed on mature granulocytes and in many B cells.

CDK5RAP2	CDK5 regulatory subunit associated protein 2	This protein may be involved in neuronal differentiation.
CDON	Cdon homolog (mouse)	CDON and BOC (MIM 608708) are cell surface receptors of the immunoglobulin (Ig)/fibronectin type III (FNIII; see MIM 135600) repeat family involved in myogenic differentiation. CDON and BOC are coexpressed during development.
CNR1	cannabinoid receptor 1 (brain)	This gene encodes one of two cannabinoid receptors, which have been found to be involved in the cannabinoid-induced CNS effects (including alterations in mood and cognition) experienced by users of marijuana.
CSF3	colony stimulating factor 3 (granulocyte)	The protein encoded by this gene is a cytokine that controls the production, differentiation, and function of granulocytes.
CTF1	cardiotrophin 1	The protein encoded by this gene is a secreted cytokine that induces cardiac myocyte hypertrophy in vitro. It has been shown to bind and activate the ILST/gp130 receoptor.
DLX1	distal-less homeobox 1	This protein may function as a transcriptional regulator of signals from multiple TGF-{beta} superfamily members. It may play a role in the control of craniofacial patterning and the differentiation and survival of inhibitory neurons in the forebrain.
EFNA3	ephrin-A3	The ephrins and EPH-related receptors comprise the largest subfamily of receptor protein-tyrosine kinases and have been implicated in mediating developmental events, especially in the nervous system and in erythropoiesis.
EMX2	empty spiracles homeobox 2	The homeodomain transcription factor EMX2 is critical for central nervous system and urogenital development.
EYA1	eyes absent homolog 1 (Drosophila)	The encoded protein may play a role in the developing kidney, branchial arches, eye, and ear.
FGF1	fibroblast growth factor 1 (acidic)	This protein functions as a modifier of endothelial cell migration and proliferation, as well as an angiogenic factor. It acts as a mitogen for a variety of mesoderm- and neuroectoderm-derived cells in vitro, thus is thought to be involved in organogenesis.
FGF2	fibroblast growth factor 2 (basic)	The CUG-initiated isoforms of this gene are localized in the nucleus and are responsible for the intracrine effect, whereas, the AUG-initiated form is mostly cytosolic and is responsible for the paracrine and autocrine effects of this FGF.
FGF4	fibroblast growth factor 4	This gene was identified by its oncogenic transforming activity.Studies on the mouse homolog suggested a function in bone morphogenesis and limb development through the sonic hedgehog (SHH) signaling pathway.
FGF5	fibroblast growth factor 5	This gene was identified as an oncogene, which confers transforming potential when transfected into mammalian cells.
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.
FOXA1	forkhead box A1	These hepatocyte nuclear factors are transcriptional activators for liver-specific transcripts such as albumin and transthyretin, and they also interact with chromatin. Similar family members in mice have roles in the regulation of metabolism and in the differentiation of the pancreas and liver.
FOXA2	forkhead box A2	These hepatocyte nuclear factors are transcriptional activators for liver-specific genes such as albumin and transthyretin, and they also interact with chromatin. Similar family members have roles in the regulation of metabolism and in the differentiation of the pancreas and liver.

GDF5	growth differentiation factor 5	The members of this family are regulators of cell growth and differentiation in both embryonic and adult tissues.
GDNF	glial cell derived neurotrophic factor	The recombinant form of this protein was shown to promote the survival and differentiation of dopaminergic neurons in culture, and was able to prevent apoptosis of motor neurons induced by axotomy.
HES1	hairy and enhancer of split 1, (Drosophila)	It is a transcriptional repressor of genes that require a bHLH protein for their transcription. The protein has a particular type of basic domain that contains a helix interrupting protein that binds to the N-box rather than the canonical E-box.
HGF	hepatocyte growth factor (hepapoietin A; scatter factor)	Hepatocyte growth factor regulates cell growth, cell motility, and morphogenesis by activating a tyrosine kinase signaling cascade after binding to the proto-oncogenic c-Met receptor. Its ability to stimulate mitogenesis, cell motility, and matrix invasion gives it a central role in angiogenesis, tumorogenesis, and tissue regeneration.
HOXA2	homeobox A2	This gene is a DNA-binding transcription factor which may regulate gene expression, morphogenesis, and differentiation. It may be involved in the placement of hindbrain segments in the proper location along the anterior-posterior axis during development.
HOXB2	homeobox B2	The encoded protein functions as a sequence-specific transcription factor that is involved in development.
HOXD3	homeobox D3	The protein encoded by this gene may play a role in the regulation of cell adhesion processes.
ID4	inhibitor of DNA binding 4, dominant negative helix-loop-helix protein	Consequently, Id proteins inhibit binding to DNA and transcriptional transactivation by heterodimerization with bHLH proteins.
IGF1	insulin-like growth factor 1 (somatomedin C)	The protein encoded by this gene is similar to insulin in function and structure and is a member of a family of proteins involved in mediating growth and development.
IL3	interleukin 3 (colony-stimulating factor, multiple)	This protein is a potent growth promoting cytokine, especially with hematopoietic cell types. It is involved in cell growth, differentiation and apoptosis, and also possesses neurotrophic activity.
ITGB1	integrin, beta 1 (fibronectin receptor, beta polypeptide, antigen CD29 includes MDF2, MSK12)	Integrin family members are membrane receptors involved in cell adhesion and recognition in a variety of processes including embryogenesis, hemostasis, tissue repair, immune response and metastatic diffusion of tumor cells.
KCNMA1	potassium large conductance calcium-activated channel, subfamily M, alpha member 1	MaxiK channels are large conductance, voltage and calcium-sensitive potassium channels which are fundamental to the control of smooth muscle tone and neuronal excitability.
KNDC1	kinase non-catalytic C-lobe domain (KIND) containing 1	
LMX1A	LIM homeobox transcription factor 1, alpha	LMX1 is a homeodomain protein that stimulates transcription of insulin.
MAPK8	mitogen-activated protein kinase 8	This kinase mediates immediate-early gene expression in response to cell stimuli and is related to cytochrome c-mediated cell death pathway. The mouse counterpart plays a key role in T cell proliferation, apoptosis and differentiation.

MAPT	microtubule-associated protein tau	MAPT transcripts are differentially expressed in the nervous system, depending on stage of neuronal maturation and neuron type.
MCOLN3	mucolipin 3	Mucolipins constitute a family of cation channel proteins with homologs in mouse, Drosophila, and C. elegans. Mutations in the human MCOLN1 gene (MIM 605248) cause mucolipodosis IV (MIM 262650).
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.
METRN	meteorin, glial cell differentiation regulator	Meteorin regulates glial cell differentiation and promotes the formation of axonal networks during neurogenesis.
MNX1	motor neuron and pancreas homeobox 1	
MYO7A	myosin VIIA	Myosins are mechanochemical proteins characterized by the presence of a motor domain, an actin-binding domain, a neck domain that interacts with other proteins, and a tail domain that serves as an anchor. This gene encodes an unconventional myosin with a very short tail.
NCAM1	neural cell adhesion molecule 1	
NLGN1	neuroligin 1	Members of this family may act as splice site-specific ligands for beta-neurexins and may be involved in the formation and remodeling of central nervous system synapses.
NOG	noggin	This protein may have a principal role in creating morphogenic gradients, and in numerous developmental processes, such as neural tube fusion and joint formation.
NR2E1	nuclear receptor subfamily 2, group E, member 1	
NRG1	neuregulin 1	This protein is a signaling protein that mediates cell-cell interactions and plays critical roles in the growth and development of multiple organ systems.
NTRK2	neurotrophic tyrosine kinase, receptor, type 2	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation.
NTRK3	neurotrophic tyrosine kinase, receptor, type 3	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation and may play a role in the development of proprioceptive neurons that sense body position.
PCDH15	protocadherin 15	This gene encodes an integral membrane protein that mediates calcium-dependent cell-cell adhesion. It plays an essential role in maintenance of normal retinal and cochlear function.
POU3F2	POU class 3 homeobox 2	Class III POU genes are expressed predominantly in the central nervous system (CNS). It is likely that CNS-specific transcription factors such as these play an important role in mammalian neurogenesis.
POU4F1	POU class 4 homeobox 1	POU4F1 is a class IV POU domain-containing transcription factor highly expressed in the developing sensory nervous system and in cells of the B- and T-lymphocytic lineages.
POU4F2	POU class 4 homeobox 2	POU4F2 is found in human retina exclusively within a subpopulation of ganglion cells where it may play a role in determining or maintaining the identities of a small subset of visual system neurons.
PTN	pleiotrophin	
RBPJ	recombination signal binding protein for immunoglobulin kappa J region	
RGS6	regulator of G-protein signaling 6	Members of the RGS (regulator of G protein signaling) family, such as RGS6, modulate G protein function by activating the intrinsic GTPase activity of the alpha (guanine nucleotide-binding) subunits.

	RIT2	Ras-like without CAAX 2	RIN belongs to the RAS (HRAS; MIM 190020) superfamily of small GTPases.
	SLC1A2	solute carrier family 1 (glial high affinity glutamate transporter), member 2	The membrane-bound protein is the principal transporter that clears the excitatory neurotransmitter glutamate from the extracellular space at synapses in the central nervous system. Glutamate clearance is necessary for proper synaptic activation and to prevent neuronal damage from excessive activation of glutamate receptors.
	SOX2	SRY (sex determining region Y)-box 2	This protein is required for stem-cell maintenance in the central nervous system, and also regulates gene expression in the stomach.
	VGF	VGF nerve growth factor inducible	This gene is specifically expressed in a subpopulation of neuroendocrine cells, and is upregulated by nerve growth factor.
	VSX1	visual system homeobox 1	The encoded protein may regulate expression of the cone opsin genes early in development.
	ZFHX3	zinc finger homeobox 3	
	ZIC3	Zic family member 3 (odd-paired homolog, Drosophila)	This nuclear protein probably functions as a transcription factor in early stages of left-right body axis formation.
Nervous System Development and Function: Synaptogenesis: Synaptogenesis (4.99E-07)	CADM1	cell adhesion molecule 1	
	CHRNB2	cholinergic receptor, nicotinic, beta 2 (neuronal)	The protein encoded by this gene belongs to a superfamily of ligand-gated ion channels which allow the flow of sodium and potassium across the plasma membrane in response to ligands such as acetylcholine and nicotine.
	CYP19A1	cytochrome P450, family 19, subfamily A, polypeptide 1	This protein localizes to the endoplasmic reticulum and catalyzes the last steps of estrogen biosynthesis, three successive hydroxylations of the A ring of androgens.
	DLG4	discs, large homolog 4 (Drosophila)	This MAGUK protein may interact at postsynaptic sites to form a multimeric scaffold for the clustering of receptors, ion channels, and associated signaling proteins.
	GHSR	growth hormone secretagogue receptor	The encoded protein may play a role in energy homeostasis and regulation of body weight.
	GJA10	gap junction protein, alpha 10, 62kDa	Connexins, such as GJA10, are involved in the formation of gap junctions, intercellular conduits that directly connect the cytoplasms of contacting cells.
	ITGB1	integrin, beta 1 (fibronectin receptor, beta polypeptide, antigen CD29 includes MDF2, MSK12)	Integrin family members are membrane receptors involved in cell adhesion and recognition in a variety of processes including embryogenesis, hemostasis, tissue repair, immune response and metastatic diffusion of tumor cells.
	MUSK	muscle, skeletal, receptor tyrosine kinase	This kinase activity is regulated by the binding of a cognate ligand to the extracellular portion of the receptor. DeChiara et al. (1996) [PubMed 8653786] noted that the RTKs, known to be expressed in cell type-specific fashions, play a role critical for the growth and differentiation of those cell types.
	NLGN1	neuroligin 1	Members of this family may act as splice site-specific ligands for beta-neurexins and may be involved in the formation and remodeling of central nervous system synapses.
	NRG1	neuregulin 1	This protein is a signaling protein that mediates cell-cell interactions and plays critical roles in the growth and development of multiple organ systems.
	NRXN1	neurexin 1	Neurexins function in the vertebrate nervous system as cell adhesion molecules and receptors.

	PCDHB3	protocadherin beta 3	The specific functions of these neural cadherin-like cell adhesion proteins are unknown but they most likely play a critical role in the establishment and function of specific cell-cell neural connections.
	PCDHB5	protocadherin beta 5	The specific functions of these neural cadherin-like cell adhesion proteins are unknown but they most likely play a critical role in the establishment and function of specific cell-cell neural connections.
	PCDHB10	protocadherin beta 10	The specific functions of these neural cadherin-like cell adhesion proteins are unknown but they most likely play a critical role in the establishment and function of specific cell-cell neural connections.
	PCDHB13	protocadherin beta 13	The specific functions of these neural cadherin-like cell adhesion proteins are unknown but they most likely play a critical role in the establishment and function of specific cell-cell neural connections.
	PCDHB11	protocadherin beta 11	The specific functions of these neural cadherin-like cell adhesion proteins are unknown but they most likely play a critical role in the establishment and function of specific cell-cell neural connections.
	PCDHB4	protocadherin beta 4	The specific functions of these neural cadherin-like cell adhesion proteins are unknown but they most likely play a critical role in the establishment and function of specific cell-cell neural connections.
	PCDHB9	protocadherin beta 9	The specific functions of these neural cadherin-like cell adhesion proteins are unknown but they most likely play a critical role in the establishment and function of specific cell-cell neural connections.
	POU4F1	POU class 4 homeobox 1	POU4F1 is a class IV POU domain-containing transcription factor highly expressed in the developing sensory nervous system and in cells of the B- and T-lymphocytic lineages.
	PRKCA	protein kinase C, alpha	This kinase plays roles in many cellular processes, such as cell adhesion, cell transformation, cell cycle checkpoint, and cell volume control. Knockout studies in mice suggest that this kinase may be a fundamental regulator of cardiac contractility and Ca(2+) handling in myocytes.
	THBS2	thrombospondin 2	This protein mediates cell-to-cell and cell-to-matrix interactions. It has been shown to function as a potent inhibitor of tumor growth and angiogenesis. Studies of the mouse counterpart suggest that this protein may modulate the cell surface properties of mesenchymal cells and be involved in cell adhesion and migration.
Nervous System Development and Function: Development: Development of Nervous System (1.09E-04) *including* Development of Central Nervous System (4.62E-04)	ADAM22	ADAM metallopeptidase domain 22	This gene is highly expressed in the brain and may function as an integrin ligand in the brain.
	ADAM23	ADAM metallopeptidase domain 23	This gene is highly expressed in the brain and may function as an integrin ligand in the brain.
	AFF2	AF4/FMR2 family, member 2	
	AKT3	v-akt murine thymoma viral oncogene homolog 3 (protein kinase B, gamma)	The protein is involved in a wide variety of biological processes including cell proliferation, differentiation, apoptosis, tumorigenesis, as well as glycogen synthesis and glucose uptake.
	ALDH5A1	aldehyde dehydrogenase 5 family, member A1	This gene encodes a mitochondrial NAD(+)-dependent succinic semialdehyde dehydrogenase.

ARSB	arylsulfatase B	The arylsulfatase B homodimer hydrolyzes sulfate groups of N-Acetyl-D-galactosamine, chondriotin sulfate, and dermatan sulfate. The protein is targetted to the lysozyme.
ARX	aristaless related homeobox	This gene is a homeobox-containing gene expressed during development, and is thought to be involved in CNS development.
ATM	ataxia telangiectasia mutated	This protein functions as a regulator of a wide variety of downstream proteins, including tumor suppressor proteins p53 and BRCA1, checkpoint kinase CHK2, checkpoint proteins RAD17 and RAD9, and DNA repair protein NBS1. This protein and the closely related kinase ATR are thought to be master controllers of cell cycle checkpoint signaling pathways that are required for cell response to DNA damage and for genome stability.
BMP5	bone morphogenetic protein 5	This protein may act as signaling molecule within the trabecular meshwork and optic nerve head, and may play a potential role in glaucoma pathogenesis. This gene is differentially regulated during the formation of various tumors.
BMP7	bone morphogenetic protein 7	Based on its expression early in embryogenesis, the BMP encoded by this gene has a proposed role in early development and possible bone inductive activity.
CCKAR	cholecystokinin A receptor	This receptor is a major physiologic mediator of pancreatic enzyme secretion and smooth muscle contraction of the gallbladder and stomach. In the central and peripheral nervous system this receptor regulates satiety and the release of beta-endorphin and dopamine.
CDK5RAP2	CDK5 regulatory subunit associated protein 2	This protein may be involved in neuronal differentiation.
CELSR1	cadherin, EGF LAG seven-pass G-type receptor 1 (flamingo homolog, Drosophila)	This particular member is a developmentally regulated, neural-specific gene which plays an unspecified role in early embryogenesis.
CHD7	chromodomain helicase DNA binding protein 7	This gene encodes a protein that contains several helicase family domains.
CSF3	colony stimulating factor 3 (granulocyte)	The protein encoded by this gene is a cytokine that controls the production, differentiation, and function of granulocytes.
CTNNA2	catenin (cadherin-associated protein), alpha 2	
DCLK1	doublecortin-like kinase 1	DCAMKL1 is a microtubule-associated protein that phosphorylates itself and myelin basic protein (MBP; MIM 159430).
DLC1	deleted in liver cancer 1	It is suggested that this gene is a candidate tumor suppressor gene for human liver cancer, as well as for prostate, lung, colorectal, and breast cancers.
E2F1	E2F transcription factor 1	The protein encoded by this gene is a member of the E2F family of transcription factors which plays a crucial role in the control of cell cycle and action of tumor suppressor proteins and is also a target of the transforming proteins of small DNA tumor viruses. It can mediate both cell proliferation and p53-dependent/independent apoptosis.
ECE2	endothelin converting enzyme 2	Endothelin-converting enzymes, such as ECE2 (EC 3.4.24.71), are type II metalloproteases that generate functionally pleiotropic members of the endothelin vasoactive peptide family.
EDNRB	endothelin receptor type B	The protein encoded by this gene is a G protein-coupled receptor which activates a phosphatidylinositol-calcium second messenger system.

