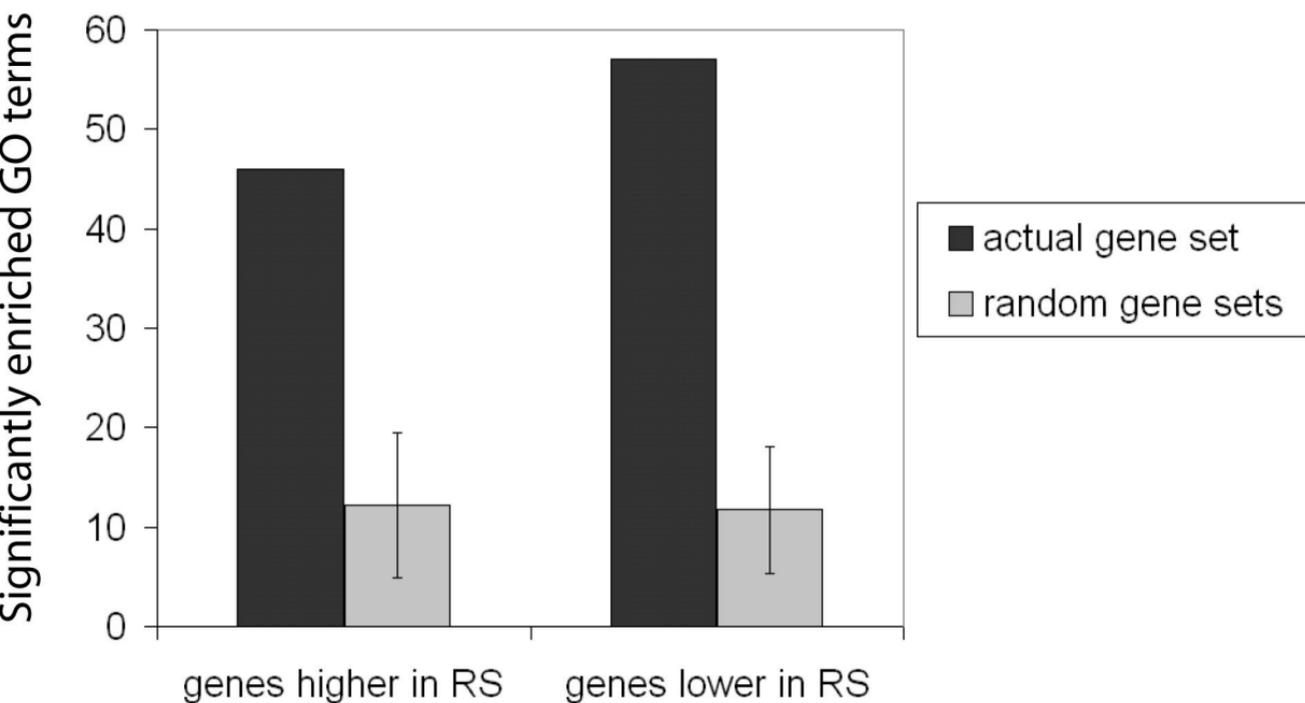
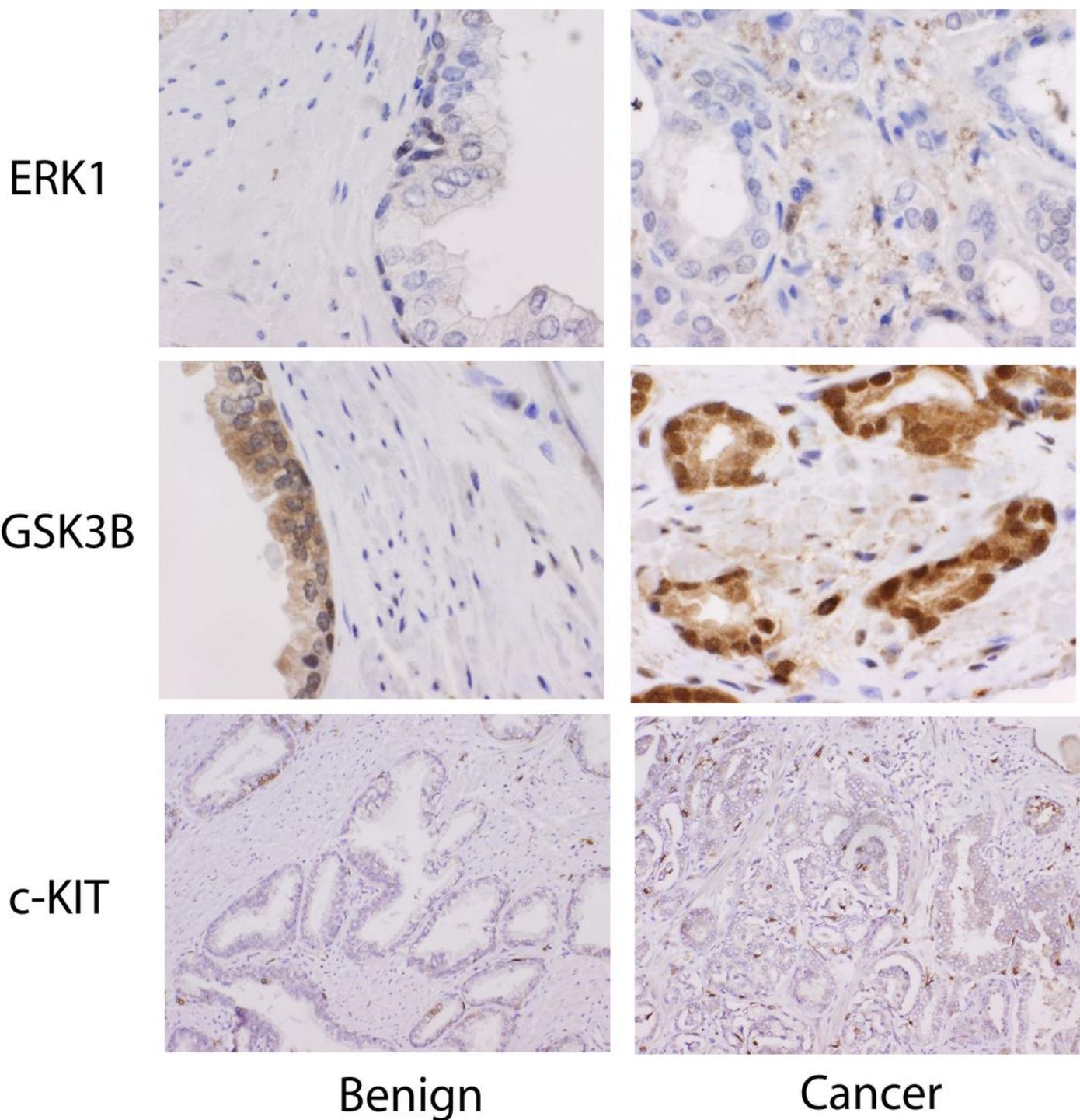