EMX2	empty spiracles homeobox 2	The homeodomain transcription factor EMX2 is critical for central nervous system and urogenital development.
EPOR	erythropoietin receptor	This erythropoietin receptor activates Jak2 tyrosine kinase which activates different intracellular pathways including: Ras/MAP kinase, phosphatidylinositol 3-kinase and STAT transcription factors. The stimulated erythropoietin receptor appears to have a role in erythroid cell survival.
EVI1	ecotropic viral integration site 1	
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.
FOXA2	forkhead box A2	These hepatocyte nuclear factors are transcriptional activators for liver-specific genes such as albumin and transthyretin, and they also interact with chromatin. Similar family members have roles in the regulation of metabolism and in the differentiation of the pancreas and liver.
GDNF	glial cell derived neurotrophic factor	The recombinant form of this protein was shown to promote the survival and differentiation of dopaminergic neurons in culture, and was able to prevent apoptosis of motor neurons induced by axotomy.
GLI3	GLI family zinc finger 3	The protein encoded by this gene localizes in the cytoplasm, activates patched Drosophila homolog (PTCH) gene expression and plays a role during embryogenesis.
GRIN2B	glutamate receptor, ionotropic, N-methyl D-aspartate 2B	This NMDA receptor channel has been shown to be involved in long-term potentiation, an activity-dependent increase in the efficiency of synaptic transmission thought to underlie certain kinds of memory and learning.
HES1	hairy and enhancer of split 1, (Drosophila)	It is a transcriptional repressor of genes that require a bHLH protein for their transcription. The protein has a particular type of basic domain that contains a helix interrupting protein that binds to the N-box rather than the canonical E-box.
HESX1	HESX homeobox 1	This gene encodes a conserved homeobox protein that is a transcriptional repressor in the developing forebrain and pituitary gland.
HGF	hepatocyte growth factor (hepapoietin A; scatter factor)	Hepatocyte growth factor regulates cell growth, cell motility, and morphogenesis by activating a tyrosine kinase signaling cascade after binding to the proto-oncogenic c-Met receptor. Its ability to stimulate mitogenesis, cell motility, and matrix invasion gives it a central role in angiogenesis, tumorogenesis, and tissue regeneration.
HMX2	H6 family homeobox 2	
HTRA2	HtrA serine peptidase 2	This gene encodes a serine protease. The protein is thought to induce apoptosis by binding the apoptosis inhibitory protein baculoviral IAP repeat-containing 4. Nuclear localization of this protein has also been observed.
ID4	inhibitor of DNA binding 4, dominant negative helix-loop-helix protein	Consequently, Id proteins inhibit binding to DNA and transcriptional transactivation by heterodimerization with bHLH proteins.
IFT57	intraflagellar transport 57 homolog (Chlamydomonas)	
ITGB1	integrin, beta 1 (fibronectin receptor, beta polypeptide, antigen CD29 includes MDF2, MSK12)	Integrin family members are membrane receptors involved in cell adhesion and recognition in a variety of processes including embryogenesis, hemostasis, tissue repair, immune response and metastatic diffusion of tumor cells.

LAMA2	laminin, alpha 2	Laminin, an extracellular protein, is a major component of the basement membrane. It is thought to mediate the attachment, migration, and organization of cells into tissues during embryonic development by interacting with other extracellular matrix components.
LATS2	LATS, large tumor suppressor, homolog 2 (Drosophila)	The protein localizes to centrosomes during interphase, and early and late metaphase.
LLGL1	lethal giant larvae homolog 1 (Drosophila)	This gene encodes a protein that is similar to a tumor suppressor in Drosophila.
LMX1A	LIM homeobox transcription factor 1, alpha	LMX1 is a homeodomain protein that stimulates transcription of insulin.
MAL	mal, T-cell differentiation protein	The protein has been localized to the endoplasmic reticulum of T-cells and is a candidate linker protein in T-cell signal transduction, and in compact myelin of cells in the nervous system and has been implicated in myelin biogenesis and/or function.
MAPK8	mitogen-activated protein kinase 8	This kinase mediates immediate-early gene expression in response to cell stimuli and is related to cytochrome c-mediated cell death pathway. The mouse counterpart plays a key role in T cell proliferation, apoptosis and differentiation.
MAPT	microtubule-associated protein tau	MAPT transcripts are differentially expressed in the nervous system, depending on stage of neuronal maturation and neuron type.
MET	met proto-oncogene (hepatocyte growth factor receptor)	The proto-oncogene MET product is the hepatocyte growth factor receptor and encodes tyrosine-kinase activity.
MOG	myelin oligodendrocyte glycoprotein	This protein may be involved in completion and maintenance of the myelin sheath and in cell-cell communication.
MSX1	msh homeobox 1	This protein functions as a transcriptional repressor during embryogenesis through interactions with components of the core transcription complex and other homeoproteins. It may also have roles in limb-pattern formation, craniofacial development, particularly odontogenesis, and tumor growth inhibition.
MYO5A	myosin VA (heavy chain 12, myoxin)	Myosin V is a class of actin-based motor proteins involved in cytoplasmic vesicle transport and anchorage, spindle-pole alignment and mRNA translocation. The protein encoded by this gene is abundant in melanocytes and nerve cells.
NDUFS4	NADH dehydrogenase (ubiquinone) Fe-S protein 4, 18kDa (NADH-coenzyme Q reductase)	This accessory subunit of the mitochondrial membrane respiratory chain NADH dehydrogenase (Complex I) plays a vital role in cellular ATP production, the primary source of energy for many crucial processes in living cells.
NF1	neurofibromin 1	This gene product appears to function as a negative regulator of the ras signal transduction pathway.
NFIB	nuclear factor I/B	
NHLH2	nescient helix loop helix 2	
NKX2-1	NK2 homeobox 1	
NNAT	neuronatin	This protein is a proteolipid that may be involved in the regulation of ion channels during brain development. The encoded protein may also play a role in forming and maintaining the structure of the nervous system.
NOG	noggin	This protein may have a principal role in creating morphogenic gradients, and in numerous developmental processes, such as neural tube fusion and joint formation.

NR2E1	nuclear receptor subfamily 2, group E, member 1	
NR2F2	nuclear receptor subfamily 2, group F, member 2	
NRG1	neuregulin 1	This protein is a signaling protein that mediates cell-cell interactions and plays critical roles in the growth and development of multiple organ systems.
NTRK2	neurotrophic tyrosine kinase, receptor, type 2	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation.
NTRK3	neurotrophic tyrosine kinase, receptor, type 3	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation and may play a role in the development of proprioceptive neurons that sense body position.
PARK2	Parkinson disease (autosomal recessive, juvenile) 2, parkin	The encoded protein is a component of a multiprotein E3 ubiquitin ligase complex that mediates the targeting of substrate proteins for proteasomal degradation.
POU6F1	POU class 6 homeobox 1	
PRKG1	protein kinase, cGMP-dependent, type I	
PTEN	phosphatase and tensin homolog	This protein preferentially dephosphorylates phosphoinositide substrates. It negatively regulates intracellular levels of phosphatidylinositol-3,4,5-trisphosphate in cells and functions as a tumor suppressor by negatively regulating AKT/PKB signaling pathway.
PYGO2	pygopus homolog 2 (Drosophila)	
RBL1	retinoblastoma-like 1 (p107)	It is thought that, given the homology to the known tumor suppressor RB1, the protein encoded by this gene may also be a tumor suppressor.
RCAN1	regulator of calcineurin 1	The protein encoded by this gene interacts with calcineurin A and inhibits calcineurin-dependent signaling pathways, possibly affecting central nervous system development.
RFX4	regulatory factor X, 4 (influences HLA class II expression)	This protein may be a transcriptional repressor rather than a transcriptional activator.
SH3GL1	SH3-domain GRB2-like 1	
SLC1A2	solute carrier family 1 (glial high affinity glutamate transporter), member 2	The membrane-bound protein is the principal transporter that clears the excitatory neurotransmitter glutamate from the extracellular space at synapses in the central nervous system. Glutamate clearance is necessary for proper synaptic activation and to prevent neuronal damage from excessive activation of glutamate receptors.
SMO	smoothened homolog (Drosophila)	
SOX1	SRY (sex determining region Y)-box 1	This protein is involved in the regulation of embryonic development and in the determination of the cell fate, and may be essential for lens development.
SOX2	SRY (sex determining region Y)-box 2	This protein is required for stem-cell maintenance in the central nervous system, and also regulates gene expression in the stomach.
SOX8	SRY (sex determining region Y)-box 8	This protein may act as a transcriptional activator after forming a protein complex with other proteins. This protein may be involved in brain development and function.

	SPTBN1	spectrin, beta, non-erythrocytic 1	Spectrin is an actin crosslinking and molecular scaffold protein that links the plasma membrane to the actin cytoskeleton, and functions in the determination of cell shape, arrangement of transmembrane proteins, and organization of organelles.
	TAL2	T-cell acute lymphocytic leukemia 2	Translocations between this gene on chromosome 9 and the T-cell receptor beta-chain locus on chromosome 7 have been associated with activation of the T-cell acute lymphocytic leukemia 2 gene and T-cell acute lymphoblastic leukemia.
	THBS2	thrombospondin 2	This protein mediates cell-to-cell and cell-to-matrix interactions. It has been shown to function as a potent inhibitor of tumor growth and angiogenesis. Studies of the mouse counterpart suggest that this protein may modulate the cell surface properties of mesenchymal cells and be involved in cell adhesion and migration.
	UGT8	UDP glycosyltransferase 8	The key enzymatic step in the biosynthesis of galactocerebrosides consists of the transfer of galactose to ceramide catalyzed by UDP-galactose ceramide galactosyltransferase (CGT, EC 2.4.1.45).
	UNC5C	unc-5 homolog C (C. elegans)	The UNC-5 family of receptors mediate the repellent response to netrin.
	ZIC1	Zic family member 1 (odd-paired homolog, Drosophila)	This gene encodes a transcription factor that can bind and transactivate the apolipoprotein E gene.
	ZIC2	Zic family member 2 (odd-paired homolog, Drosophila)	This protein functions as a transcriptional repressor and may regulate tissue specific expression of dopamine receptor D1.
	ZIC3	Zic family member 3 (odd-paired homolog, Drosophila)	This nuclear protein probably functions as a transcription factor in early stages of left-right body axis formation.
Nervous System Development and Function: Development: Development of Neurons (2.00E-04)	ACE	angiotensin I converting enzyme (peptidyl-dipeptidase A) 1	This gene encodes an enzyme involved in catalyzing the conversion of angiotensin I into a physiologically active peptide angiotensin II. This enzyme plays a key role in the renin-angiotensin system.
	ASCL1	achaete-scute complex homolog 1 (Drosophila)	The protein activates transcription by binding to the E box. This protein plays a role in the neuronal commitment and differentiation and in the generation of olfactory and autonomic neurons.
	BCL11B	B-cell CLL/lymphoma 11B (zinc finger protein)	The specific function of this gene has not yet been determined.
	CHL1	cell adhesion molecule with homology to L1CAM (close homolog of L1)	The protein encoded by this gene is a neural recognition molecule that may be involved in signal transduction pathways.
	CNR1	cannabinoid receptor 1 (brain)	This gene encodes one of two cannabinoid receptors, which have been found to be involved in the cannabinoid-induced CNS effects (including alterations in mood and cognition) experienced by users of marijuana.
	CTF1	cardiotrophin 1	The protein encoded by this gene is a secreted cytokine that induces cardiac myocyte hypertrophy in vitro. It has been shown to bind and activate the ILST/gp130 receoptor.
	EBF2	early B-cell factor 2	EBF2 belongs to the conserved Olf/EBF family (see MIM 164343) of helix-loop-helix transcription factors.
	EBF3	early B-cell factor 3	
	ENAH	enabled homolog (Drosophila)	

ERBB4	v-erb-a erythroblastic leukemia viral oncogene homolog 4 (avian)	This gene encodes a protein which binds to and is activated by neuregulins and other factors and induces a variety of cellular responses including mitogenesis and differentiation.
FGF2	fibroblast growth factor 2 (basic)	The CUG-initiated isoforms of this gene are localized in the nucleus and are responsible for the intracrine effect, whereas, the AUG-initiated form is mostly cytosolic and is responsible for the paracrine and autocrine effects of this FGF.
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.
GDNF	glial cell derived neurotrophic factor	The recombinant form of this protein was shown to promote the survival and differentiation of dopaminergic neurons in culture, and was able to prevent apoptosis of motor neurons induced by axotomy.
HES1	hairy and enhancer of split 1, (Drosophila)	It is a transcriptional repressor of genes that require a bHLH protein for their transcription. The protein has a particular type of basic domain that contains a helix interrupting protein that binds to the N-box rather than the canonical E-box.
HEY1	hairy/enhancer-of-split related with YRPW motif 1	This gene encodes a transcriptional repressor. Two similar and redundant genes in mouse are required for embryonic cardiovascular development, and are also implicated in neurogenesis and somitogenesis.
HTRA2	HtrA serine peptidase 2	This gene encodes a serine protease. The protein is thought to induce apoptosis by binding the apoptosis inhibitory protein baculoviral IAP repeat-containing 4. Nuclear localization of this protein has also been observed.
KCNJ10	potassium inwardly-rectifying channel, subfamily J, member 10	This protein may form a heterodimer with another potassium channel protein and may be responsible for the potassium buffering action of glial cells in the brain.
LHX8	LIM homeobox 8	Members of the LIM homeobox gene family, such as LHX8, encode transcription regulators that share common structural features Members of the LIM homeobox gene family are required for the patterning or the specification and differentiation of different cell types during embryonic development.
MNX1	motor neuron and pancreas homeobox 1	
NCAM1	neural cell adhesion molecule 1	
NCAM2	neural cell adhesion molecule 2	The protein may function in selective fasciculation and zone-to-zone projection of the primary olfactory axons.
NEUROD2	neurogenic differentiation 2	Expression of this gene can induce transcription from neuron-specific promoters, such as the GAP-43 promoter, which contain a specific DNA sequence known as an E-box. The product of this gene is thought to play a role in the determination and maintenance of neuronal cell fates.
NKX2-1	NK2 homeobox 1	
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.
NRTN	neurturin	Neurturin is a member of the TGF-beta subfamily, TRN. This gene signals through RET and a GPI-linked coreceptor, and promotes survival of neuronal populations.

	NTRK3	neurotrophic tyrosine kinase, receptor, type 3	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation and may play a role in the development of proprioceptive neurons that sense body position.
	PAX5	paired box 5	This gene encodes the B-cell lineage specific activator protein that is expressed at early, but not late stages of B-cell differentiation. It may also play a role in neural development and spermatogenesis.
	PBX3	pre-B-cell leukemia homeobox 3	
	POU4F1	POU class 4 homeobox 1	POU4F1 is a class IV POU domain-containing transcription factor highly expressed in the developing sensory nervous system and in cells of the B- and T-lymphocytic lineages.
	PTN	pleiotrophin	
	THBS2	thrombospondin 2	This protein mediates cell-to-cell and cell-to-matrix interactions. It has been shown to function as a potent inhibitor of tumor growth and angiogenesis. Studies of the mouse counterpart suggest that this protein may modulate the cell surface properties of mesenchymal cells and be involved in cell adhesion and migration.
	VSX1	visual system homeobox 1	The encoded protein may regulate expression of the cone opsin genes early in development.
Nervous System Development and Function: Development: Development of Schwann Cells (1.24E-03)	FGF2	fibroblast growth factor 2 (basic)	The CUG-initiated isoforms of this gene are localized in the nucleus and are responsible for the intracrine effect, whereas, the AUG-initiated form is mostly cytosolic and is responsible for the paracrine and autocrine effects of this FGF.
	ITGB1	integrin, beta 1 (fibronectin receptor, beta polypeptide, antigen CD29 includes MDF2, MSK12)	Integrin family members are membrane receptors involved in cell adhesion and recognition in a variety of processes including embryogenesis, hemostasis, tissue repair, immune response and metastatic diffusion of tumor cells.
	NF1	neurofibromin 1	This gene product appears to function as a negative regulator of the ras signal transduction pathway.
	NRG1	neuregulin 1	This protein is a signaling protein that mediates cell-cell interactions and plays critical roles in the growth and development of multiple organ systems.
	POU3F1	POU class 3 homeobox 1	
	POU3F2	POU class 3 homeobox 2	Class III POU genes are expressed predominantly in the central nervous system (CNS). It is likely that CNS-specific transcription factors such as these play an important role in mammalian neurogenesis.
Nervous System Development and Function: Development: Development of Olfactory Receptor Neurons (4.86E-03)	EBF2	early B-cell factor 2	EBF2 belongs to the conserved Olf/EBF family (see MIM 164343) of helix-loop-helix transcription factors.
	EBF3	early B-cell factor 3	
	NCAM2	neural cell adhesion molecule 2	The protein may function in selective fasciculation and zone-to-zone projection of the primary olfactory axons.