Supplemental Figure 1. Decreased smooth muscle in reactive stroma grade 3. A. H&E section of normal prostate showing abundant smooth muscle in stroma. B. Trichrome stain of normal prostate showing abundant smooth muscle, which stains red in the trichrome stain. C. Prostate cancer with reactive stroma grade 3 with abundant collagen and decreased smooth muscle. D. Trichrome stain of prostate cancer showing abundant collagen, which stains blue in the trichrome stain.

Supplementary Figure 2
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Supplementary Figure 2. Simulation testing of Gene Ontology enrichment using actual gene set compared to 1000 sets of random gene sets.



Supplementary Figure 3. Immunohistochemistry with antibodies recognizing ERK1, GSK3 beta or c-KIT in cancer with Grade 3 reactive stroma or matched normal tissue. ERK1 and GSK3 beta (400X); c-KIT (100X)

Supplemental Table 1. Primers used for RT-PCR

Gene	Annealing Temp (°C)	No of cycles	Product length, bp		Oligonucleotide sequence
FOXA1	57	40	288	Fw Rv	atcgtgtgcttgtttcatccagt tttccacggcttaaaatctggt
TGFBR2	58	40	272	Fw Rv	acctctaggcaccctcctcag tgctgataaccagaagtgagaa
ERBB2	58	40	297	Fw Rv	cttctgcttgagttcccagat ctgacaccattgctgttcctc
DVL1	64	40	236	Fw Rv	cgaccctgtcatctgtcccacct gactgcccattcccccaagacc
GSK3B	63	40	305	Fw Rv	gctggctgtgtgttgctga ggtgttagtcgggcagtgggtg
SEMA4F	65	40	282	Fw Rv	ccactgagatgccaaaggtgc caagcaccagggatgaacgag
GLI2	57	40	297	Fw Rv	tcctgttcagtgtagccaagac gcagcgagcccagatgac
HPRT	58	40	342	Fw Rv	ggcggtattgtgttaacttg gggaactgctgacaaagattca

Term	Gene Name
NEUROGENESIS	
dendrite development	abl interactor 2
dendrite development	choline acetyltransferase
dendrite development	myosin VI
dendrite development	Bardet-Biedl syndrome 4
neurite development	cyclin-dependent kinase 5
neurite development	GDNF
neurite development	cyclin-dependent kinase 5, regulatory subunit 1 (p35)
neural crest cell migration	endothelin receptor type B
neural crest cell migration	GDNF
neural crest cell migration	fibroblast growth factor 19
axonogenesis	cyclin-dependent kinase 5
axonogenesis	GLI-Kruppel family member GLI2
axonogenesis	Notch homolog 1, translocation-associated (Drosophila)
axonogenesis	cyclin-dependent kinase 5, regulatory subunit 1 (p35)
axonogenesis	cholecystokinin A receptor
axonogenesis	doublecortin and CaM kinase-like 1
synapse organization and biogenesis	CUG triplet repeat, RNA binding protein 2
synapse organization and biogenesis	choline acetyltransferase
synapse organization and biogenesis	protocadherin beta 5
synapse organization and biogenesis	myosin VI
synapse organization and biogenesis	protocadherin beta 16
neurite morphogenesis	cyclin-dependent kinase 5
neurite morphogenesis	GLI-Kruppel family member GLI2
neurite morphogenesis	Notch homolog 1, translocation-associated (Drosophila)
neurite morphogenesis	cyclin-dependent kinase 5, regulatory subunit 1 (p35)
neurite morphogenesis	cholecystokinin A receptor
neurite morphogenesis	doublecortin and CaM kinase-like 1
cell soma	cyclin-dependent kinase 5
cell soma	choline acetyltransferase
cell soma	myosin VI
cell soma	cyclin-dependent kinase 5, regulatory subunit 1 (p35)
synaptic transmission	choline acetyltransferase
synaptic transmission	protocadherin beta 5
synaptic transmission	glutamate receptor, ionotropic, N-methyl D-aspartate 2B
synaptic transmission	potassium large conductance calcium-activated channel, subfamily M, alpha member 1
synaptic transmission	myosin VI
synaptic transmission	nitric oxide synthase 1 (neuronal)
synaptic transmission	neuro-oncological ventral antigen 1

synaptic transmission	olfactory marker protein
synaptic transmission	protocadherin beta 16
synaptic transmission	synuclein, alpha (non A4 component of amyloid precursor)
synaptic transmission	synapsin I
synaptic transmission	glycine receptor, alpha 3
DNA DAMAGE REPAIR	
DNA fragmentation during apoptosis	deoxyribonuclease I-like 3
DNA fragmentation during apoptosis	forkhead box L2
DNA fragmentation during apoptosis	programmed cell death 8 (apoptosis-inducing factor)
cell structure disassembly during apoptosis	deoxyribonuclease I-like 3
cell structure disassembly during apoptosis	phorbol-12-myristate-13-acetate-induced protein 1
cell structure disassembly during apoptosis	forkhead box L2
cell structure disassembly during apoptosis	programmed cell death 8 (apoptosis-inducing factor)
DNA damage checkpoint	mitogen-activated protein kinase 14
DNA damage checkpoint	HUS1 checkpoint homolog (S. pombe)
DNA damage checkpoint	RAD17 homolog (S. pombe)
DNA damage checkpoint	cyclin A2
DNA damage response, signal transduction	mitogen-activated protein kinase 14
DNA damage response, signal transduction	HUS1 checkpoint homolog (S. pombe)
DNA damage response, signal transduction	myosin VI
DNA damage response, signal transduction	RAD17 homolog (S. pombe)
DNA damage response, signal transduction	cyclin A2
DNA damage response, signal transduction	programmed cell death 8 (apoptosis-inducing factor)
DNA integrity checkpoint	mitogen-activated protein kinase 14
DNA integrity checkpoint	HUS1 checkpoint homolog (S. pombe)
DNA integrity checkpoint	RAD17 homolog (S. pombe)
DNA integrity checkpoint	cyclin A2
response to DNA damage stimulus	mitogen-activated protein kinase 14
response to DNA damage stimulus	leucine rich repeat containing 59
response to DNA damage stimulus	excision repair cross-complementing rodent repair deficiency, complementation group 2
response to DNA damage stimulus	HUS1 checkpoint homolog (S. pombe)
response to DNA damage stimulus	MRE11, other names ATLD; HNGS1; MRE11; MRE11B; meiotic recombination 11 homolog A
response to DNA damage stimulus	myosin VI
response to DNA damage stimulus	8-oxoguanine DNA glycosylase

response to DNA damage stimulus	mitogen-activated protein kinase 3
response to DNA damage stimulus	chromosome 11 open reading frame 30
response to DNA damage stimulus	RAD17 homolog (S. pombe)
response to DNA damage stimulus	RAD23 homolog B (S. cerevisiae)
response to DNA damage stimulus	SET domain and mariner transposase fusion gene
response to DNA damage stimulus	ubiquitin-conjugating enzyme E2A (RAD6 homolog)
response to DNA damage stimulus	LOC732139, similar to postmeiotic segregation increased 2-like 2
response to DNA damage stimulus	cyclin A2
response to DNA damage stimulus	programmed cell death 8 (apoptosis-inducing factor)
DEVELOPMENT AND MORPHOGENESIS	
cell part morphogenesis	cyclin-dependent kinase 5
cell part morphogenesis	GLI-Kruppel family member GLI2
cell part morphogenesis	Notch homolog 1, translocation-associated (Drosophila)
cell part morphogenesis	cyclin-dependent kinase 5, regulatory subunit 1 (p35)
cell part morphogenesis	cholecystokinin A receptor
cell part morphogenesis	doublecortin and CaM kinase-like 1
cell projection morphogenesis	cyclin-dependent kinase 5
cell projection morphogenesis	GLI-Kruppel family member GLI2
cell projection morphogenesis	Notch homolog 1, translocation-associated (Drosophila)
cell projection morphogenesis	cyclin-dependent kinase 5, regulatory subunit 1 (p35)
cell projection morphogenesis	cholecystokinin A receptor
cell projection morphogenesis	doublecortin and CaM kinase-like 1
cell projection organization and biogenesis	cyclin-dependent kinase 5
cell projection organization and biogenesis	GDNF
cell projection organization and biogenesis	FYVE, RhoGEF and PH domain containing 6
cell projection organization and biogenesis	Bardet-Biedl syndrome 4
cell projection organization and biogenesis	thrombospondin 4
cell projection organization and biogenesis	cyclin-dependent kinase 5, regulatory subunit 1 (p35)
epidermis development	homeobox B13
epidermis development	desmoplakin
epidermis development	kallikrein 5
epidermis development	ATPase, Ca ⁺⁺ transporting, type 2C, member 1
epidermis development	Notch homolog 1, translocation-associated (Drosophila)
epidermis development	ovo-like 1(Drosophila)
epidermis development	forkhead box N1

epidermis development	ADAM metallopeptidase with thrombospondin type 1 motif, 2
cellular structure morphogenesis	cyclin-dependent kinase 5
cellular structure morphogenesis	GDNF
cellular structure morphogenesis	GLI-Kruppel family member GLI2
cellular structure morphogenesis	Notch homolog 1, translocation-associated (Drosophila)
cellular structure morphogenesis	FYVE, RhoGEF and PH domain containing 6
cellular structure morphogenesis	Bardet-Biedl syndrome 4
cellular structure morphogenesis	thrombospondin 4
cellular structure morphogenesis	cyclin-dependent kinase 5, regulatory subunit 1 (p35)
cellular structure morphogenesis	cholecystokinin A receptor
cellular structure morphogenesis	doublecortin and CaM kinase-like 1
METABOLIC PROCESSES	
cellular polysaccharide catabolic process	chitobiase, di-N-acetyl-
cellular polysaccharide catabolic process	phosphorylase kinase, alpha 1 (muscle)
cellular polysaccharide catabolic process	phosphorylase kinase, beta
polysaccharide catabolic process	chitobiase, di-N-acetyl-
polysaccharide catabolic process	phosphorylase kinase, alpha 1 (muscle)
polysaccharide catabolic process	phosphorylase kinase, beta
oxidoreductase activity, acting on CH-OH group of donors	alcohol dehydrogenase 6 (class V)
oxidoreductase activity, acting on CH-OH group of donors	fatty acid synthase
oxidoreductase activity, acting on CH-OH group of donors	hydroxysteroid (17-beta) dehydrogenase 4
oxidoreductase activity, acting on CH-OH group of donors	isocitrate dehydrogenase 1 (NADP+), soluble
oxidoreductase activity, acting on CH-OH group of donors	isocitrate dehydrogenase 3 (NAD+) gamma
oxidoreductase activity, acting on CH-OH group of donors	lactate dehydrogenase C
oxidoreductase activity, acting on CH-OH group of donors	hydroxyacid oxidase 2 (long chain)
oxidoreductase activity, acting on CH-OH group of donors	UDP-glucose dehydrogenase
monocarboxylic acid metabolic process	mitogen-activated protein kinase 14
monocarboxylic acid metabolic process	solute carrier family 25 (mitochondrial carrier; dicarboxylate transporter), member 10
monocarboxylic acid metabolic process	cytochrome P450, family 2, subfamily J, polypeptide 2
monocarboxylic acid metabolic process	fatty acid synthase
monocarboxylic acid metabolic process	hydroxysteroid (17-beta) dehydrogenase 4
monocarboxylic acid metabolic process	isocitrate dehydrogenase 1 (NADP+), soluble
monocarboxylic acid metabolic process	microsomal glutathione S-transferase 2
monocarboxylic acid metabolic process	ASAH1 N-acylsphingosine amidohydrolase (acid ceramidase) 1