Nervous System Development and Function: Development: Development of Astrocytes (1.70E-02)	NF1	neurofibromin 1	This gene product appears to function as a negative regulator of the ras signal transduction pathway.
	POU3F2	POU class 3 homeobox 2	Class III POU genes are expressed predominantly in the central nervous system (CNS). It is likely that CNS-specific transcription factors such as these play an important role in mammalian neurogenesis.
	RBPJ	recombination signal binding protein for immunoglobulin kappa J region	
Nervous System Development and Function: Development: Development of Trigeminal Ganglion Neurons (1.70E-02)	GDNF	glial cell derived neurotrophic factor	The recombinant form of this protein was shown to promote the survival and differentiation of dopaminergic neurons in culture, and was able to prevent apoptosis of motor neurons induced by axotomy.
	NRTN	neurturin	Neurturin is a member of the TGF-beta subfamily, TRN. This gene signals through RET and a GPI-linked coreceptor, and promotes survival of neuronal populations.
	POU4F1	POU class 4 homeobox 1	POU4F1 is a class IV POU domain-containing transcription factor highly expressed in the developing sensory nervous system and in cells of the B- and T-lymphocytic lineages.
Nervous System Development and Function: Branching: Branching of Neurites (3.32E-04) *including* Branching of Dendrites (3.21E-04)	BSN	bassoon (presynaptic cytomatrix protein)	The protein encoded by this gene is thought to be a scaffolding protein involved in organizing the presynaptic cytoskeleton, primarily in neurons in the brain.
	CRH	corticotropin releasing hormone	CRH is secreted by the paraventricular nucleus (PVN) of the hypothalamus in response to stress. In the placenta CRH is a marker that determines the length of gestation and the timing of parturition and delivery. CRH may also act as a trigger for parturition.
	CRHR1	corticotropin releasing hormone receptor 1	The encoded protein is essential for the activation of signal transduction pathways that regulate diverse physiological processes including stress, reproduction, immune response and obesity.
	CTNNA2	catenin (cadherin-associated protein), alpha 2	
	DIAPH1	diaphanous homolog 1 (Drosophila)	This gene may have a role in the regulation of actin polymerization in hair cells of the inner ear.
	FGF2	fibroblast growth factor 2 (basic)	The CUG-initiated isoforms of this gene are localized in the nucleus and are responsible for the intracrine effect, whereas, the AUG-initiated form is mostly cytosolic and is responsible for the paracrine and autocrine effects of this FGF.

HGF	hepatocyte growth factor (hepapoietin A; scatter factor)	Hepatocyte growth factor regulates cell growth, cell motility, and morphogenesis by activating a tyrosine kinase signaling cascade after binding to the proto-oncogenic c-Met receptor. Its ability to stimulate mitogenesis, cell motility, and matrix invasion gives it a central role in angiogenesis, tumorogenesis, and tissue regeneration.
KNDC1	kinase non-catalytic C-lobe domain (KIND) containing 1	
MET	met proto-oncogene (hepatocyte growth factor receptor)	The proto-oncogene MET product is the hepatocyte growth factor receptor and encodes tyrosine-kinase activity.
MUSK	muscle, skeletal, receptor tyrosine kinase	This kinase activity is regulated by the binding of a cognate ligand to the extracellular portion of the receptor. DeChiara et al. (1996) [PubMed 8653786] noted that the RTKs, known to be expressed in cell type-specific fashions, play a role critical for the growth and differentiation of those cell types.
NEFL	neurofilament, light polypeptide	Neurofilaments are type IV intermediate filament heteropolymers composed of light, medium, and heavy chains. Neurofilaments comprise the axoskeleton and they functionally maintain the neuronal caliber. They may also play a role in intracellular transport to axons and dendrites. This gene encodes the light chain neurofilament protein.
NF1	neurofibromin 1	This gene product appears to function as a negative regulator of the ras signal transduction pathway.
NOS1	nitric oxide synthase 1 (neuronal)	Nitric oxide is a reactive free radical which mediates neurotransmission and antimicrobial and antitumoral activities. Nitric oxide is synthesized from L-arginine by nitric oxide synthases. This gene encodes a nitric oxide synthase which is highly expressed in skeletal muscle.
NTRK2	neurotrophic tyrosine kinase, receptor, type 2	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation.
NTRK3	neurotrophic tyrosine kinase, receptor, type 3	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation and may play a role in the development of proprioceptive neurons that sense body position.
PRKG1	protein kinase, cGMP-dependent, type I	
ROBO2	roundabout, axon guidance receptor, homolog 2 (Drosophila)	The encoded protein is a receptor for SLIT2, molecules known to function in axon guidance and cell migration.
ROR2	receptor tyrosine kinase-like orphan receptor 2	The protein may be involved in the early formation of the chondrocytes and may be required for cartilage and growth plate development.
SEMA3E	sema domain, immunoglobulin domain (Ig), short basic domain, secreted, (semaphorin) 3E	These proteins are involved in embryonic development, and some behave as neural guidance molecules.
SP4	Sp4 transcription factor	
UGCG	UDP-glucose ceramide glucosyltransferase	The product of this protein, glucosylceramide, is the core structure of more than 300 Glycosphingolipids. UGCG is widely expressed and transciption is upregulated during keratinocyte differentiation.
ULK2	unc-51-like kinase 2 (C. elegans)	This gene encodes a protein that is similar to a serine/threonine kinase in C. elegans which is involved in axonal elongation.

Nervous System Development and Function: Formation: Formation of Neuroglia (5.00E-03) *including* Formation of Oligodendrocytes (8.23E-04)	ASCL1	achaete-scute complex homolog 1 (Drosophila)	The protein activates transcription by binding to the E box. This protein plays a role in the neuronal commitment and differentiation and in the generation of olfactory and autonomic neurons.
	ERBB4	v-erb-a erythroblastic leukemia viral oncogene homolog 4 (avian)	This gene encodes a protein which binds to and is activated by neuregulins and other factors and induces a variety of cellular responses including mitogenesis and differentiation.
	FGF2	fibroblast growth factor 2 (basic)	The CUG-initiated isoforms of this gene are localized in the nucleus and are responsible for the intracrine effect, whereas, the AUG-initiated form is mostly cytosolic and is responsible for the paracrine and autocrine effects of this FGF.
	NKX2-1	NK2 homeobox 1	
	NRG1	neuregulin 1	This protein is a signaling protein that mediates cell-cell interactions and plays critical roles in the growth and development of multiple organ systems.
	RBPJ	recombination signal binding protein for immunoglobulin kappa J region	
Nervous System Development and Function: Neurogenesis: Neurogenesis (9.64E-04)	ABI2	abl interactor 2	
	ACSL6	acyl-CoA synthetase long-chain family member 6	
	ACSL1	acyl-CoA synthetase long-chain family member 1	The protein converts free long-chain fatty acids into fatty acyl-CoA esters, and thereby play a key role in lipid biosynthesis and fatty acid degradation.
	ATXN3	ataxin 3	The protein encoded by this gene contains (CAG)n repeats in the coding region, and the expansion of these repeats from the normal 13-36 to 68-79 is the cause of Machado-Joseph disease.
	BCL2	B-cell CLL/lymphoma 2	This gene encodes an integral outer mitochondrial membrane protein that blocks the apoptotic death of some cells such as lymphocytes.
	BMP7	bone morphogenetic protein 7	Based on its expression early in embryogenesis, the BMP encoded by this gene has a proposed role in early development and possible bone inductive activity.
	BPNT1	3'(2'), 5'-bisphosphate nucleotidase 1	BPntase's physiologic role in nucleotide metabolism may be regulated by inositol signaling pathways.
	CD24	CD24 molecule	This gene encodes a sialoglycoprotein that is expressed on mature granulocytes and in many B cells.
	CHERP	calcium homeostasis endoplasmic reticulum protein	

CHRM1	cholinergic receptor, muscarinic 1	The muscarinic cholinergic receptor 1 is involved in mediation of vagally-induced bronchoconstriction and in the acid secretion of the gastrointestinal tract.
CHRM3	cholinergic receptor, muscarinic 3	The muscarinic cholinergic receptor 3 controls smooth muscle contraction and its stimulation causes secretion of glandular tissue.
CHRNB2	cholinergic receptor, nicotinic, beta 2 (neuronal)	The protein encoded by this gene belongs to a superfamily of ligand-gated ion channels which allow the flow of sodium and potassium across the plasma membrane in response to ligands such as acetylcholine and nicotine.
CNR1	cannabinoid receptor 1 (brain)	This gene encodes one of two cannabinoid receptors, which have been found to be involved in the cannabinoid-induced CNS effects (including alterations in mood and cognition) experienced by users of marijuana.
CNTN3	contactin 3 (plasmacytoma associated)	
CSF3	colony stimulating factor 3 (granulocyte)	The protein encoded by this gene is a cytokine that controls the production, differentiation, and function of granulocytes.
CTF1	cardiotrophin 1	The protein encoded by this gene is a secreted cytokine that induces cardiac myocyte hypertrophy in vitro. It has been shown to bind and activate the ILST/gp130 receoptor.
DCC	deleted in colorectal carcinoma	
DCLK1	doublecortin-like kinase 1	DCAMKL1 is a microtubule-associated protein that phosphorylates itself and myelin basic protein (MBP; MIM 159430).
DISC1	disrupted in schizophrenia 1	The protein is involved in neurite outgrowth and cortical development through its interaction with other proteins.
DLG4	discs, large homolog 4 (Drosophila)	This MAGUK protein may interact at postsynaptic sites to form a multimeric scaffold for the clustering of receptors, ion channels, and associated signaling proteins.
DLL3	delta-like 3 (Drosophila)	This gene encodes a member of the delta protein ligand family. This family functions as Notch ligands that are characterized by a DSL domain, EGF repeats, and a transmembrane domain.
DOK5	docking protein 5	This protein interacts with phosphorylated receptor tyrosine kinases to mediate neurite outgrowth and activation of the MAP kinase pathway.
DPYSL3	dihydropyrimidinase-like 3	
DPYSL5	dihydropyrimidinase-like 5	Members of the CRMP family, such as DPYSL5, are believed to play a role in growth cone guidance during neural development.
DSCAM	Down syndrome cell adhesion molecule	
EFNB3	ephrin-B3	EFNB3, a member of the ephrin gene family, is important in brain development as well as in its maintenance. It may play a pivotal role in forebrain function. The EPH and EPH-related receptors comprise the largest subfamily of receptor protein-tyrosine kinases and have been implicated in mediating developmental events, particularly in the nervous system.
ERBB4	v-erb-a erythroblastic leukemia viral oncogene homolog 4 (avian)	This gene encodes a protein which binds to and is activated by neuregulins and other factors and induces a variety of cellular responses including mitogenesis and differentiation.
FABP7	fatty acid binding protein 7, brain	The protein encoded by this gene is a brain fatty acid binding protein which is thought to play roles in fatty acid uptake, transport, and metabolism.

FGF1	fibroblast growth factor 1 (acidic)	This protein functions as a modifier of endothelial cell migration and proliferation, as well as an angiogenic factor. It acts as a mitogen for a variety of mesoderm- and neuroectoderm-derived cells in vitro, thus is thought to be involved in organogenesis.
FGF2	fibroblast growth factor 2 (basic)	The CUG-initiated isoforms of this gene are localized in the nucleus and are responsible for the intracrine effect, whereas, the AUG-initiated form is mostly cytosolic and is responsible for the paracrine and autocrine effects of this FGF.
FGF5	fibroblast growth factor 5	This gene was identified as an oncogene, which confers transforming potential when transfected into mammalian cells.
FGF13	fibroblast growth factor 13	This gene is a possible candidate gene for familial cases of the BFLS, and for other syndromal and nonspecific forms of X-linked mental retardation, due to its chromosomal location.
FGF14	fibroblast growth factor 14	FGF family members possess broad mitogenic and cell survival activities, and are involved in a variety of biological processes, including embryonic development, cell growth, morphogenesis, tissue repair, tumor growth and invasion.
FGF17	fibroblast growth factor 17	This gene is predominately expressed in the cerebellum and cortex. In mice it is localized to specific sites in the midline structures of the forebrain, the midbrain-hindbrain junction, developing skeleton and developing arteries, which suggests a role in CNS, bone and vascular development.
FGF18	fibroblast growth factor 18	This protein may be a pleiotropic growth factor that stimulates proliferation in many tissues, notably the liver and small intestine. Knockout studies in mice implied the its role in regulating proliferation and differentiation of midline cerebellar structures.
FKTN	fukutin	The protein encoded by this gene may be involved in the glycosylation of alpha-dystroglycan in skeletal muscle. The encoded protein is thought to be a glycosyltransferase and could play a role in brain development.
FUT9	fucosyltransferase 9 (alpha (1,3) fucosyltransferase)	FUT9 synthesizes the LeX oligosaccharide (CD15), which is expressed in organ buds progressing in mesenchyma during human embryogenesis.
GDNF	glial cell derived neurotrophic factor	The recombinant form of this protein was shown to promote the survival and differentiation of dopaminergic neurons in culture, and was able to prevent apoptosis of motor neurons induced by axotomy.
GLI3	GLI family zinc finger 3	The protein encoded by this gene localizes in the cytoplasm, activates patched Drosophila homolog (PTCH) gene expression and plays a role during embryogenesis.
GRIN3A	glutamate receptor, ionotropic, N-methyl-D-aspartate 3A	Studies suggest that this gene may be involved in the development of synaptic elements by modulating NMDA receptor activity.
HDAC9	histone deacetylase 9	Histone acetylation/deacetylation alters chromosome structure and affects transcription factor access to DNA. The protein encoded by this gene has sequence homology to members of the histone deacetylase family. This encoded protein may play a role in hematopoiesis.
HES1	hairy and enhancer of split 1, (Drosophila)	It is a transcriptional repressor of genes that require a bHLH protein for their transcription. The protein has a particular type of basic domain that contains a helix interrupting protein that binds to the N-box rather than the canonical E-box.
HEY1	hairy/enhancer-of-split related with YRPW motif 1	This gene encodes a transcriptional repressor. Two similar and redundant genes in mouse are required for embryonic cardiovascular development, and are also implicated in neurogenesis and somitogenesis.