monocarboxylic acid metabolic process	hydroxyacid oxidase 2 (long chain)
monocarboxylic acid metabolic process	phospholipase A2, group IVA (cytosolic, calcium-dependent)
monocarboxylic acid metabolic process	3-oxoacyl-ACP synthase, mitochondrial
monocarboxylic acid metabolic process	sulfotransferase family, cytosolic, 2A, dehydroepiandrosterone (DHEA)-preferring, member 1
monocarboxylic acid metabolic process	UDP-glucose dehydrogenase
monocarboxylic acid metabolic process	adiponectin receptor 2
monocarboxylic acid metabolic process	CD36 molecule (thrombospondin receptor)
fatty acid metabolic process	mitogen-activated protein kinase 14
fatty acid metabolic process	cytochrome P450, family 2, subfamily J, polypeptide 2
fatty acid metabolic process	fatty acid synthase
fatty acid metabolic process	hydroxysteroid (17-beta) dehydrogenase 4
fatty acid metabolic process	microsomal glutathione S-transferase 2
fatty acid metabolic process	ASAH1, N-acylsphingosine amidohydrolase (acid ceramidase)
fatty acid metabolic process	hydroxyacid oxidase 2 (long chain)
fatty acid metabolic process	phospholipase A2, group IVA (cytosolic, calcium-dependent)
fatty acid metabolic process	3-oxoacyl-ACP synthase, mitochondrial
fatty acid metabolic process	adiponectin receptor 2
fatty acid metabolic process	CD36 molecule (thrombospondin receptor)
regulation of hydrolase activity	centaurin, gamma-like family, member 1
regulation of hydrolase activity	TBC1 domain family, member 30
regulation of hydrolase activity	DKFZP434O047 protein
regulation of hydrolase activity	lymphocyte-specific protein tyrosine kinase
regulation of hydrolase activity	nitric oxide synthase 1 (neuronal)
regulation of hydrolase activity	development and differentiation enhancing factor 1
regulation of hydrolase activity	phorbol-12-myristate-13-acetate-induced protein 1
regulation of hydrolase activity	FYVE, RhoGEF and PH domain containing 6
regulation of hydrolase activity	TBC1 domain family, member 15
regulation of hydrolase activity	forkhead box L2
regulation of hydrolase activity	signal transducer and activator of transcription 1, 91kDa
KINASE ACTIVITY	
calmodulin regulated protein kinase activity	calcium/calmodulin-dependent protein kinase kinase 2, beta
calmodulin regulated protein kinase activity	phosphorylase kinase, alpha 1 (muscle)
calmodulin regulated protein kinase activity	phosphorylase kinase, beta
protein kinase cascade	calcium/calmodulin-dependent protein kinase kinase 2, beta
protein kinase cascade	mitogen-activated protein kinase 14
protein kinase cascade	adrenergic, beta-2-, receptor, surface
protein kinase cascade	TANK-binding kinase 1

protein kinase cascade	signal transducer and activator of transcription 1, 91kDa
protein kinase cascade	cerebral cavernous malformation 2
protein kinase cascade	mitogen-activated protein kinase kinase kinase 3
protein kinase cascade	MAP kinase interacting serine/threonine kinase 1
protein kinase cascade	serine/threonine kinase 17a (apoptosis-inducing)
protein kinase cascade	Rap guanine nucleotide exchange factor (GEF) 2
protein kinase cascade	oxidative-stress responsive 1
protein serine/threonine kinase activity	cyclin-dependent kinase 5
protein serine/threonine kinase activity	calcium/calmodulin-dependent protein kinase kinase 2, beta
protein serine/threonine kinase activity	U2AF homology motif (UHM) kinase 1
protein serine/threonine kinase activity	mitogen-activated protein kinase 14
protein serine/threonine kinase activity	obscurin-like 1
protein serine/threonine kinase activity	protein kinase D3
protein serine/threonine kinase activity	receptor interacting protein kinase 5
protein serine/threonine kinase activity	TANK-binding kinase 1
protein serine/threonine kinase activity	glycogen synthase kinase 3 beta
protein serine/threonine kinase activity	HUS1 checkpoint homolog (S. pombe)
protein serine/threonine kinase activity	phosphorylase kinase, alpha 1 (muscle)
protein serine/threonine kinase activity	phosphorylase kinase, beta
protein serine/threonine kinase activity	RIO kinase 2 (yeast)
protein serine/threonine kinase activity	mitogen-activated protein kinase 3
protein serine/threonine kinase activity	testis-specific kinase 1
protein serine/threonine kinase activity	transforming growth factor, beta receptor II (70/80kDa)
protein serine/threonine kinase activity	mitogen-activated protein kinase kinase kinase 3
protein serine/threonine kinase activity	MAP kinase interacting serine/threonine kinase 1
protein serine/threonine kinase activity	cyclin D3
protein serine/threonine kinase activity	MLCK protein
protein serine/threonine kinase activity	doublecortin and CaM kinase-like 1
protein serine/threonine kinase activity	serine/threonine kinase 17a (apoptosis-inducing)
protein serine/threonine kinase activity	oxidative-stress responsive 1
MEMBRANE TRANSPORT	
porter activity	solute carrier family 17 (sodium phosphate), member 4
porter activity	solute carrier family 7, (cationic amino acid transporter, y+ system) member 11
porter activity	solute carrier family 2, (facilitated glucose transporter) member 8
porter activity	solute carrier family 13 (sodium-dependent dicarboxylate transporter), member 3
porter activity	solute carrier family 5 (inositol transporters), member 3
porter activity	solute carrier family 6 (neurotransmitter transporter, GABA), member 11