HGF	hepatocyte growth factor (hepapoietin A; scatter factor)	Hepatocyte growth factor regulates cell growth, cell motility, and morphogenesis by activating a tyrosine kinase signaling cascade after binding to the proto-oncogenic c-Met receptor. Its ability to stimulate mitogenesis, cell motility, and matrix invasion gives it a central role in angiogenesis, tumorogenesis, and tissue regeneration.
HHIP	hedgehog interacting protein	This protein similar to the mouse hedgehog-interacting protein, which is involved in many fundamental processes in embryonic development, including anteroposterior patterns of limbs and regulation of left-right asymmetry.
ID4	inhibitor of DNA binding 4, dominant negative helix-loop-helix protein	Consequently, Id proteins inhibit binding to DNA and transcriptional transactivation by heterodimerization with bHLH proteins.
IGF1	insulin-like growth factor 1 (somatomedin C)	The protein encoded by this gene is similar to insulin in function and structure and is a member of a family of proteins involved in mediating growth and development.
IL3	interleukin 3 (colony-stimulating factor, multiple)	This protein is a potent growth promoting cytokine, especially with hematopoietic cell types. It is involved in cell growth, differentiation and apoptosis, and also possesses neurotrophic activity.
IL11	interleukin 11	This cytokine is shown to stimulate the T-cell-dependent development of immunoglobulin-producing B cells. It is also found to support the proliferation of hematopoietic stem cells and megakaryocyte progenitor cells.
ITGB1	integrin, beta 1 (fibronectin receptor, beta polypeptide, antigen CD29 includes MDF2, MSK12)	Integrin family members are membrane receptors involved in cell adhesion and recognition in a variety of processes including embryogenesis, hemostasis, tissue repair, immune response and metastatic diffusion of tumor cells.
KCNQ2	potassium voltage-gated channel, KQT-like subfamily, member 2	The M channel is a slowly activating and deactivating potassium channel that plays a critical role in the regulation of neuronal excitability.
KNDC1	kinase non-catalytic C-lobe domain (KIND) containing 1	
LAMA2	laminin, alpha 2	Laminin, an extracellular protein, is a major component of the basement membrane. It is thought to mediate the attachment, migration, and organization of cells into tissues during embryonic development by interacting with other extracellular matrix components.
LZTS1	leucine zipper, putative tumor suppressor 1	
MAB21L2	mab-21-like 2 (C. elegans)	This gene may be involved in neural development.
MAPT	microtubule-associated protein tau	MAPT transcripts are differentially expressed in the nervous system, depending on stage of neuronal maturation and neuron type.
MCF2	MCF.2 cell line derived transforming sequence	MCF2 is a member of a large family of GDP-GTP exchange factors that modulate the activity of small GTPases of the Rho family.
MET	met proto-oncogene (hepatocyte growth factor receptor)	The proto-oncogene MET product is the hepatocyte growth factor receptor and encodes tyrosine-kinase activity.
MOBP	myelin-associated oligodendrocyte basic protein	

MYCN	v-myc myelocytomatosis viral related oncogene, neuroblastoma derived (avian)	This gene is a member of the MYC family and encodes a protein with a basic helix-loop-helix (bHLH) domain. This protein is located in the nucleus and must dimerize with another bHLH protein in order to bind DNA. Amplification of this gene is associated with a variety of tumors, most notably neuroblastomas.
NAGLU	N-acetylglucosaminidase, alpha-	This gene encodes an enzyme that degrades heparan sulfate by hydrolysis of terminal N-acetyl-D-glucosamine residues in N-acetyl-alpha-D-glucosaminides.
NAV2	neuron navigator 2	The vitamin A metabolite, all-trans retinoic acid (atRA), plays an important role in neuronal development, including neurite outgrowth.
NCAM1	neural cell adhesion molecule 1	
NEUROD2	neurogenic differentiation 2	Expression of this gene can induce transcription from neuron-specific promoters, such as the GAP-43 promoter, which contain a specific DNA sequence known as an E-box. The product of this gene is thought to play a role in the determination and maintenance of neuronal cell fates.
NF1	neurofibromin 1	This gene product appears to function as a negative regulator of the ras signal transduction pathway.
NOG	noggin	This protein may have a principal role in creating morphogenic gradients, and in numerous developmental processes, such as neural tube fusion and joint formation.
NOVA1	neuro-oncological ventral antigen 1	This gene encodes a neuron-specific RNA-binding protein, a member of the Nova family of paraneoplastic disease antigens, that is recognized and inhibited by paraneoplastic antibodies.
NR2E1	nuclear receptor subfamily 2, group E, member 1	
NRG1	neuregulin 1	This protein is a signaling protein that mediates cell-cell interactions and plays critical roles in the growth and development of multiple organ systems.
NTRK2	neurotrophic tyrosine kinase, receptor, type 2	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation.
OTP	orthopedia homeobox	This protein may function during brain development.
PAX3	paired box 3	Members of the PAX family play critical roles during fetal development.
PCDHA2	protocadherin alpha 2	These neural cadherin-like cell adhesion proteins are integral plasma membrane proteins that most likely play a critical role in the establishment and function of specific cell-cell connections in the brain.
PCDHAC2	protocadherin alpha subfamily C, 2	These neural cadherin-like cell adhesion proteins are integral plasma membrane proteins that most likely play a critical role in the establishment and function of specific cell-cell connections in the brain.
PCDHB15	protocadherin beta 15	These neural cadherin-like cell adhesion proteins are integral plasma membrane proteins, whose functions are unknown but most likely play a critical role in the establishment and function of specific cell-cell neural connections.
PIAS2	protein inhibitor of activated STAT, 2	This gene encodes a protein involved in the regulation of transcription factors involved in MAP kinase signaling.
PLXNA3	plexin A3	
PLXNA4	plexin A4	
POU3F2	POU class 3 homeobox 2	Class III POU genes are expressed predominantly in the central nervous system (CNS). It is likely that CNS-specific transcription factors such as these play an important role in mammalian neurogenesis.
POU4F1	POU class 4 homeobox 1	POU4F1 is a class IV POU domain-containing transcription factor highly expressed in the developing sensory nervous system and in cells of the B- and T-lymphocytic lineages.

POU4F2	POU class 4 homeobox 2	POU4F2 is found in human retina exclusively within a subpopulation of ganglion cells where it may play a role in determining or maintaining the identities of a small subset of visual system neurons.
PRKG1	protein kinase, cGMP-dependent, type I	
PTN	pleiotrophin	
PXMP3	peroxisomal membrane protein 3, 35kDa	This integral peroxisomal membrane protein is required for peroxisome biogenesis, and is thought to be involved in peroxisomal matrix protein import.
RBL1	retinoblastoma-like 1 (p107)	It is thought that, given the homology to the known tumor suppressor RB1, the protein encoded by this gene may also be a tumor suppressor.
SCN2A	sodium channel, voltage-gated, type II, alpha subunit	This gene encodes one member of the sodium channel alpha subunit gene family, which is heterogeneously expressed in the brain.
SEMA4F	sema domain, immunoglobulin domain (Ig), transmembrane domain (TM) and short cytoplasmic domain, (semaphorin) 4F	
SHOX2	short stature homeobox 2	SHOX is a pseudoautosomal homeo box gene that is thought to be responsible for idiopathic short stature and implicated to play a role in the short stature phenotype of Turner syndrome patients.
SIM1	single-minded homolog 1 (Drosophila)	SIM1 transcript was detected only in fetal kidney out of various adult and fetal tissues tested, and it is a candidate for involvement in certain dysmorphic features (particularly the facial and skull characteristics), abnormalities of brain development, and/or mental retardation of Down syndrome.
SLC1A2	solute carrier family 1 (glial high affinity glutamate transporter), member 2	The membrane-bound protein is the principal transporter that clears the excitatory neurotransmitter glutamate from the extracellular space at synapses in the central nervous system. Glutamate clearance is necessary for proper synaptic activation and to prevent neuronal damage from excessive activation of glutamate receptors.
SMO	smoothened homolog (Drosophila)	
SOX2	SRY (sex determining region Y)-box 2	This protein is required for stem-cell maintenance in the central nervous system, and also regulates gene expression in the stomach.
SOX11	SRY (sex determining region Y)-box 11	The protein may function in the developing nervous system and play a role in tumorigenesis
SPG7	spastic paraplegia 7 (pure and complicated autosomal recessive)	Members of this protein family share an ATPase domain and have roles in diverse cellular processes including membrane trafficking, intracellular motility, organelle biogenesis, protein folding, and proteolysis.
TRIO	triple functional domain (PTPRF interacting)	
TRPC5	transient receptor potential cation channel, subfamily C, member 5	

	TRPV1	transient receptor potential cation channel, subfamily V, member 1	The protein encoded by this gene is a receptor for capsaicin and is a non-selective cation channel that is structurally related to members of the TRP family of ion channels. This receptor is also activated by increases in temperature in the noxious range, suggesting that it functions as a transducer of painful thermal stimuli in vivo.
	VSX1	visual system homeobox 1	The encoded protein may regulate expression of the cone opsin genes early in development.
	WT1	Wilms tumor 1	This protein has an essential role in the normal development of the urogenital system, and it is mutated in a small subset of patients with Wilm's tumors.
	ZIC1	Zic family member 1 (odd-paired homolog, Drosophila)	This gene encodes a transcription factor that can bind and transactivate the apolipoprotein E gene.
	ZIC2	Zic family member 2 (odd-paired homolog, Drosophila)	This protein functions as a transcriptional repressor and may regulate tissue specific expression of dopamine receptor D1.
Nervous System Development and Function: Growth: Growth of Neurites (9.65E-04)	ACAN	aggrecan	The encoded protein is an integral part of the extracellular matrix in cartilagenous tissue and it withstands compression in cartilage.
	ALS2	amyotrophic lateral sclerosis 2 (juvenile)	The protein functions as a guanine nucleotide exchange factor for the small GTPase RAB5.
	AR	androgen receptor	This protein functions as a steroid-hormone activated transcription factor.
	ARHGAP5	Rho GTPase activating protein 5	This protein negatively regulates RHO GTPases, a family which may mediate cytoskeleton changes by stimulating the hydrolysis of bound GTP.
	BCL2	B-cell CLL/lymphoma 2	This gene encodes an integral outer mitochondrial membrane protein that blocks the apoptotic death of some cells such as lymphocytes.
	BMP7	bone morphogenetic protein 7	Based on its expression early in embryogenesis, the BMP encoded by this gene has a proposed role in early development and possible bone inductive activity.
	CD47	CD47 molecule	This protein, involved in the increase in intracellular calcium concentration that occurs upon cell adhesion to extracellular matrix, is also a receptor for the C-terminal cell binding domain of thrombospondin, and plays a role in membrane transport and signal transduction. Is has broad tissue distribution.
	CDC2	cell division cycle 2, G1 to S and G2 to M	This protein is a catalytic subunit of the highly conserved protein kinase complex known as M-phase promoting factor (MPF), which is essential for G1/S and G2/M phase transitions of eukaryotic cell cycle.
	CDK2	cyclin-dependent kinase 2	This protein is a catalytic subunit of the cyclin-dependent protein kinase complex, whose activity is restricted to the G1-S phase, and essential for cell cycle G1/S phase transition.
	CHL1	cell adhesion molecule with homology to L1CAM (close homolog of L1)	The protein encoded by this gene is a neural recognition molecule that may be involved in signal transduction pathways.
	CNPY2	canopy 2 homolog (zebrafish)	
	CNR1	cannabinoid receptor 1 (brain)	This gene encodes one of two cannabinoid receptors, which have been found to be involved in the cannabinoid-induced CNS effects (including alterations in mood and cognition) experienced by users of marijuana.
	CYP19A1	cytochrome P450, family 19, subfamily A, polypeptide 1	This protein localizes to the endoplasmic reticulum and catalyzes the last steps of estrogen biosynthesis, three successive hydroxylations of the A ring of androgens.

DCC	deleted in colorectal carcinoma	
DNER	delta/notch-like EGF repeat containing	
DOCK1	dedicator of cytokinesis 1	This gene product binds to the SH3 domain of CRK protein. It may regulate cell surface extension and may have a role in the cell surface extension of an engulfing cell around a dying cell during apoptosis.
DOK5	docking protein 5	This protein interacts with phosphorylated receptor tyrosine kinases to mediate neurite outgrowth and activation of the MAP kinase pathway.
E2F1	E2F transcription factor 1	The protein encoded by this gene is a member of the E2F family of transcription factors which plays a crucial role in the control of cell cycle and action of tumor suppressor proteins and is also a target of the transforming proteins of small DNA tumor viruses. It can mediate both cell proliferation and p53-dependent/independent apoptosis.
EFNB3	ephrin-B3	EFNB3, a member of the ephrin gene family, is important in brain development as well as in its maintenance. It may play a pivotal role in forebrain function. The EPH and EPH-related receptors comprise the largest subfamily of receptor protein-tyrosine kinases and have been implicated in mediating developmental events, particularly in the nervous system.
ELAVL4	ELAV (embryonic lethal, abnormal vision, Drosophila)-like 4 (Hu antigen D)	
ELK1	ELK1, member of ETS oncogene family	This protein is a nuclear target for the ras-raf-MAPK signaling cascade.
EPN1	epsin 1	EPN1 is an endocytic accessory protein that interacts with EPS15 (MIM 600051), the alpha subunit of the clathrin adaptor AP2 (AP2A1; MIM 601026), and clathrin (see MIM 118960), as well as with other accessory proteins for the endocytosis of clathrin-coated vesicles.
ERBB4	v-erb-a erythroblastic leukemia viral oncogene homolog 4 (avian)	This gene encodes a protein which binds to and is activated by neuregulins and other factors and induces a variety of cellular responses including mitogenesis and differentiation.
FGF1	fibroblast growth factor 1 (acidic)	This protein functions as a modifier of endothelial cell migration and proliferation, as well as an angiogenic factor. It acts as a mitogen for a variety of mesoderm- and neuroectoderm-derived cells in vitro, thus is thought to be involved in organogenesis.
FGF2	fibroblast growth factor 2 (basic)	The CUG-initiated isoforms of this gene are localized in the nucleus and are responsible for the intracrine effect, whereas, the AUG-initiated form is mostly cytosolic and is responsible for the paracrine and autocrine effects of this FGF.
FGF4	fibroblast growth factor 4	This gene was identified by its oncogenic transforming activity.Studies on the mouse homolog suggested a function in bone morphogenesis and limb development through the sonic hedgehog (SHH) signaling pathway.
FGF5	fibroblast growth factor 5	This gene was identified as an oncogene, which confers transforming potential when transfected into mammalian cells.
FGF7	fibroblast growth factor 7 (keratinocyte growth factor)	This protein is an epithelial cell-specific growth factor, whose mitogenic activity is exhibited in keratinocytes but not in fibroblasts and endothelial cells. It may also be implicated roles in morphogenesis of epithelium, reepithelialization of wounds, hair development and early lung organogenesis.

FGF18	fibroblast growth factor 18	This protein may be a pleiotropic growth factor that stimulates proliferation in many tissues, notably the liver and small intestine. Knockout studies in mice implied the its role in regulating proliferation and differentiation of midline cerebellar structures.
FN1	fibronectin 1	Fibronectin is involved in cell adhesion and migration processes including embryogenesis, wound healing, blood coagulation, host defense, and metastasis.
GAB1	GRB2-associated binding protein 1	The protein encoded by this gene is an important mediator of branching tubulogenesis and plays a central role in cellular growth response, transformation and apoptosis.
GDNF	glial cell derived neurotrophic factor	The recombinant form of this protein was shown to promote the survival and differentiation of dopaminergic neurons in culture, and was able to prevent apoptosis of motor neurons induced by axotomy.
GNAO1	guanine nucleotide binding protein (G protein), alpha activating activity polypeptide O	
GNAS	GNAS complex locus	This protein is associated with the classical signal transduction pathway linking receptor-ligand interactions with the activation of adenylyl cyclase and a variety of cellular reponses.
GPR6	G protein-coupled receptor 6	
GPR12	G protein-coupled receptor 12	
HGF	hepatocyte growth factor (hepapoietin A; scatter factor)	Hepatocyte growth factor regulates cell growth, cell motility, and morphogenesis by activating a tyrosine kinase signaling cascade after binding to the proto-oncogenic c-Met receptor. Its ability to stimulate mitogenesis, cell motility, and matrix invasion gives it a central role in angiogenesis, tumorogenesis, and tissue regeneration.
IGF1	insulin-like growth factor 1 (somatomedin C)	The protein encoded by this gene is similar to insulin in function and structure and is a member of a family of proteins involved in mediating growth and development.
ITGB1	integrin, beta 1 (fibronectin receptor, beta polypeptide, antigen CD29 includes MDF2, MSK12)	Integrin family members are membrane receptors involved in cell adhesion and recognition in a variety of processes including embryogenesis, hemostasis, tissue repair, immune response and metastatic diffusion of tumor cells.
ITGB3	integrin, beta 3 (platelet glycoprotein IIIa, antigen CD61)	Integrins are known to participate in cell adhesion as well as cell-surface mediated signalling.
KIT	v-kit Hardy-Zuckerman 4 feline sarcoma viral oncogene homolog	This gene encodes the human homolog of the proto-oncogene c-kit. This protein is a type 3 transmembrane receptor for MGF (mast cell growth factor, also known as stem cell factor).
KNDC1	kinase non-catalytic C-lobe domain (KIND) containing 1	
KRAS	v-Ki-ras2 Kirsten rat sarcoma viral oncogene homolog	This gene, a Kirsten ras oncogene, encodes a protein that is a member of the small GTPase superfamily.The transforming protein that results is implicated in various malignancies, including lung adenocarcinoma, mucinous adenoma, ductal carcinoma of the pancreas and colorectal carcinoma.

LAMA2	laminin, alpha 2	Laminin, an extracellular protein, is a major component of the basement membrane. It is thought to mediate the attachment, migration, and organization of cells into tissues during embryonic development by interacting with other extracellular matrix components.
LAMA3	laminin, alpha 3	The protein encoded by this gene is the alpha-3 subunit of laminin 5, which is thought to be involved in cell adhesion, signal transduction and differentiation of keratinocytes.
LINGO1	leucine rich repeat and Ig domain containing 1	
MAPK11	mitogen-activated protein kinase 11	This kinase can be activated by proinflammatory cytokines and environmental stress.
MAPT	microtubule-associated protein tau	MAPT transcripts are differentially expressed in the nervous system, depending on stage of neuronal maturation and neuron type.
MET	met proto-oncogene (hepatocyte growth factor receptor)	The proto-oncogene MET product is the hepatocyte growth factor receptor and encodes tyrosine-kinase activity.
NCAM1	neural cell adhesion molecule 1	
NF1	neurofibromin 1	This gene product appears to function as a negative regulator of the ras signal transduction pathway.
NRG1	neuregulin 1	This protein is a signaling protein that mediates cell-cell interactions and plays critical roles in the growth and development of multiple organ systems.
NRTN	neurturin	Neurturin is a member of the TGF-beta subfamily, TRN. This gene signals through RET and a GPI-linked coreceptor, and promotes survival of neuronal populations.
NTRK2	neurotrophic tyrosine kinase, receptor, type 2	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation.
NTRK3	neurotrophic tyrosine kinase, receptor, type 3	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation and may play a role in the development of proprioceptive neurons that sense body position.
PAK7	p21 protein (Cdc42/Rac)-activated kinase 7	This kinase is predominantly expressed in brain. It is capable of promoting neurite outgrowth, and thus may play a role in neurite development. This kinase is associated with microtubule networks and induces microtubule stabilization.
PLA2G10	phospholipase A2, group X	
PLXNA3	plexin A3	
PLXNA4	plexin A4	
POLR3E	polymerase (RNA) III (DNA directed) polypeptide E (80kD)	
POU3F2	POU class 3 homeobox 2	Class III POU genes are expressed predominantly in the central nervous system (CNS). It is likely that CNS-specific transcription factors such as these play an important role in mammalian neurogenesis.
POU4F1	POU class 4 homeobox 1	POU4F1 is a class IV POU domain-containing transcription factor highly expressed in the developing sensory nervous system and in cells of the B- and T-lymphocytic lineages.
POU4F2	POU class 4 homeobox 2	POU4F2 is found in human retina exclusively within a subpopulation of ganglion cells where it may play a role in determining or maintaining the identities of a small subset of visual system neurons.

	PPP2R2C	protein phosphatase 2 (formerly 2A), regulatory subunit B, gamma isoform	Protein phosphatase 2 is one of the four major Ser/Thr phosphatases, and it is implicated in the negative control of cell growth and division
	PTEN	phosphatase and tensin homolog	This protein preferentially dephosphorylates phosphoinositide substrates. It negatively regulates intracellular levels of phosphatidylinositol-3,4,5-trisphosphate in cells and functions as a tumor suppressor by negatively regulating AKT/PKB signaling pathway.
	PTN	pleiotrophin	
	RAP1GAP	RAP1 GTPase activating protein	
	RHOQ	ras homolog gene family, member Q	TC10 is a member of the RAS superfamily of small GTP-binding proteins (see HRAS, MIM 190020) involved in insulin-stimulated glucose uptake.
	RIT2	Ras-like without CAAX 2	RIN belongs to the RAS (HRAS; MIM 190020) superfamily of small GTPases.
	SIP1	survival of motor neuron protein interacting protein 1	
	TNFRSF19	tumor necrosis factor receptor superfamily, member 19	This receptor is highly expressed during embryonic development. This receptor is capable of inducing apoptosis by a caspase-independent mechanism, and it is thought to play an essential role in embryonic development.
	TNK2	tyrosine kinase, non-receptor, 2	This protein may be involved in a regulatory mechanism that sustains the GTP-bound active form of Cdc42Hs and which is directly linked to a tyrosine phosphorylation signal transduction pathway.
	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.
	TRIO	triple functional domain (PTPRF interacting)	
	TRPC5	transient receptor potential cation channel, subfamily C, member 5	
	WT1	Wilms tumor 1	This protein has an essential role in the normal development of the urogenital system, and it is mutated in a small subset of patients with Wilm's tumors.
Nervous System Development and Function: Quantity: Quantity of Neurons (1.34E-03)	ARX	aristaless related homeobox	This gene is a homeobox-containing gene expressed during development, and is thought to be involved in CNS development.
	ASCL1	achaete-scute complex homolog 1 (Drosophila)	The protein activates transcription by binding to the E box. This protein plays a role in the neuronal commitment and differentiation and in the generation of olfactory and autonomic neurons.
	ATM	ataxia telangiectasia mutated	This protein functions as a regulator of a wide variety of downstream proteins, including tumor suppressor proteins p53 and BRCA1, checkpoint kinase CHK2, checkpoint proteins RAD17 and RAD9, and DNA repair protein NBS1. This protein and the closely related kinase ATR are thought to be master controllers of cell cycle checkpoint signaling pathways that are required for cell response to DNA damage and for genome stability.
	BCL2	B-cell CLL/lymphoma 2	This gene encodes an integral outer mitochondrial membrane protein that blocks the apoptotic death of some cells such as lymphocytes.

BMPR1B	bone morphogenetic protein receptor, type IB	The ligands of this receptor are BMPs, which are members of the TGF-beta superfamily. BMPs are involved in endochondral bone formation and embryogenesis.
CDNF	cerebral dopamine neurotrophic factor	
CHRNB2	cholinergic receptor, nicotinic, beta 2 (neuronal)	The protein encoded by this gene belongs to a superfamily of ligand-gated ion channels which allow the flow of sodium and potassium across the plasma membrane in response to ligands such as acetylcholine and nicotine.
DCC	deleted in colorectal carcinoma	
DCLK1	doublecortin-like kinase 1	DCAMKL1 is a microtubule-associated protein that phosphorylates itself and myelin basic protein (MBP; MIM 159430).
DLX1	distal-less homeobox 1	This protein may function as a transcriptional regulator of signals from multiple TGF-{beta} superfamily members. It may play a role in the control of craniofacial patterning and the differentiation and survival of inhibitory neurons in the forebrain.
ERBB4	v-erb-a erythroblastic leukemia viral oncogene homolog 4 (avian)	This gene encodes a protein which binds to and is activated by neuregulins and other factors and induces a variety of cellular responses including mitogenesis and differentiation.
ESR1	estrogen receptor 1	This gene encodes an estrogen receptor which are essential for sexual development and reproductive function, but also play a role in other tissues such as bone.
FGF2	fibroblast growth factor 2 (basic)	The CUG-initiated isoforms of this gene are localized in the nucleus and are responsible for the intracrine effect, whereas, the AUG-initiated form is mostly cytosolic and is responsible for the paracrine and autocrine effects of this FGF.
FGF13	fibroblast growth factor 13	This gene is a possible candidate gene for familial cases of the BFLS, and for other syndromal and nonspecific forms of X-linked mental retardation, due to its chromosomal location.
GCG	glucagon	Glucagon, is a pancreatic hormone that counteracts the glucose-lowering action of insulin by stimulating glycogenolysis and gluconeogenesis.
GDNF	glial cell derived neurotrophic factor	The recombinant form of this protein was shown to promote the survival and differentiation of dopaminergic neurons in culture, and was able to prevent apoptosis of motor neurons induced by axotomy.
GNAO1	guanine nucleotide binding protein (G protein), alpha activating activity polypeptide O	
HES1	hairy and enhancer of split 1, (Drosophila)	It is a transcriptional repressor of genes that require a bHLH protein for their transcription. The protein has a particular type of basic domain that contains a helix interrupting protein that binds to the N-box rather than the canonical E-box.
HGF	hepatocyte growth factor (hepapoietin A; scatter factor)	Hepatocyte growth factor regulates cell growth, cell motility, and morphogenesis by activating a tyrosine kinase signaling cascade after binding to the proto-oncogenic c-Met receptor. Its ability to stimulate mitogenesis, cell motility, and matrix invasion gives it a central role in angiogenesis, tumorogenesis, and tissue regeneration.
HIPK2	homeodomain interacting protein kinase 2	HIPK2 is a conserved serine/threonine nuclear kinase that interacts with homeodomain transcription factors.

IGF1	insulin-like growth factor 1 (somatomedin C)	The protein encoded by this gene is similar to insulin in function and structure and is a member of a family of proteins involved in mediating growth and development.
JAG2	jagged 2	Members of the Notch gene family encode transmembrane receptors that are critical for various cell fate decisions. The protein encoded by this gene is one of several ligands that activate Notch and related receptors.
KCNIP3	Kv channel interacting protein 3, calsenilin	This gene encodes a member of the family of voltage-gated potassium (Kv) channel-interacting proteins. They are integral subunit components of native Kv4 channel complexes that may regulate A-type currents, and hence neuronal excitability, in response to changes in intracellular calcium. The encoded protein also functions as a calcium-regulated transcriptional repressor, and interacts with presenilins.
KIF5C	kinesin family member 5C	
LEF1	lymphoid enhancer-binding factor 1	LEF1 is a nuclear protein that is expressed in pre-B and T cells. It binds to a functionally important site in the T-cell receptor-alpha (TCRA; MIM 186880) enhancer and confers maximal enhancer activity.
LHX8	LIM homeobox 8	Members of the LIM homeobox gene family, such as LHX8, encode transcription regulators that share common structural features Members of the LIM homeobox gene family are required for the patterning or the specification and differentiation of different cell types during embryonic development.
MAPT	microtubule-associated protein tau	MAPT transcripts are differentially expressed in the nervous system, depending on stage of neuronal maturation and neuron type.
MUSK	muscle, skeletal, receptor tyrosine kinase	This kinase activity is regulated by the binding of a cognate ligand to the extracellular portion of the receptor. DeChiara et al. (1996) [PubMed 8653786] noted that the RTKs, known to be expressed in cell type-specific fashions, play a role critical for the growth and differentiation of those cell types.
NEFL	neurofilament, light polypeptide	Neurofilaments are type IV intermediate filament heteropolymers composed of light, medium, and heavy chains. Neurofilaments comprise the axoskeleton and they functionally maintain the neuronal caliber. They may also play a role in intracellular transport to axons and dendrites. This gene encodes the light chain neurofilament protein.
NEUROD2	neurogenic differentiation 2	Expression of this gene can induce transcription from neuron-specific promoters, such as the GAP-43 promoter, which contain a specific DNA sequence known as an E-box. The product of this gene is thought to play a role in the determination and maintenance of neuronal cell fates.
NHLH2	nescient helix loop helix 2	
NKX2-1	NK2 homeobox 1	
NOG	noggin	This protein may have a principal role in creating morphogenic gradients, and in numerous developmental processes, such as neural tube fusion and joint formation.
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.
NRTN	neurturin	Neurturin is a member of the TGF-beta subfamily, TRN. This gene signals through RET and a GPI-linked coreceptor, and promotes survival of neuronal populations.
NTRK2	neurotrophic tyrosine kinase, receptor, type 2	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation.
NTRK3	neurotrophic tyrosine kinase, receptor, type 3	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation and may play a role in the development of proprioceptive neurons that sense body position.

	PARK2	Parkinson disease (autosomal recessive, juvenile) 2, parkin	The encoded protein is a component of a multiprotein E3 ubiquitin ligase complex that mediates the targeting of substrate proteins for proteasomal degradation.
	POU4F1	POU class 4 homeobox 1	POU4F1 is a class IV POU domain-containing transcription factor highly expressed in the developing sensory nervous system and in cells of the B- and T-lymphocytic lineages.
	POU4F2	POU class 4 homeobox 2	POU4F2 is found in human retina exclusively within a subpopulation of ganglion cells where it may play a role in determining or maintaining the identities of a small subset of visual system neurons.
	RBL1	retinoblastoma-like 1 (p107)	It is thought that, given the homology to the known tumor suppressor RB1, the protein encoded by this gene may also be a tumor suppressor.
	SIM1	single-minded homolog 1 (Drosophila)	SIM1 transcript was detected only in fetal kidney out of various adult and fetal tissues tested, and it is a candidate for involvement in certain dysmorphic features (particularly the facial and skull characteristics), abnormalities of brain development, and/or mental retardation of Down syndrome.
	TH	tyrosine hydroxylase	The protein encoded by this gene is involved in the conversion of tyrosine to dopamine. It is the rate-limiting enzyme in the synthesis of catecholamines, hence plays a key role in the physiology of adrenergic neurons.
Nervous System Development and Function: Quantity: Quantity of Trigeminal Ganglion Neurons (9.23E-03)	BCL2	B-cell CLL/lymphoma 2	This gene encodes an integral outer mitochondrial membrane protein that blocks the apoptotic death of some cells such as lymphocytes.
	GDNF	glial cell derived neurotrophic factor	The recombinant form of this protein was shown to promote the survival and differentiation of dopaminergic neurons in culture, and was able to prevent apoptosis of motor neurons induced by axotomy.
	NOG	noggin	This protein may have a principal role in creating morphogenic gradients, and in numerous developmental processes, such as neural tube fusion and joint formation.
	POU4F1	POU class 4 homeobox 1	POU4F1 is a class IV POU domain-containing transcription factor highly expressed in the developing sensory nervous system and in cells of the B- and T-lymphocytic lineages.
Nervous System Development and Function: Migration: Migration of Schwann Cells (1.40E-03)	CSPG4	chondroitin sulfate proteoglycan 4	A human melanoma-associated chondroitin sulfate proteoglycan plays a role in stabilizing cell-substratum interactions during early events of melanoma cell spreading on endothelial basement membranes.
	FN1	fibronectin 1	Fibronectin is involved in cell adhesion and migration processes including embryogenesis, wound healing, blood coagulation, host defense, and metastasis.
	GDNF	glial cell derived neurotrophic factor	The recombinant form of this protein was shown to promote the survival and differentiation of dopaminergic neurons in culture, and was able to prevent apoptosis of motor neurons induced by axotomy.
	ITGB1	integrin, beta 1 (fibronectin receptor, beta polypeptide, antigen CD29 includes MDF2, MSK12)	Integrin family members are membrane receptors involved in cell adhesion and recognition in a variety of processes including embryogenesis, hemostasis, tissue repair, immune response and metastatic diffusion of tumor cells.

	LAMA2	laminin, alpha 2	Laminin, an extracellular protein, is a major component of the basement membrane. It is thought to mediate the attachment, migration, and organization of cells into tissues during embryonic development by interacting with other extracellular matrix components.
	NCAM1	neural cell adhesion molecule 1	
	NF1	neurofibromin 1	This gene product appears to function as a negative regulator of the ras signal transduction pathway.
	NRG1	neuregulin 1	This protein is a signaling protein that mediates cell-cell interactions and plays critical roles in the growth and development of multiple organ systems.
Nervous System Development and Function: Migration: Migration of Neurons (1.11E-02)	ARX	aristaless related homeobox	This gene is a homeobox-containing gene expressed during development, and is thought to be involved in CNS development.
	ASCL1	achaete-scute complex homolog 1 (Drosophila)	The protein activates transcription by binding to the E box. This protein plays a role in the neuronal commitment and differentiation and in the generation of olfactory and autonomic neurons.
	CCKAR	cholecystokinin A receptor	This receptor is a major physiologic mediator of pancreatic enzyme secretion and smooth muscle contraction of the gallbladder and stomach. In the central and peripheral nervous system this receptor regulates satiety and the release of beta-endorphin and dopamine.
	CHL1	cell adhesion molecule with homology to L1CAM (close homolog of L1)	The protein encoded by this gene is a neural recognition molecule that may be involved in signal transduction pathways.
	DCC	deleted in colorectal carcinoma	
	DCLK1	doublecortin-like kinase 1	DCAMKL1 is a microtubule-associated protein that phosphorylates itself and myelin basic protein (MBP; MIM 159430).
	DLX1	distal-less homeobox 1	This protein may function as a transcriptional regulator of signals from multiple TGF-{beta} superfamily members. It may play a role in the control of craniofacial patterning and the differentiation and survival of inhibitory neurons in the forebrain.
	EBF1	early B-cell factor 1	
	EBF2	early B-cell factor 2	EBF2 belongs to the conserved Olf/EBF family (see MIM 164343) of helix-loop-helix transcription factors.
	EDNRB	endothelin receptor type B	The protein encoded by this gene is a G protein-coupled receptor which activates a phosphatidylinositol-calcium second messenger system.
	FGF2	fibroblast growth factor 2 (basic)	The CUG-initiated isoforms of this gene are localized in the nucleus and are responsible for the intracrine effect, whereas, the AUG-initiated form is mostly cytosolic and is responsible for the paracrine and autocrine effects of this FGF.
	FN1	fibronectin 1	Fibronectin is involved in cell adhesion and migration processes including embryogenesis, wound healing, blood coagulation, host defense, and metastasis.
	GAD1	glutamate decarboxylase 1 (brain, 67kDa)	The enzyme encoded is responsible for catalyzing the production of gamma-aminobutyric acid from L-glutamic acid.
	GDNF	glial cell derived neurotrophic factor	The recombinant form of this protein was shown to promote the survival and differentiation of dopaminergic neurons in culture, and was able to prevent apoptosis of motor neurons induced by axotomy.