porter activity	solute carrier family 9 (sodium/hydrogen exchanger), member 3
porter activity	KIAA1702 protein
porter activity	solute carrier family 7 (cationic amino acid transporter, y ⁺ system), member 5
porter activity	chromosome 4 open reading frame 13
porter activity	solute carrier family 4, sodium bicarbonate cotransporter, member 4
porter activity	solute carrier family 9 (sodium/hydrogen exchanger), member 3 regulator 1
electrochemical potential-driven transporter activity	solute carrier family 17 (sodium phosphate), member 4
electrochemical potential-driven transporter activity	solute carrier family 7, (cationic amino acid transporter, y ⁺ system) member 11
electrochemical potential-driven transporter activity	solute carrier family 2, (facilitated glucose transporter) member 8
electrochemical potential-driven transporter activity	solute carrier family 13 (sodium-dependent dicarboxylate transporter), member 3
electrochemical potential-driven transporter activity	solute carrier family 5 (inositol transporters), member 3
electrochemical potential-driven transporter activity	solute carrier family 6 (neurotransmitter transporter, GABA), member 11
electrochemical potential-driven transporter activity	solute carrier family 9 (sodium/hydrogen exchanger), member 3
electrochemical potential-driven transporter activity	KIAA1702 protein
electrochemical potential-driven transporter activity	solute carrier family 7 (cationic amino acid transporter, y ⁺ system), member 5
electrochemical potential-driven transporter activity	chromosome 4 open reading frame 13
electrochemical potential-driven transporter activity	solute carrier family 4, sodium bicarbonate cotransporter, member 4
electrochemical potential-driven transporter activity	solute carrier family 9 (sodium/hydrogen exchanger), member 3 regulator 1
carrier activity	solute carrier family 17 (sodium phosphate), member 4
carrier activity	ATPase type 13A2
carrier activity	solute carrier family 7, (cationic amino acid transporter, y ⁺ system) member 11
carrier activity	ATPase, Ca ⁺⁺ transporting, type 2C, member 1
carrier activity	Sec61 alpha 1 subunit (<i>S. cerevisiae</i>)
carrier activity	solute carrier family 2, (facilitated glucose transporter) member 8
carrier activity	ATPase, H ⁺ transporting, lysosomal accessory protein 1
carrier activity	solute carrier family 13 (sodium-dependent dicarboxylate transporter), member 3
carrier activity	solute carrier family 5 (inositol transporters), member 3
carrier activity	solute carrier family 6 (neurotransmitter transporter, GABA), member 11

carrier activity	solute carrier family 9 (sodium/hydrogen exchanger), member 3
carrier activity	KIAA1702 protein
carrier activity	solute carrier family 7 (cationic amino acid transporter, y+ system), member 5
carrier activity	chromosome 4 open reading frame 13
carrier activity	solute carrier family 4, sodium bicarbonate cotransporter, member 4
carrier activity	ATPase, H ⁺ transporting, lysosomal 31kDa, V1 subunit E2
carrier activity	solute carrier family 9 (sodium/hydrogen exchanger), member 3 regulator 1
ION TRANSPORT	
chloride transport	chloride channel 4
chloride transport	gamma-aminobutyric acid (GABA) A receptor, gamma 2
chloride transport	pyrimidinergic receptor P2Y, G-protein coupled, 6
chloride transport	chloride intracellular channel 5
chloride transport	glycine receptor, alpha 3
TRANSCRIPTION REGULATION	
positive regulation of transcription from RNA polymerase II promoter	mitogen-activated protein kinase 14
positive regulation of transcription from RNA polymerase II promoter	adrenergic, beta-2-, receptor, surface
positive regulation of transcription from RNA polymerase II promoter	CREB regulated transcription coactivator 1
positive regulation of transcription from RNA polymerase II promoter	GLI-Kruppel family member GLI2
positive regulation of transcription from RNA polymerase II promoter	forkhead box A1
positive regulation of transcription from RNA polymerase II promoter	myosin VI
positive regulation of transcription from RNA polymerase II promoter	Notch homolog 1, translocation-associated (Drosophila)
positive regulation of transcription from RNA polymerase II promoter	retinoid X receptor, alpha
positive regulation of transcription from RNA polymerase II promoter	forkhead box L2
positive regulation of transcription from RNA polymerase II promoter	thyroid hormone receptor associated protein 3
APOPTOSIS	
DNA fragmentation during apoptosis	deoxyribonuclease I-like 3
DNA fragmentation during apoptosis	forkhead box L2
DNA fragmentation during apoptosis	programmed cell death 8 (apoptosis-inducing factor)
cell structure disassembly during apoptosis	deoxyribonuclease I-like 3

cell structure disassembly during apoptosis	phorbol-12-myristate-13-acetate-induced protein 1
cell structure disassembly during apoptosis	forkhead box L2
cell structure disassembly during apoptosis	programmed cell death 8 (apoptosis-inducing factor)

Term	Gene Name
OXYGEN TRANSPORT	
hemoglobin complex	hemoglobin, alpha 2
hemoglobin complex	hemoglobin, epsilon 1
hemoglobin complex	neuroglobin
superoxide metabolic process	cytochrome b-245, alpha polypeptide
superoxide metabolic process	arachidonate 12-lipoxygenase
superoxide metabolic process	NADPH oxidase 1
superoxide metabolic process	apolipoprotein A-IV
superoxide metabolic process	NADPH oxidase 4
gas transport	hemoglobin, alpha 2
gas transport	hemoglobin, epsilon 1
gas transport	neuroglobin
oxygen transporter activity	hemoglobin, alpha 2
oxygen transporter activity	hemoglobin, epsilon 1
oxygen transporter activity	neuroglobin
oxygen transport	hemoglobin, alpha 2
oxygen transport	hemoglobin, epsilon 1
oxygen transport	neuroglobin
oxygen binding	cytochrome P450, family 26, subfamily A, polypeptide 1
oxygen binding	hemoglobin, alpha 2
oxygen binding	hemoglobin, epsilon 1
oxygen binding	NADPH oxidase 4
oxygen binding	neuroglobin
CYTOSKELETON	
structural constituent of muscle	desmuslin
actin filament bundle	pleckstrin homology domain containing, family C (with FERM domain) member 1
actin filament bundle	myosin, heavy polypeptide 9, non-muscle
actin filament bundle	actin, alpha 1, skeletal muscle
actin filament bundle	similar to cell division cycle 10 homolog
stress fiber	pleckstrin homology domain containing, family C (with FERM domain) member 1
stress fiber	myosin, heavy polypeptide 9, non-muscle
stress fiber	actin, alpha 1, skeletal muscle
stress fiber	similar to cell division cycle 10 homolog
perinuclear region of cytoplasm	syntaxin 6
perinuclear region of cytoplasm	Sec23 homolog A (<i>S. cerevisiae</i>)
perinuclear region of cytoplasm	amyloid beta (A4) precursor protein (peptidase nexin-II, Alzheimer disease)
perinuclear region of cytoplasm	SET translocation (myeloid leukemia-associated)
perinuclear region of cytoplasm	chromosome 3 open reading frame 29
perinuclear region of cytoplasm	TAF10 RNA polymerase II, TATA box binding protein (TBP)-associated factor, 30kDa
perinuclear region of cytoplasm	caveolin 1, caveolae protein, 22kDa
cytoskeleton	actin related protein 2/3 complex, subunit 5, 16kDa
cytoskeleton	nuclear distribution gene C homolog (<i>A. nidulans</i>)

cytoskeleton	pleckstrin homology domain containing, family C (with FERM domain) member 1
cytoskeleton	actin-related protein T1
cytoskeleton	desmoglein 4
cytoskeleton	cystatin A (stefin A)
cytoskeleton	MAP/microtubule affinity-regulating kinase 2
cytoskeleton	MAPRE1, microtubule-associated protein, RP/EB family, member 1
cytoskeleton	myosin phosphatase-Rho interacting protein
cytoskeleton	filamin C, gamma (actin binding protein 280)
cytoskeleton	parvin, beta
cytoskeleton	annexin A1
cytoskeleton	microtubule-associated protein tau
cytoskeleton	myosin, heavy polypeptide 9, non-muscle
cytoskeleton	protein phosphatase 1, regulatory (inhibitor) subunit 12A
cytoskeleton	kelch-like 5 (Drosophila)
cytoskeleton	myosin XVA
cytoskeleton	tubulin, alpha 8
cytoskeleton	ras homolog gene family, member F (in filopodia)
cytoskeleton	protein tyrosine phosphatase, non-receptor type 6
cytoskeleton	actin, alpha 1, skeletal muscle
cytoskeleton	actin, beta
cytoskeleton	smoothelin
cytoskeleton	actin, gamma 1
cytoskeleton	tropomyosin 1 (alpha)
cytoskeleton	tropomyosin 2 (beta)
cytoskeleton	tropomyosin 3
cytoskeleton	tropomyosin 4
cytoskeleton	actin, gamma 2, smooth muscle, enteric
cytoskeleton	FKSG44 gene
MUSCLE	
structural constituent of muscle	desmuslin
structural constituent of muscle	myosin, light polypeptide 4, alkali; atrial, embryonic
structural constituent of muscle	myosin, light chain 6, alkali, smooth muscle and non-muscle
structural constituent of muscle	smoothelin
structural constituent of muscle	tropomyosin 1 (alpha)
structural constituent of muscle	tropomyosin 2 (beta)
structural constituent of muscle	tropomyosin 4
regulation of heart contraction	KCNE1-like
regulation of heart contraction	guanine nucleotide binding protein (G protein), alpha activating activity polypeptide O
regulation of heart contraction	ATPase, Na ⁺ /K ⁺ transporting, alpha 2 (+) polypeptide
regulation of heart contraction	tyrosine hydroxylase
regulation of heart contraction	tropomyosin 1 (alpha)
contractile fiber part	myosin, light polypeptide 4, alkali; atrial, embryonic
contractile fiber part	actin, alpha 1, skeletal muscle