GLI3	GLI family zinc finger 3	The protein encoded by this gene localizes in the cytoplasm, activates patched Drosophila homolog (PTCH) gene expression and plays a role during embryogenesis.
HGF	hepatocyte growth factor (hepapoietin A; scatter factor)	Hepatocyte growth factor regulates cell growth, cell motility, and morphogenesis by activating a tyrosine kinase signaling cascade after binding to the proto-oncogenic c-Met receptor. Its ability to stimulate mitogenesis, cell motility, and matrix invasion gives it a central role in angiogenesis, tumorogenesis, and tissue regeneration.
HOXB2	homeobox B2	The encoded protein functions as a sequence-specific transcription factor that is involved in development.
ITGB1	integrin, beta 1 (fibronectin receptor, beta polypeptide, antigen CD29 includes MDF2, MSK12)	Integrin family members are membrane receptors involved in cell adhesion and recognition in a variety of processes including embryogenesis, hemostasis, tissue repair, immune response and metastatic diffusion of tumor cells.
LAMA2	laminin, alpha 2	Laminin, an extracellular protein, is a major component of the basement membrane. It is thought to mediate the attachment, migration, and organization of cells into tissues during embryonic development by interacting with other extracellular matrix components.
MAPT	microtubule-associated protein tau	MAPT transcripts are differentially expressed in the nervous system, depending on stage of neuronal maturation and neuron type.
MET	met proto-oncogene (hepatocyte growth factor receptor)	The proto-oncogene MET product is the hepatocyte growth factor receptor and encodes tyrosine-kinase activity.
MNX1	motor neuron and pancreas homeobox 1	
NAV1	neuron navigator 1	This gene is similar to unc-53, a Caenorhabditis elegans gene involved in axon guidance. The exact function of this gene is not known.
NFIX	nuclear factor I/X (CCAAT-binding transcription factor)	
NKX2-1	NK2 homeobox 1	
NR2F2	nuclear receptor subfamily 2, group F, member 2	
PEX13	peroxisomal biogenesis factor 13	This gene encodes a peroxisomal membrane protein that binds the type 1 peroxisomal targeting signal receptor via a SH3 domain located in the cytoplasm.
POU3F2	POU class 3 homeobox 2	Class III POU genes are expressed predominantly in the central nervous system (CNS). It is likely that CNS-specific transcription factors such as these play an important role in mammalian neurogenesis.
POU4F1	POU class 4 homeobox 1	POU4F1 is a class IV POU domain-containing transcription factor highly expressed in the developing sensory nervous system and in cells of the B- and T-lymphocytic lineages.
PRKG1	protein kinase, cGMP-dependent, type I	
PTEN	phosphatase and tensin homolog	This protein preferentially dephosphorylates phosphoinositide substrates. It negatively regulates intracellular levels of phosphatidylinositol-3,4,5-trisphosphate in cells and functions as a tumor suppressor by negatively regulating AKT/PKB signaling pathway.

	PTK2	PTK2 protein tyrosine kinase 2	Activation of this gene may be an important early step in cell growth and intracellular signal transduction pathways triggered in response to certain neural peptides or to cell interactions with the extracellular matrix.
	PTN	pleiotrophin	
	PXMP3	peroxisomal membrane protein 3, 35kDa	This integral peroxisomal membrane protein is required for peroxisome biogenesis, and is thought to be involved in peroxisomal matrix protein import.
	RGS3	regulator of G-protein signaling 3	This protein is a GTP-ase activating protein which inhibits G-protein mediated signal transduction..
	SLC1A2	solute carrier family 1 (glial high affinity glutamate transporter), member 2	The membrane-bound protein is the principal transporter that clears the excitatory neurotransmitter glutamate from the extracellular space at synapses in the central nervous system. Glutamate clearance is necessary for proper synaptic activation and to prevent neuronal damage from excessive activation of glutamate receptors.
	SOX1	SRY (sex determining region Y)-box 1	This protein is involved in the regulation of embryonic development and in the determination of the cell fate, and may be essential for lens development.
Nervous System Development and Function: Outgrowth: Outgrowth of Neurites (1.82E-03)	ALS2	amyotrophic lateral sclerosis 2 (juvenile)	The protein functions as a guanine nucleotide exchange factor for the small GTPase RAB5.
	AR	androgen receptor	This protein functions as a steroid-hormone activated transcription factor.
	ARHGAP5	Rho GTPase activating protein 5	This protein negatively regulates RHO GTPases, a family which may mediate cytoskeleton changes by stimulating the hydrolysis of bound GTP.
	BCL2	B-cell CLL/lymphoma 2	This gene encodes an integral outer mitochondrial membrane protein that blocks the apoptotic death of some cells such as lymphocytes.
	CD47	CD47 molecule	This protein, involved in the increase in intracellular calcium concentration that occurs upon cell adhesion to extracellular matrix, is also a receptor for the C-terminal cell binding domain of thrombospondin, and plays a role in membrane transport and signal transduction. Is has broad tissue distribution.
	CDC2	cell division cycle 2, G1 to S and G2 to M	This protein is a catalytic subunit of the highly conserved protein kinase complex known as M-phase promoting factor (MPF), which is essential for G1/S and G2/M phase transitions of eukaryotic cell cycle.
	CDK2	cyclin-dependent kinase 2	This protein is a catalytic subunit of the cyclin-dependent protein kinase complex, whose activity is restricted to the G1-S phase, and essential for cell cycle G1/S phase transition.
	CHL1	cell adhesion molecule with homology to L1CAM (close homolog of L1)	The protein encoded by this gene is a neural recognition molecule that may be involved in signal transduction pathways.
	CNPY2	canopy 2 homolog (zebrafish)	
	CNR1	cannabinoid receptor 1 (brain)	This gene encodes one of two cannabinoid receptors, which have been found to be involved in the cannabinoid-induced CNS effects (including alterations in mood and cognition) experienced by users of marijuana.
	DCC	deleted in colorectal carcinoma	

DNER	delta/notch-like EGF repeat containing	
DOCK1	dedicator of cytokinesis 1	This gene product binds to the SH3 domain of CRK protein. It may regulate cell surface extension and may have a role in the cell surface extension of an engulfing cell around a dying cell during apoptosis.
DOK5	docking protein 5	This protein interacts with phosphorylated receptor tyrosine kinases to mediate neurite outgrowth and activation of the MAP kinase pathway.
E2F1	E2F transcription factor 1	The protein encoded by this gene is a member of the E2F family of transcription factors which plays a crucial role in the control of cell cycle and action of tumor suppressor proteins and is also a target of the transforming proteins of small DNA tumor viruses. It can mediate both cell proliferation and p53-dependent/independent apoptosis.
EFNB3	ephrin-B3	EFNB3, a member of the ephrin gene family, is important in brain development as well as in its maintenance. It may play a pivotal role in forebrain function. The EPH and EPH-related receptors comprise the largest subfamily of receptor protein-tyrosine kinases and have been implicated in mediating developmental events, particularly in the nervous system.
ELAVL4	ELAV (embryonic lethal, abnormal vision, Drosophila)-like 4 (Hu antigen D)	
ELK1	ELK1, member of ETS oncogene family	This protein is a nuclear target for the ras-raf-MAPK signaling cascade.
EPN1	epsin 1	EPN1 is an endocytic accessory protein that interacts with EPS15 (MIM 600051), the alpha subunit of the clathrin adaptor AP2 (AP2A1; MIM 601026), and clathrin (see MIM 118960), as well as with other accessory proteins for the endocytosis of clathrin-coated vesicles.
ERBB4	v-erb-a erythroblastic leukemia viral oncogene homolog 4 (avian)	This gene encodes a protein which binds to and is activated by neuregulins and other factors and induces a variety of cellular responses including mitogenesis and differentiation.
FGF1	fibroblast growth factor 1 (acidic)	This protein functions as a modifier of endothelial cell migration and proliferation, as well as an angiogenic factor. It acts as a mitogen for a variety of mesoderm- and neuroectoderm-derived cells in vitro, thus is thought to be involved in organogenesis.
FGF2	fibroblast growth factor 2 (basic)	The CUG-initiated isoforms of this gene are localized in the nucleus and are responsible for the intracrine effect, whereas, the AUG-initiated form is mostly cytosolic and is responsible for the paracrine and autocrine effects of this FGF.
FGF4	fibroblast growth factor 4	This gene was identified by its oncogenic transforming activity.Studies on the mouse homolog suggested a function in bone morphogenesis and limb development through the sonic hedgehog (SHH) signaling pathway.
FGF5	fibroblast growth factor 5	This gene was identified as an oncogene, which confers transforming potential when transfected into mammalian cells.
FGF7	fibroblast growth factor 7 (keratinocyte growth factor)	This protein is an epithelial cell-specific growth factor, whose mitogenic activity is exhibited in keratinocytes but not in fibroblasts and endothelial cells. It may also be implicated roles in morphogenesis of epithelium, reepithelialization of wounds, hair development and early lung organogenesis.
FGF18	fibroblast growth factor 18	This protein may be a pleiotropic growth factor that stimulates proliferation in many tissues, notably the liver and small intestine. Knockout studies in mice implied the its role in regulating proliferation and differentiation of midline cerebellar structures.

FN1	fibronectin 1	Fibronectin is involved in cell adhesion and migration processes including embryogenesis, wound healing, blood coagulation, host defense, and metastasis.
GAB1	GRB2-associated binding protein 1	The protein encoded by this gene is an important mediator of branching tubulogenesis and plays a central role in cellular growth response, transformation and apoptosis.
GDNF	glial cell derived neurotrophic factor	The recombinant form of this protein was shown to promote the survival and differentiation of dopaminergic neurons in culture, and was able to prevent apoptosis of motor neurons induced by axotomy.
GNAO1	guanine nucleotide binding protein (G protein), alpha activating activity polypeptide O	
GNAS	GNAS complex locus	This protein is associated with the classical signal transduction pathway linking receptor-ligand interactions with the activation of adenylyl cyclase and a variety of cellular reponses.
GPR6	G protein-coupled receptor 6	
GPR12	G protein-coupled receptor 12	
HGF	hepatocyte growth factor (hepapoietin A; scatter factor)	Hepatocyte growth factor regulates cell growth, cell motility, and morphogenesis by activating a tyrosine kinase signaling cascade after binding to the proto-oncogenic c-Met receptor. Its ability to stimulate mitogenesis, cell motility, and matrix invasion gives it a central role in angiogenesis, tumorogenesis, and tissue regeneration.
IGF1	insulin-like growth factor 1 (somatomedin C)	The protein encoded by this gene is similar to insulin in function and structure and is a member of a family of proteins involved in mediating growth and development.
ITGB1	integrin, beta 1 (fibronectin receptor, beta polypeptide, antigen CD29 includes MDF2, MSK12)	Integrin family members are membrane receptors involved in cell adhesion and recognition in a variety of processes including embryogenesis, hemostasis, tissue repair, immune response and metastatic diffusion of tumor cells.
ITGB3	integrin, beta 3 (platelet glycoprotein IIIa, antigen CD61)	Integrins are known to participate in cell adhesion as well as cell-surface mediated signalling.
KIT	v-kit Hardy-Zuckerman 4 feline sarcoma viral oncogene homolog	This gene encodes the human homolog of the proto-oncogene c-kit. This protein is a type 3 transmembrane receptor for MGF (mast cell growth factor, also known as stem cell factor).
KRAS	v-Ki-ras2 Kirsten rat sarcoma viral oncogene homolog	This gene, a Kirsten ras oncogene, encodes a protein that is a member of the small GTPase superfamily.The transforming protein that results is implicated in various malignancies, including lung adenocarcinoma, mucinous adenoma, ductal carcinoma of the pancreas and colorectal carcinoma.
LAMA2	laminin, alpha 2	Laminin, an extracellular protein, is a major component of the basement membrane. It is thought to mediate the attachment, migration, and organization of cells into tissues during embryonic development by interacting with other extracellular matrix components.
LAMA3	laminin, alpha 3	The protein encoded by this gene is the alpha-3 subunit of laminin 5, which is thought to be involved in cell adhesion, signal transduction and differentiation of keratinocytes.

MAPK11	mitogen-activated protein kinase 11	This kinase can be activated by proinflammatory cytokines and environmental stress.
MAPT	microtubule-associated protein tau	MAPT transcripts are differentially expressed in the nervous system, depending on stage of neuronal maturation and neuron type.
MET	met proto-oncogene (hepatocyte growth factor receptor)	The proto-oncogene MET product is the hepatocyte growth factor receptor and encodes tyrosine-kinase activity.
NCAM1	neural cell adhesion molecule 1	
NF1	neurofibromin 1	This gene product appears to function as a negative regulator of the ras signal transduction pathway.
NRTN	neurturin	Neurturin is a member of the TGF-beta subfamily, TRN. This gene signals through RET and a GPI-linked coreceptor, and promotes survival of neuronal populations.
NTRK2	neurotrophic tyrosine kinase, receptor, type 2	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation.
NTRK3	neurotrophic tyrosine kinase, receptor, type 3	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation and may play a role in the development of proprioceptive neurons that sense body position.
PAK7	p21 protein (Cdc42/Rac)-activated kinase 7	This kinase is predominantly expressed in brain. It is capable of promoting neurite outgrowth, and thus may play a role in neurite development. This kinase is associated with microtubule networks and induces microtubule stabilization.
PLA2G10	phospholipase A2, group X	
PLXNA3	plexin A3	
PLXNA4	plexin A4	
POLR3E	polymerase (RNA) III (DNA directed) polypeptide E (80kD)	
POU3F2	POU class 3 homeobox 2	Class III POU genes are expressed predominantly in the central nervous system (CNS). It is likely that CNS-specific transcription factors such as these play an important role in mammalian neurogenesis.
POU4F1	POU class 4 homeobox 1	POU4F1 is a class IV POU domain-containing transcription factor highly expressed in the developing sensory nervous system and in cells of the B- and T-lymphocytic lineages.
POU4F2	POU class 4 homeobox 2	POU4F2 is found in human retina exclusively within a subpopulation of ganglion cells where it may play a role in determining or maintaining the identities of a small subset of visual system neurons.
PPP2R2C	protein phosphatase 2 (formerly 2A), regulatory subunit B, gamma isoform	Protein phosphatase 2 is one of the four major Ser/Thr phosphatases, and it is implicated in the negative control of cell growth and division
PTEN	phosphatase and tensin homolog	This protein preferentially dephosphorylates phosphoinositide substrates. It negatively regulates intracellular levels of phosphatidylinositol-3,4,5-trisphosphate in cells and functions as a tumor suppressor by negatively regulating AKT/PKB signaling pathway.
PTN	pleiotrophin	
RAP1GAP	RAP1 GTPase activating protein	

	RHOQ	ras homolog gene family, member Q	TC10 is a member of the RAS superfamily of small GTP-binding proteins (see HRAS, MIM 190020) involved in insulin-stimulated glucose uptake.
	RIT2	Ras-like without CAAX 2	RIN belongs to the RAS (HRAS; MIM 190020) superfamily of small GTPases.
	TNFRSF19	tumor necrosis factor receptor superfamily, member 19	This receptor is highly expressed during embryonic development. This receptor is capable of inducing apoptosis by a caspase-independent mechanism, and it is thought to play an essential role in embryonic development.
	TNK2	tyrosine kinase, non-receptor, 2	This protein may be involved in a regulatory mechanism that sustains the GTP-bound active form of Cdc42Hs and which is directly linked to a tyrosine phosphorylation signal transduction pathway.
	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.
	TRIO	triple functional domain (PTPRF interacting)	
	TRPC5	transient receptor potential cation channel, subfamily C, member 5	
Nervous System Development and Function: Myelination: Myelination (2.22E-03) *including* Myelination of Nerves (4.51E-03), Myelination of Normal Cells (1.65E-02)	B4GALNT1	beta-1,4-N-acetyl-galactosaminyl transferase 1	GalNAc-T is the enzyme involved in the biosynthesis of G(M2) and G(D2) glycosphingolipids. GalNAc-T catalyzes the transfer of GalNAc into G(M3) and G(D3) by a beta-1,4 linkage, resulting in the synthesis of G(M2) and G(D2), respectively.
	BACE1	beta-site APP-cleaving enzyme 1	The encoded protein, a member of the peptidase A1 protein family, is a type I integral membrane glycoprotein and aspartic protease that is found mainly in the Golgi.
	CLDN5	claudin 5	Claudins, are a part of tight junctons which serve as a physical barrier to prevent solutes and water from passing freely through the paracellular space between epithelial or endothelial cell sheets.
	CTF1	cardiotrophin 1	The protein encoded by this gene is a secreted cytokine that induces cardiac myocyte hypertrophy in vitro. It has been shown to bind and activate the ILST/gp130 receoptor.
	FGF2	fibroblast growth factor 2 (basic)	The CUG-initiated isoforms of this gene are localized in the nucleus and are responsible for the intracrine effect, whereas, the AUG-initiated form is mostly cytosolic and is responsible for the paracrine and autocrine effects of this FGF.
	GDNF	glial cell derived neurotrophic factor	The recombinant form of this protein was shown to promote the survival and differentiation of dopaminergic neurons in culture, and was able to prevent apoptosis of motor neurons induced by axotomy.
	HEXA	hexosaminidase A (alpha polypeptide)	Hexosaminidase A is the alpha subunit of the lysosomal enzyme beta-hexosaminidase that, together with the cofactor GM2 activator protein, catalyzes the degradation of the ganglioside GM2, and other molecules containing terminal N-acetyl hexosamines.
	ITGB1	integrin, beta 1 (fibronectin receptor, beta polypeptide, antigen CD29 includes MDF2, MSK12)	Integrin family members are membrane receptors involved in cell adhesion and recognition in a variety of processes including embryogenesis, hemostasis, tissue repair, immune response and metastatic diffusion of tumor cells.

	KCNJ10	potassium inwardly-rectifying channel, subfamily J, member 10	This protein may form a heterodimer with another potassium channel protein and may be responsible for the potassium buffering action of glial cells in the brain.
	LAMA2	laminin, alpha 2	Laminin, an extracellular protein, is a major component of the basement membrane. It is thought to mediate the attachment, migration, and organization of cells into tissues during embryonic development by interacting with other extracellular matrix components.
	LAMA4	laminin, alpha 4	Laminins, a family of extracellular matrix glycoproteins, are the major noncollagenous constituent of basement membranes. They have been implicated in a wide variety of biological processes including cell adhesion, differentiation, migration, signaling, neurite outgrowth and metastasis. This gene encodes the alpha chain isoform laminin, alpha 4.
	LAMA5	laminin, alpha 5	The protein encoded by this gene belongs to the alpha subfamily of laminin chains and is a major component of basement membranes.
	MAL	mal, T-cell differentiation protein	The protein has been localized to the endoplasmic reticulum of T-cells and is a candidate linker protein in T-cell signal transduction, and in compact myelin of cells in the nervous system and has been implicated in myelin biogenesis and/or function.
	MPDZ	multiple PDZ domain protein	
	MYO5A	myosin VA (heavy chain 12, myoxin)	Myosin V is a class of actin-based motor proteins involved in cytoplasmic vesicle transport and anchorage, spindle-pole alignment and mRNA translocation. The protein encoded by this gene is abundant in melanocytes and nerve cells.
	NRG1	neuregulin 1	This protein is a signaling protein that mediates cell-cell interactions and plays critical roles in the growth and development of multiple organ systems.
	NTRK2	neurotrophic tyrosine kinase, receptor, type 2	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation.
	NTRK3	neurotrophic tyrosine kinase, receptor, type 3	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation and may play a role in the development of proprioceptive neurons that sense body position.
	POU3F1	POU class 3 homeobox 1	
	THRB	thyroid hormone receptor, beta (erythroblastic leukemia viral (v-erb-a) oncogene homolog 2, avian)	The protein encoded by this gene is a nuclear hormone receptor for triiodothyronine. It is one of the several receptors for thyroid hormone, and has been shown to mediate the biological activities of thyroid hormone.
	UGT8	UDP glycosyltransferase 8	The key enzymatic step in the biosynthesis of galactocerebrosides consists of the transfer of galactose to ceramide catalyzed by UDP-galactose ceramide galactosyltransferase (CGT, EC 2.4.1.45).
Nervous System Development and Function: Survival: Survival of Trigeminal Ganglion Neurons (2.65E-03)	BCL2	B-cell CLL/lymphoma 2	This gene encodes an integral outer mitochondrial membrane protein that blocks the apoptotic death of some cells such as lymphocytes.
	GDNF	glial cell derived neurotrophic factor	The recombinant form of this protein was shown to promote the survival and differentiation of dopaminergic neurons in culture, and was able to prevent apoptosis of motor neurons induced by axotomy.

	NRTN	neurturin	Neurturin is a member of the TGF-beta subfamily, TRN. This gene signals through RET and a GPI-linked coreceptor, and promotes survival of neuronal populations.
	POU4F1	POU class 4 homeobox 1	POU4F1 is a class IV POU domain-containing transcription factor highly expressed in the developing sensory nervous system and in cells of the B- and T-lymphocytic lineages.
	POU4F2	POU class 4 homeobox 2	POU4F2 is found in human retina exclusively within a subpopulation of ganglion cells where it may play a role in determining or maintaining the identities of a small subset of visual system neurons.
	SLC6A8	solute carrier family 6 (neurotransmitter transporter, creatine), member 8	The protein encoded by this gene is a plasma membrane protein whose function is to transport creatine into and out of cells.
Nervous System Development and Function: Survival: Survival of Spinal Cord Cells (5.00E-03)	CTF1	cardiotrophin 1	The protein encoded by this gene is a secreted cytokine that induces cardiac myocyte hypertrophy in vitro. It has been shown to bind and activate the ILST/gp130 receoptor.
	GDNF	glial cell derived neurotrophic factor	The recombinant form of this protein was shown to promote the survival and differentiation of dopaminergic neurons in culture, and was able to prevent apoptosis of motor neurons induced by axotomy.
	IGF1	insulin-like growth factor 1 (somatomedin C)	The protein encoded by this gene is similar to insulin in function and structure and is a member of a family of proteins involved in mediating growth and development.
	IL11	interleukin 11	This cytokine is shown to stimulate the T-cell-dependent development of immunoglobulin-producing B cells. It is also found to support the proliferation of hematopoietic stem cells and megakaryocyte progenitor cells.
	POU4F1	POU class 4 homeobox 1	POU4F1 is a class IV POU domain-containing transcription factor highly expressed in the developing sensory nervous system and in cells of the B- and T-lymphocytic lineages.
	PTN	pleiotrophin	
Nervous System Development and Function: Survival: Survival of Neurons (8.94E-03)	AMIGO2	adhesion molecule with Ig-like domain 2	
	BCL2	B-cell CLL/lymphoma 2	This gene encodes an integral outer mitochondrial membrane protein that blocks the apoptotic death of some cells such as lymphocytes.
	CDC2	cell division cycle 2, G1 to S and G2 to M	This protein is a catalytic subunit of the highly conserved protein kinase complex known as M-phase promoting factor (MPF), which is essential for G1/S and G2/M phase transitions of eukaryotic cell cycle.
	CTF1	cardiotrophin 1	The protein encoded by this gene is a secreted cytokine that induces cardiac myocyte hypertrophy in vitro. It has been shown to bind and activate the ILST/gp130 receoptor.
	DCC	deleted in colorectal carcinoma	

E2F1	E2F transcription factor 1	The protein encoded by this gene is a member of the E2F family of transcription factors which plays a crucial role in the control of cell cycle and action of tumor suppressor proteins and is also a target of the transforming proteins of small DNA tumor viruses. It can mediate both cell proliferation and p53-dependent/independent apoptosis.
EFNA3	ephrin-A3	The ephrins and EPH-related receptors comprise the largest subfamily of receptor protein-tyrosine kinases and have been implicated in mediating developmental events, especially in the nervous system and in erythropoiesis.
FGF1	fibroblast growth factor 1 (acidic)	This protein functions as a modifier of endothelial cell migration and proliferation, as well as an angiogenic factor. It acts as a mitogen for a variety of mesoderm- and neuroectoderm-derived cells in vitro, thus is thought to be involved in organogenesis.
FGF2	fibroblast growth factor 2 (basic)	The CUG-initiated isoforms of this gene are localized in the nucleus and are responsible for the intracrine effect, whereas, the AUG-initiated form is mostly cytosolic and is responsible for the paracrine and autocrine effects of this FGF.
FGF5	fibroblast growth factor 5	This gene was identified as an oncogene, which confers transforming potential when transfected into mammalian cells.
GAD2	glutamate decarboxylase 2 (pancreatic islets and brain, 65kDa)	This gene encodes one of several forms of glutamic acid decarboxylase, identified as a major autoantigen in insulin-dependent diabetes.
GDNF	glial cell derived neurotrophic factor	The recombinant form of this protein was shown to promote the survival and differentiation of dopaminergic neurons in culture, and was able to prevent apoptosis of motor neurons induced by axotomy.
GPR44	G protein-coupled receptor 44	These proteins mediate signals to the interior of the cell via activation of heterotrimeric G proteins that in turn activate various effector proteins, ultimately resulting in a physiologic response.
HGF	hepatocyte growth factor (hepapoietin A; scatter factor)	Hepatocyte growth factor regulates cell growth, cell motility, and morphogenesis by activating a tyrosine kinase signaling cascade after binding to the proto-oncogenic c-Met receptor. Its ability to stimulate mitogenesis, cell motility, and matrix invasion gives it a central role in angiogenesis, tumorogenesis, and tissue regeneration.
IGF1	insulin-like growth factor 1 (somatomedin C)	The protein encoded by this gene is similar to insulin in function and structure and is a member of a family of proteins involved in mediating growth and development.
IL3	interleukin 3 (colony-stimulating factor, multiple)	This protein is a potent growth promoting cytokine, especially with hematopoietic cell types. It is involved in cell growth, differentiation and apoptosis, and also possesses neurotrophic activity.
IL11	interleukin 11	This cytokine is shown to stimulate the T-cell-dependent development of immunoglobulin-producing B cells. It is also found to support the proliferation of hematopoietic stem cells and megakaryocyte progenitor cells.
LINGO1	leucine rich repeat and Ig domain containing 1	
MAPT	microtubule-associated protein tau	MAPT transcripts are differentially expressed in the nervous system, depending on stage of neuronal maturation and neuron type.
MET	met proto-oncogene (hepatocyte growth factor receptor)	The proto-oncogene MET product is the hepatocyte growth factor receptor and encodes tyrosine-kinase activity.

MUSK	muscle, skeletal, receptor tyrosine kinase	This kinase activity is regulated by the binding of a cognate ligand to the extracellular portion of the receptor. DeChiara et al. (1996) [PubMed 8653786] noted that the RTKs, known to be expressed in cell type-specific fashions, play a role critical for the growth and differentiation of those cell types.
MYCN	v-myc myelocytomatosis viral related oncogene, neuroblastoma derived (avian)	This gene is a member of the MYC family and encodes a protein with a basic helix-loop-helix (bHLH) domain. This protein is located in the nucleus and must dimerize with another bHLH protein in order to bind DNA. Amplification of this gene is associated with a variety of tumors, most notably neuroblastomas.
NEFL	neurofilament, light polypeptide	Neurofilaments are type IV intermediate filament heteropolymers composed of light, medium, and heavy chains. Neurofilaments comprise the axoskeleton and they functionally maintain the neuronal caliber. They may also play a role in intracellular transport to axons and dendrites. This gene encodes the light chain neurofilament protein.
NF1	neurofibromin 1	This gene product appears to function as a negative regulator of the ras signal transduction pathway.
NRG1	neuregulin 1	This protein is a signaling protein that mediates cell-cell interactions and plays critical roles in the growth and development of multiple organ systems.
NRTN	neurturin	Neurturin is a member of the TGF-beta subfamily, TRN. This gene signals through RET and a GPI-linked coreceptor, and promotes survival of neuronal populations.
NTRK2	neurotrophic tyrosine kinase, receptor, type 2	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation.
NTRK3	neurotrophic tyrosine kinase, receptor, type 3	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation and may play a role in the development of proprioceptive neurons that sense body position.
PEG3	paternally expressed 3	
POU4F1	POU class 4 homeobox 1	POU4F1 is a class IV POU domain-containing transcription factor highly expressed in the developing sensory nervous system and in cells of the B- and T-lymphocytic lineages.
POU4F2	POU class 4 homeobox 2	POU4F2 is found in human retina exclusively within a subpopulation of ganglion cells where it may play a role in determining or maintaining the identities of a small subset of visual system neurons.
PRKCG	protein kinase C, gamma	This kinase is expressed solely in the brain and spinal cord and its localization is restricted to neurons. It has been demonstrated that several neuronal functions, including long term potentiation (LTP) and long term depression (LTD), specifically require this kinase. Knockout studies in mice also suggest that this kinase may be involved in neuropathic pain development.
PTN	pleiotrophin	
SLC1A2	solute carrier family 1 (glial high affinity glutamate transporter), member 2	The membrane-bound protein is the principal transporter that clears the excitatory neurotransmitter glutamate from the extracellular space at synapses in the central nervous system. Glutamate clearance is necessary for proper synaptic activation and to prevent neuronal damage from excessive activation of glutamate receptors.
SLC6A8	solute carrier family 6 (neurotransmitter transporter, creatine), member 8	The protein encoded by this gene is a plasma membrane protein whose function is to transport creatine into and out of cells.
UNC5B	unc-5 homolog B (C. elegans)	UNC5B belongs to a family of netrin-1 (MIM 601614) receptors thought to mediate the chemorepulsive effect of netrin-1 on specific axons.

	XIAP	X-linked inhibitor of apoptosis	This protein inhibits apoptosis induced by menadione, a potent inducer of free radicals, and ICE. It also inhibits at least two members of the caspase family of cell-death proteases.
Nervous System Development and Function: Survival: Survival of Dorsal Root Ganglion Cells (9.23E-03)	CTF1	cardiotrophin 1	The protein encoded by this gene is a secreted cytokine that induces cardiac myocyte hypertrophy in vitro. It has been shown to bind and activate the ILST/gp130 receoptor.
	GDNF	glial cell derived neurotrophic factor	The recombinant form of this protein was shown to promote the survival and differentiation of dopaminergic neurons in culture, and was able to prevent apoptosis of motor neurons induced by axotomy.
	IL11	interleukin 11	This cytokine is shown to stimulate the T-cell-dependent development of immunoglobulin-producing B cells. It is also found to support the proliferation of hematopoietic stem cells and megakaryocyte progenitor cells.
	POU4F1	POU class 4 homeobox 1	POU4F1 is a class IV POU domain-containing transcription factor highly expressed in the developing sensory nervous system and in cells of the B- and T-lymphocytic lineages.
Nervous System Development and Function: Survival: Survival of Ganglion Cells (1.24E-02)	BCL2	B-cell CLL/lymphoma 2	This gene encodes an integral outer mitochondrial membrane protein that blocks the apoptotic death of some cells such as lymphocytes.
	CTF1	cardiotrophin 1	The protein encoded by this gene is a secreted cytokine that induces cardiac myocyte hypertrophy in vitro. It has been shown to bind and activate the ILST/gp130 receoptor.
	GDNF	glial cell derived neurotrophic factor	The recombinant form of this protein was shown to promote the survival and differentiation of dopaminergic neurons in culture, and was able to prevent apoptosis of motor neurons induced by axotomy.
	IL11	interleukin 11	This cytokine is shown to stimulate the T-cell-dependent development of immunoglobulin-producing B cells. It is also found to support the proliferation of hematopoietic stem cells and megakaryocyte progenitor cells.
	NRTN	neurturin	Neurturin is a member of the TGF-beta subfamily, TRN. This gene signals through RET and a GPI-linked coreceptor, and promotes survival of neuronal populations.
	POU4F1	POU class 4 homeobox 1	POU4F1 is a class IV POU domain-containing transcription factor highly expressed in the developing sensory nervous system and in cells of the B- and T-lymphocytic lineages.
	POU4F2	POU class 4 homeobox 2	POU4F2 is found in human retina exclusively within a subpopulation of ganglion cells where it may play a role in determining or maintaining the identities of a small subset of visual system neurons.
	SLC6A8	solute carrier family 6 (neurotransmitter transporter, creatine), member 8	The protein encoded by this gene is a plasma membrane protein whose function is to transport creatine into and out of cells.

Nervous System Development and Function: Size: Size of Nervous Tissue (3.56E-03)	EBF1	early B-cell factor 1	
	FZD3	frizzled homolog 3 (Drosophila)	The function of this protein is unknown, although it may play a role in mammalian hair follicle development.
	IGF1	insulin-like growth factor 1 (somatomedin C)	The protein encoded by this gene is similar to insulin in function and structure and is a member of a family of proteins involved in mediating growth and development.
	NR2E1	nuclear receptor subfamily 2, group E, member 1	
Nervous System Development and Function: Proliferation: Proliferation of Neurons (4.85E-03) *including* Proliferation of Neuronal Progenitor Cells (4.85E-03)	ACSL6	acyl-CoA synthetase long-chain family member 6	
	ACSL1	acyl-CoA synthetase long-chain family member 1	The protein converts free long-chain fatty acids into fatty acyl-CoA esters, and thereby play a key role in lipid biosynthesis and fatty acid degradation.
	ATM	ataxia telangiectasia mutated	This protein functions as a regulator of a wide variety of downstream proteins, including tumor suppressor proteins p53 and BRCA1, checkpoint kinase CHK2, checkpoint proteins RAD17 and RAD9, and DNA repair protein NBS1. This protein and the closely related kinase ATR are thought to be master controllers of cell cycle checkpoint signaling pathways that are required for cell response to DNA damage and for genome stability.
	CD24	CD24 molecule	This gene encodes a sialoglycoprotein that is expressed on mature granulocytes and in many B cells.
	CDON	Cdon homolog (mouse)	CDON and BOC (MIM 608708) are cell surface receptors of the immunoglobulin (Ig)/fibronectin type III (FNIII; see MIM 135600) repeat family involved in myogenic differentiation. CDON and BOC are coexpressed during development.
	CNR1	cannabinoid receptor 1 (brain)	This gene encodes one of two cannabinoid receptors, which have been found to be involved in the cannabinoid-induced CNS effects (including alterations in mood and cognition) experienced by users of marijuana.
	E2F1	E2F transcription factor 1	The protein encoded by this gene is a member of the E2F family of transcription factors which plays a crucial role in the control of cell cycle and action of tumor suppressor proteins and is also a target of the transforming proteins of small DNA tumor viruses. It can mediate both cell proliferation and p53-dependent/independent apoptosis.
	FGF2	fibroblast growth factor 2 (basic)	The CUG-initiated isoforms of this gene are localized in the nucleus and are responsible for the intracrine effect, whereas, the AUG-initiated form is mostly cytosolic and is responsible for the paracrine and autocrine effects of this FGF.