contractile fiber part	tropomyosin 1 (alpha)
contractile fiber part	tropomyosin 2 (beta)
contractile fiber part	tropomyosin 3
contractile fiber part	tropomyosin 4
ION CHANNEL ACTIVITY	
channel inhibitor activity	arachidonate 12-lipoxygenase
channel inhibitor activity	protein immuno-reactive with anti-PTH polyclonal antibodies
channel inhibitor activity	PDZ domain containing 3
ion channel inhibitor activity	arachidonate 12-lipoxygenase
ion channel inhibitor activity	protein immuno-reactive with anti-PTH polyclonal antibodies
ion channel inhibitor activity	PDZ domain containing 3
PROTEIN FOLDING	
unfolded protein response	interferon, gamma
unfolded protein response	nuclear factor (erythroid-derived 2)-like 2
unfolded protein response	Der1-like domain family, member 3
response to protein stimulus	heat shock 70kDa protein 8
response to protein stimulus	heat shock protein 90kDa alpha (cytosolic), class A member 1
response to protein stimulus	DnaJ (Hsp40) homolog, subfamily C, member 4
response to protein stimulus	interferon, gamma
response to protein stimulus	nuclear factor (erythroid-derived 2)-like 2
response to protein stimulus	Der1-like domain family, member 3. Degradation of misfolded pycoproteins in the ER
response to protein stimulus	heat shock protein, alpha-crystallin-related, B9
response to unfolded protein	heat shock 70kDa protein 8
response to unfolded protein	heat shock protein 90kDa alpha (cytosolic), class A member 1
response to unfolded protein	DnaJ (Hsp40) homolog, subfamily C, member 4
response to unfolded protein	interferon, gamma
response to unfolded protein	nuclear factor (erythroid-derived 2)-like 2
response to unfolded protein	Der1-like domain family, member 3
response to unfolded protein	heat shock protein, alpha-crystallin-related, B9
DEVELOPMENTAL PROCESSES	
ureteric bud development	forkhead box C1
ureteric bud development	GDNF, glial cell derived neurotrophic factor
ureteric bud development	ret proto-oncogene
ureteric bud development	roundabout, axon guidance receptor, homolog 2 (Drosophila)
positive regulation of developmental process	mitogen-activated protein kinase 14
positive regulation of developmental process	jagged 1 (Alagille syndrome)
positive regulation of developmental process	microtubule-associated protein tau
positive regulation of developmental process	roundabout, axon guidance receptor, homolog 2 (Drosophila)
positive regulation of developmental process	T-cell lymphoma invasion and metastasis 1

positive regulation of developmental process	CD276 molecule
regulation of developmental process	craniofacial development protein 1
regulation of developmental process	pleckstrin homology domain containing, family C (with FERM domain) member 1
regulation of developmental process	mitogen-activated protein kinase 14
regulation of developmental process	jagged 1 (Alagille syndrome)
regulation of developmental process	hairy and enhancer of split 1, (Drosophila)
regulation of developmental process	microtubule-associated protein tau
regulation of developmental process	myosin, heavy polypeptide 9, non-muscle
regulation of developmental process	nuclear factor (erythroid-derived 2)-like 2
regulation of developmental process	nodal homolog (mouse)
regulation of developmental process	wingless-type MMTV integration site family, member 4
regulation of developmental process	roundabout, axon guidance receptor, homolog 2 (Drosophila)
regulation of developmental process	transcription factor binding to IGHM enhancer 3
regulation of developmental process	T-cell lymphoma invasion and metastasis 1
regulation of developmental process	toll-like receptor 4
regulation of developmental process	CD276 molecule
NEUROGENESIS	
positive regulation of axonogenesis	microtubule-associated protein tau
positive regulation of axonogenesis	roundabout, axon guidance receptor, homolog 2 (Drosophila)
positive regulation of axonogenesis	T-cell lymphoma invasion and metastasis 1
positive regulation of neurogenesis	microtubule-associated protein tau
positive regulation of neurogenesis	roundabout, axon guidance receptor, homolog 2 (Drosophila)
positive regulation of neurogenesis	T-cell lymphoma invasion and metastasis 1
IMMUNE SYSTEM	
leukocyte activation	complexin 2
leukocyte activation	Kruppel-like factor 6
leukocyte activation	early growth response 1
leukocyte activation	linker for activation of T cells
leukocyte activation	killer cell immunoglobulin-like receptor, three domains, long cytoplasmic tail, 1
leukocyte activation	ras homolog gene family, member H
leukocyte activation	toll interacting protein
leukocyte activation	lymphocyte transmembrane adaptor 1
leukocyte activation	Sp3 transcription factor
leukocyte activation	toll-like receptor 4
leukocyte activation	CD40 molecule, TNF receptor superfamily member 5
cell activation	complexin 2
cell activation	Kruppel-like factor 6
cell activation	early growth response 1
cell activation	linker for activation of T cells
cell activation	glycoprotein Ib (platelet), alpha polypeptide
cell activation	killer cell immunoglobulin-like receptor, three domains, long cytoplasmic tail, 1
cell activation	ras homolog gene family, member H
cell activation	toll interacting protein

cell activation	lymphocyte transmembrane adaptor 1
cell activation	Sp3 transcription factor
cell activation	toll-like receptor 4
cell activation	CD40 molecule, TNF receptor superfamily member 5
BEHAVIOR	
learning	ceroid-lipofuscinosis, neuronal 3, juvenile (Batten, Spielmeyer-Vogt disease)
learning	amyloid beta (A4) precursor protein (peptidase nexin-II, Alzheimer disease)
learning	pleiotrophin (heparin binding growth factor 8, neurite growth-promoting factor 1)
learning	tyrosine hydroxylase
locomotory behavior	complement component 1, q subcomponent-like 1
locomotory behavior	chemokine (C-C motif) receptor 5
locomotory behavior	mitogen-activated protein kinase 14
locomotory behavior	guanine nucleotide binding protein (G protein), alpha activating activity polypeptide O
locomotory behavior	v-Ha-ras Harvey rat sarcoma viral oncogene homolog
locomotory behavior	interferon, gamma
locomotory behavior	amyloid beta (A4) precursor protein (peptidase nexin-II, Alzheimer disease)
locomotory behavior	neurotensin receptor 1 (high affinity)
locomotory behavior	myosin XVA
locomotory behavior	roundabout, axon guidance receptor, homolog 2 (Drosophila)
locomotory behavior	chemokine (C-C motif) ligand 2
locomotory behavior	chemokine (C-X-C motif) ligand 12 (stromal cell-derived factor 1)
locomotory behavior	tyrosine hydroxylase
CELL MOTILITY	
cell motility	actin related protein 2/3 complex, subunit 5, 16kDa
cell motility	mitogen-activated protein kinase 14
cell motility	forkhead box C1
cell motility	arachidonate 12-lipoxygenase
cell motility	GDNF, glial cell derived neurotrophic factor
cell motility	guanine nucleotide binding protein (G protein), alpha activating activity polypeptide O
cell motility	annexin A1
cell motility	interferon, gamma
cell motility	insulin-like growth factor 1 (somatomedin C)
cell motility	integrin, beta 1 (fibronectin receptor, beta polypeptide, antigen CD29)
cell motility	myosin, heavy polypeptide 9, non-muscle
cell motility	ATPase, Na ⁺ /K ⁺ transporting, alpha 2 (+) polypeptide
cell motility	nodal homolog (mouse)
cell motility	ret proto-oncogene
cell motility	actin, beta
cell motility	roundabout, axon guidance receptor, homolog 2 (Drosophila)
cell motility	signal transducer and activator of transcription 3 (acute-