	GDNF	glial cell derived neurotrophic factor	The recombinant form of this protein was shown to promote the survival and differentiation of dopaminergic neurons in culture, and was able to prevent apoptosis of motor neurons induced by axotomy.
	HHIP	hedgehog interacting protein	This protein similar to the mouse hedgehog-interacting protein, which is involved in many fundamental processes in embryonic development, including anteroposterior patterns of limbs and regulation of left-right asymmetry.
	ID4	inhibitor of DNA binding 4, dominant negative helix-loop-helix protein	Consequently, Id proteins inhibit binding to DNA and transcriptional transactivation by heterodimerization with bHLH proteins.
	IGF1	insulin-like growth factor 1 (somatomedin C)	The protein encoded by this gene is similar to insulin in function and structure and is a member of a family of proteins involved in mediating growth and development.
	MAPT	microtubule-associated protein tau	MAPT transcripts are differentially expressed in the nervous system, depending on stage of neuronal maturation and neuron type.
	MYCN	v-myc myelocytomatosis viral related oncogene, neuroblastoma derived (avian)	This gene is a member of the MYC family and encodes a protein with a basic helix-loop-helix (bHLH) domain. This protein is located in the nucleus and must dimerize with another bHLH protein in order to bind DNA. Amplification of this gene is associated with a variety of tumors, most notably neuroblastomas.
	NCAM1	neural cell adhesion molecule 1	
	NF1	neurofibromin 1	This gene product appears to function as a negative regulator of the ras signal transduction pathway.
	OTP	orthopedia homeobox	This protein may function during brain development.
	PDGFB	platelet-derived growth factor beta polypeptide (simian sarcoma viral (v-sis) oncogene homolog)	The protein encoded by this gene is a member of the platelet-derived growth factor family. The four members of this family are mitogenic factors for cells of mesenchymal origin and are characterized by a motif of eight cysteines.
	SMO	smoothened homolog (Drosophila)	
	SOX2	SRY (sex determining region Y)-box 2	This protein is required for stem-cell maintenance in the central nervous system, and also regulates gene expression in the stomach.
	ZIC1	Zic family member 1 (odd-paired homolog, Drosophila)	This gene encodes a transcription factor that can bind and transactivate the apolipoprotein E gene.
Nervous System Development and Function: Neuritogenesis: Neuritogenesis of Eukaryotic Cells (5.32E-03) *including* Neuritogenesis of Neurons (1.65E-02)	ACE	angiotensin I converting enzyme (peptidyl-dipeptidase A) 1	This gene encodes an enzyme involved in catalyzing the conversion of angiotensin I into a physiologically active peptide angiotensin II. This enzyme plays a key role in the renin-angiotensin system.
	ARHGAP5	Rho GTPase activating protein 5	This protein negatively regulates RHO GTPases, a family which may mediate cytoskeleton changes by stimulating the hydrolysis of bound GTP.

	BCL2	B-cell CLL/lymphoma 2	This gene encodes an integral outer mitochondrial membrane protein that blocks the apoptotic death of some cells such as lymphocytes.
	FGF2	fibroblast growth factor 2 (basic)	The CUG-initiated isoforms of this gene are localized in the nucleus and are responsible for the intracrine effect, whereas, the AUG-initiated form is mostly cytosolic and is responsible for the paracrine and autocrine effects of this FGF.
	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.
	GDNF	glial cell derived neurotrophic factor	The recombinant form of this protein was shown to promote the survival and differentiation of dopaminergic neurons in culture, and was able to prevent apoptosis of motor neurons induced by axotomy.
	NCAM1	neural cell adhesion molecule 1	
	NRTN	neurturin	Neurturin is a member of the TGF-beta subfamily, TRN. This gene signals through RET and a GPI-linked coreceptor, and promotes survival of neuronal populations.
	PPP2R2C	protein phosphatase 2 (formerly 2A), regulatory subunit B, gamma isoform	Protein phosphatase 2 is one of the four major Ser/Thr phosphatases, and it is implicated in the negative control of cell growth and division
	PTN	pleiotrophin	
Nervous System Development and Function: Density: Density of Synapse (9.23E-03)	EFNB3	ephrin-B3	EFNB3, a member of the ephrin gene family, is important in brain development as well as in its maintenance. It may play a pivotal role in forebrain function. The EPH and EPH-related receptors comprise the largest subfamily of receptor protein-tyrosine kinases and have been implicated in mediating developmental events, particularly in the nervous system.
	GPM6A	glycoprotein M6A	
	NTRK2	neurotrophic tyrosine kinase, receptor, type 2	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation.
	NTRK3	neurotrophic tyrosine kinase, receptor, type 3	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation and may play a role in the development of proprioceptive neurons that sense body position.
Nervous System Development and Function: Neuroprotection: Neuroprotection of Cells (1.60E-02) *including* Neuroprotection of Neurons (1.65E-02)	CHRNA7	cholinergic receptor, nicotinic, alpha 7	The protein encoded by this gene forms a homo-oligomeric channel, displays marked permeability to calcium ions and is a major component of brain nicotinic receptors that are blocked by, and highly sensitive to, alpha-bungarotoxin.
	CNR1	cannabinoid receptor 1 (brain)	This gene encodes one of two cannabinoid receptors, which have been found to be involved in the cannabinoid-induced CNS effects (including alterations in mood and cognition) experienced by users of marijuana.

	CRH	corticotropin releasing hormone	CRH is secreted by the paraventricular nucleus (PVN) of the hypothalamus in response to stress. In the placenta CRH is a marker that determines the length of gestation and the timing of parturition and delivery. CRH may also act as a trigger for parturition.
	CRHR1	corticotropin releasing hormone receptor 1	The encoded protein is essential for the activation of signal transduction pathways that regulate diverse physiological processes including stress, reproduction, immune response and obesity.
	F2R	coagulation factor II (thrombin) receptor	Coagulation factor II receptor is a 7-transmembrane receptor involved in the regulation of thrombotic response.
	GDNF	glial cell derived neurotrophic factor	The recombinant form of this protein was shown to promote the survival and differentiation of dopaminergic neurons in culture, and was able to prevent apoptosis of motor neurons induced by axotomy.
	IGF1	insulin-like growth factor 1 (somatomedin C)	The protein encoded by this gene is similar to insulin in function and structure and is a member of a family of proteins involved in mediating growth and development.
Nervous System Development and Function: Activation: Activation of Nervous Cell Lines (1.70E-02)	ANGPT1	angiopoietin 1	This protein plays a role in mediating reciprocal interactions between the endothelium and surrounding matrix and mesenchyme. It also contributes to blood vessel maturation and stability, and may be involved in early development of the heart.
	ERBB4	v-erb-a erythroblastic leukemia viral oncogene homolog 4 (avian)	This gene encodes a protein which binds to and is activated by neuregulins and other factors and induces a variety of cellular responses including mitogenesis and differentiation.
	NRG1	neuregulin 1	This protein is a signaling protein that mediates cell-cell interactions and plays critical roles in the growth and development of multiple organ systems.
Digestive System Development: Feeding: Feeding (1.23E-05) *including* Feeding of Organism (2.02E-05)	CCKAR	cholecystokinin A receptor	This receptor is a major physiologic mediator of pancreatic enzyme secretion and smooth muscle contraction of the gallbladder and stomach. In the central and peripheral nervous system this receptor regulates satiety and the release of beta-endorphin and dopamine.
	CNR1	cannabinoid receptor 1 (brain)	This gene encodes one of two cannabinoid receptors, which have been found to be involved in the cannabinoid-induced CNS effects (including alterations in mood and cognition) experienced by users of marijuana.
	CRH	corticotropin releasing hormone	CRH is secreted by the paraventricular nucleus (PVN) of the hypothalamus in response to stress. In the placenta CRH is a marker that determines the length of gestation and the timing of parturition and delivery. CRH may also act as a trigger for parturition.
	CRHR1	corticotropin releasing hormone receptor 1	The encoded protein is essential for the activation of signal transduction pathways that regulate diverse physiological processes including stress, reproduction, immune response and obesity.
	DMBX1	diencephalon/mesencephalon homeobox 1	The encoded protein acts as a transcription factor and may play a role in brain and sensory organ development.
	GALP	galanin-like peptide	The encoded protein binds galanin receptors 1, 2 and 3 with the highest affinity for galanin receptor 3 and has been implicated in biological processes involving the central nervous system including hypothalamic regulation of metabolism and reproduction.
	GALR3	galanin receptor 3	The neuropeptide galanin modulates a variety of physiologic processes including cognition/memory, sensory/pain processing, hormone secretion, and feeding behavior.

GCG	glucagon	Glucagon, is a pancreatic hormone that counteracts the glucose-lowering action of insulin by stimulating glycogenolysis and gluconeogenesis.
GHSR	growth hormone secretagogue receptor	The encoded protein may play a role in energy homeostasis and regulation of body weight.
GLP1R	glucagon-like peptide 1 receptor	
GRIN2B	glutamate receptor, ionotropic, N-methyl D-aspartate 2B	This NMDA receptor channel has been shown to be involved in long-term potentiation, an activity-dependent increase in the efficiency of synaptic transmission thought to underlie certain kinds of memory and learning.
HCRTR2	hypocretin (orexin) receptor 2	The protein encoded by this gene is involved in the regulation of feeding behavior. The encoded protein binds the hypothalamic neuropeptides orexin A and orexin B.
HRH3	histamine receptor H3	This gene encodes one of the histamine receptors (H3) which can regulate neurotransmitter release. This receptor can also increase voltage-dependent calcium current in smooth muscles and innervates the blood vessels and the heart in cardiovascular system.
HTR2C	5-hydroxytryptamine (serotonin) receptor 2C	Serotonin (5-hydroxytryptamine, 5-HT), a neurotransmitter, elicits a wide array of physiological effects by binding to several receptor subtypes, including the 5-HT2 family of seven-transmembrane-spanning, G-protein-coupled receptors, which activate phospholipase C and D signaling pathways.
IL1RN	interleukin 1 receptor antagonist	This protein inhibits the activities of interleukin 1, alpha (IL1A) and interleukin 1, beta (IL1B), and modulates a variety of interleukin 1 related immune and inflammatory responses.
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.
JPH1	junctophilin 1	The protein encoded by this gene is a component of junctional complexes and is composed of a C-terminal hydrophobic segment spanning the endoplasmic/sarcoplasmic reticulum membrane and a remaining cytoplasmic domain that shows specific affinity for the plasma membrane.
LALBA	lactalbumin, alpha-	This gene encodes alpha-lactalbumin, a principal protein of milk.
LEPR	leptin receptor	Leptin (LEP; MIM 164160), an adipocyte-specific hormone that regulates adipose-tissue mass through hypothalamic effects on satiety and energy expenditure, acts through the leptin receptor (LEPR).
MCHR1	melanin-concentrating hormone receptor 1	This protein binds melanin-concentrating hormone. The encoded protein can inhibit cAMP accumulation and stimulate intracellular calcium flux, and is probably involved in the neuronal regulation of food consumption.
NKX2-1	NK2 homeobox 1	
NPY1R	neuropeptide Y receptor Y1	Neuropeptide Y exhibits a diverse range of important physiologic activities, including effects on psychomotor activity, food intake, regulation of central endocrine secretion, and potent vasoactive effects on the cardiovascular system.
NPY2R	neuropeptide Y receptor Y2	
NTRK2	neurotrophic tyrosine kinase, receptor, type 2	This kinase is a membrane-bound receptor that, upon neurotrophin binding, phosphorylates itself and members of the MAPK pathway. Signalling through this kinase leads to cell differentiation.
OPRK1	opioid receptor, kappa 1	
PEX13	peroxisomal biogenesis factor 13	This gene encodes a peroxisomal membrane protein that binds the type 1 peroxisomal targeting signal receptor via a SH3 domain located in the cytoplasm.

	POU4F1	POU class 4 homeobox 1	POU4F1 is a class IV POU domain-containing transcription factor highly expressed in the developing sensory nervous system and in cells of the B- and T-lymphocytic lineages.
	PRLH	prolactin releasing hormone	
	PTGER3	prostaglandin E receptor 3 (subtype EP3)	The functions of this protein include digestion, nervous system, kidney reabsorption, and uterine contraction activities. This receptor may also mediate adrenocorticotropic hormone response as well as fever generation in response to exogenous and endogenous stimuli.
	PTK2	PTK2 protein tyrosine kinase 2	Activation of this gene may be an important early step in cell growth and intracellular signal transduction pathways triggered in response to certain neural peptides or to cell interactions with the extracellular matrix.
	PYY	peptide YY	
	SLC18A2	solute carrier family 18 (vesicular monoamine), member 2	The vesicular monoamine transporter acts to accumulate cytosolic monoamines into synaptic vesicles, using the proton gradient maintained across the synaptic vesicular membrane. Its proper function is essential to the correct activity of the monoaminergic systems that have been implicated in several human neuropsychiatric disorders.
	TH	tyrosine hydroxylase	The protein encoded by this gene is involved in the conversion of tyrosine to dopamine. It is the rate-limiting enzyme in the synthesis of catecholamines, hence plays a key role in the physiology of adrenergic neurons.
	TRH	thyrotropin-releasing hormone	
Digestive System Development: Development: Development of Tooth (1.31E-02)	BMP7	bone morphogenetic protein 7	Based on its expression early in embryogenesis, the BMP encoded by this gene has a proposed role in early development and possible bone inductive activity.
	DLX1	distal-less homeobox 1	This protein may function as a transcriptional regulator of signals from multiple TGF-{beta} superfamily members. It may play a role in the control of craniofacial patterning and the differentiation and survival of inhibitory neurons in the forebrain.
	DMP1	dentin matrix acidic phosphoprotein 1	This protein, which is critical for proper mineralization of bone and dentin, is present in diverse cells of bone and tooth tissues.
	EDA	ectodysplasin A	The encoded protein, which belongs to the tumor necrosis factor family, acts as a homotrimer and may be involved in cell-cell signaling during the development of ectodermal organs.
	FGF4	fibroblast growth factor 4	This gene was identified by its oncogenic transforming activity.Studies on the mouse homolog suggested a function in bone morphogenesis and limb development through the sonic hedgehog (SHH) signaling pathway.
	GLI3	GLI family zinc finger 3	The protein encoded by this gene localizes in the cytoplasm, activates patched Drosophila homolog (PTCH) gene expression and plays a role during embryogenesis.
	JAG2	jagged 2	Members of the Notch gene family encode transmembrane receptors that are critical for various cell fate decisions. The protein encoded by this gene is one of several ligands that activate Notch and related receptors.
	LAMA5	laminin, alpha 5	The protein encoded by this gene belongs to the alpha subfamily of laminin chains and is a major component of basement membranes.

LEF1	lymphoid enhancer-binding factor 1	LEF1 is a nuclear protein that is expressed in pre-B and T cells. It binds to a functionally important site in the T-cell receptor-alpha (TCRA; MIM 186880) enhancer and confers maximal enhancer activity.
LHX8	LIM homeobox 8	Members of the LIM homeobox gene family, such as LHX8, encode transcription regulators that share common structural features Members of the LIM homeobox gene family are required for the patterning or the specification and differentiation of different cell types during embryonic development.
MYO5A	myosin VA (heavy chain 12, myoxin)	Myosin V is a class of actin-based motor proteins involved in cytoplasmic vesicle transport and anchorage, spindle-pole alignment and mRNA translocation. The protein encoded by this gene is abundant in melanocytes and nerve cells.
RUNX2	runt-related transcription factor 2	This protein is essential for osteoblastic differentiation and skeletal morphogenesis and acts as a scaffold for nucleic acids and regulatory factors involved in skeletal gene expression.
SMO	smoothened homolog (Drosophila)	
SOSTDC1	sclerostin domain containing 1	This protein functions as a bone morphogenetic protein (BMP) antagonist, prohibiting them from binding their receptors, so regulating BMP signaling during cellular proliferation, differentiation, and programmed cell death.
TP63	tumor protein p63	This protein plays a role in the development and maintenance of stratified epithelial tissues. p63 -/- mice have several developmental defects which include the lack of limbs and other tissues, such as teeth and mammary glands, which develop as a result of interactions between mesenchyme and epithelium.