	phase response factor)
cell motility	actin, gamma 1
cell motility	tropomyosin 1 (alpha)
cell motility	tropomyosin 3
cell motility	tropomyosin 4
CELL MEMBRANE	
lipid raft	ceroid-lipofuscinosis, neuronal 3, juvenile (Batten, Spielmeyer-Vogt disease)
lipid raft	linker for activation of T cells
lipid raft	lymphocyte transmembrane adaptor 1
lipid raft	caveolin 1, caveolae protein, 22kDa
OTHERS	
histone binding	nucleophosmin/nucleoplasmin, 2
histone binding	ASF1 anti-silencing function 1 homolog A (<i>S. cerevisiae</i>)
histone binding	importin 9
histone binding	SET translocation (myeloid leukemia-associated)
histone binding	chromatin assembly factor 1, subunit B (p60)
ER-nuclear signaling pathway	interferon, gamma
ER-nuclear signaling pathway	nuclear factor (erythroid-derived 2)-like 2
ER-nuclear signaling pathway	Der1-like domain family, member 3
Golgi trans face	syntaxin 6
Golgi trans face	ceroid-lipofuscinosis, neuronal 3, juvenile (Batten, Spielmeyer-Vogt disease)
Golgi trans face	golgi associated, gamma adaptin ear containing, ARF binding protein 2
Golgi trans face	golgi autoantigen, golgin subfamily a, 4
copper ion binding	apolipoprotein A-IV
copper ion binding	amyloid beta (A4) precursor protein (peptidase nexin-II, Alzheimer disease)
copper ion binding	metallothionein 1A (functional)
copper ion binding	metallothionein 1E (functional)
copper ion binding	metallothionein 1G
copper ion binding	metallothionein 1H
copper ion binding	metallothionein 1X

Term	P-value	Gene Name
DNA DAMAGE REPAIR		
DNA damage response, signal transduction	1.3E-05	mitogen-activated protein kinase 14
DNA damage response, signal transduction	1.3E-05	HUS1 checkpoint homolog (S. pombe)
DNA damage response, signal transduction	1.3E-05	myosin VI
DNA damage response, signal transduction	1.3E-05	RAD17 homolog (S. pombe)
DNA damage checkpoint	9.5E-05	mitogen-activated protein kinase 14
DNA damage checkpoint	9.5E-05	HUS1 checkpoint homolog (S. pombe)
DNA damage checkpoint	9.5E-05	RAD17 homolog (S. pombe)
DNA integrity checkpoint	0.00013	mitogen-activated protein kinase 14
DNA integrity checkpoint	0.00013	HUS1 checkpoint homolog (S. pombe)
DNA integrity checkpoint	0.00013	RAD17 homolog (S. pombe)
response to DNA damage stimulus	0.00029	mitogen-activated protein kinase 14
response to DNA damage stimulus	0.00029	leucine rich repeat containing 59
response to DNA damage stimulus	0.00029	HUS1 checkpoint homolog (S. pombe)
response to DNA damage stimulus	0.00029	myosin VI
response to DNA damage stimulus	0.00029	RAD17 homolog (S. pombe)
response to DNA damage stimulus	0.00029	SET domain and mariner transposase fusion gene
response to endogenous stimulus	0.00056	mitogen-activated protein kinase 14
response to endogenous stimulus	0.00056	leucine rich repeat containing 59
response to endogenous stimulus	0.00056	HUS1 checkpoint homolog (S. pombe)
response to endogenous stimulus	0.00056	myosin VI
response to endogenous stimulus	0.00056	RAD17 homolog (S. pombe)
response to endogenous stimulus	0.00056	SET domain and mariner transposase fusion gene
negative regulation of DNA replication	0.00069	HUS1 checkpoint homolog (S. pombe)
negative regulation of DNA replication	0.00069	RAD17 homolog (S. pombe)
cell cycle checkpoint	0.0008	mitogen-activated protein kinase 14
cell cycle checkpoint	0.0008	HUS1 checkpoint homolog (S. pombe)
cell cycle checkpoint	0.0008	RAD17 homolog (S. pombe)
APOPTOSIS		
positive regulation of caspase activity	0.00027	phorbol-12-myristate-13-acetate-induced protein 1
positive regulation of caspase activity	0.00027	forkhead box L2
positive regulation of caspase activity	0.00027	signal transducer and activator of transcription 1, 91kDa
regulation of caspase activity	0.00047	phorbol-12-myristate-13-acetate-induced protein 1
regulation of caspase activity	0.00047	forkhead box L2
regulation of caspase activity	0.00047	signal transducer and activator of transcription 1, 91kDa