

Top Canonical Pathway	P-score	Z-score
LXR/RXR Activation	2.57E-11	-0.426
Complement System	4E-9	-2.121
LPS/IL-1 Mediated Inhibition of RXR Function	8.47E-9	-0.258
Acetone Degradation I (to Methylglyoxal)	3.82E-08	-3.317
Bupropion Degradation	6.05E-8	-3.162
Melatonin Degradation I	1.53E-07	-3.873
FXR/RXR Activation	2.23E-7	Not available
Superpathway of Melatonin Degradation	4.3E-07	-3.873
Acute Phase Response Signaling	5.48E-7	-2.500
Nicotine Degradation II	9.73E-7	-3.742

Supplemental Table S1 Top canonical pathways in HBV-related hepatocellular carcinoma identified by Ingenuity Pathway Analysis. P-values and z-scores are shown above.

Gene Symbol	Entrez Gene Name	Expr p-value	Expr Log Ratio	Type(s)
<b>A1BG</b>	alpha-1-B glycoprotein	0.0163	-0.756	other
<b>AADACP1</b>	arylacetamide deacetylase pseudogene 1	0.0432	-1.237	other
<b>AADAT</b>	aminoadipate aminotransferase	0.014	-2.274	enzyme
<b>ABCA6</b>	ATP binding cassette subfamily A member 6	0.0431	-0.856	transporter
<b>ABCC10</b>	ATP binding cassette subfamily C member 10	0.0286	0.868	transporter
<b>ABHD6</b>	abhydrolase domain containing 6	0.0291	-0.96	enzyme
<b>ABHD18</b>	abhydrolase domain containing 18	0.0119	-0.856	other
<b>ABI3BP</b>	ABI family member 3 binding protein	0.000165	-1.051	other
<b>ACAA1</b>	acetyl-CoA acyltransferase 1	0.0245	-0.776	enzyme
<b>ACAA2</b>	acetyl-CoA acyltransferase 2	0.0274	-1.178	enzyme
<b>ACACA</b>	acetyl-CoA carboxylase alpha	0.0132	0.745	enzyme
<b>ACADL</b>	acyl-CoA dehydrogenase long chain	0.0349	-1.403	enzyme
<b>ACADM</b>	acyl-CoA dehydrogenase medium chain	0.0194	-0.705	enzyme
<b>ACADS</b>	acyl-CoA dehydrogenase short chain	0.0256	-1.02	enzyme
<b>ACADSB</b>	acyl-CoA dehydrogenase short/branched chain	0.0315	-0.921	enzyme
<b>ACLY</b>	ATP citrate lyase	0.00262	0.711	enzyme
<b>ACMSD</b>	aminocarboxymuconate semialdehyde decarboxylase	0.024	-1.376	enzyme
<b>ACOT12</b>	acyl-CoA thioesterase 12	0.000681	-1.19	enzyme
<b>ACSL1</b>	acyl-CoA synthetase long chain family member 1	0.00694	-0.858	enzyme
<b>ACSM3</b>	acyl-CoA synthetase medium chain family member 3	0.00307	-1.615	enzyme
<b>ACSM5</b>	acyl-CoA synthetase medium chain family member 5	0.0173	-1.062	enzyme
<b>ADAMTS1</b>	ADAM metalloproteinase with thrombospondin type 1 motif 1	0.0105	-1.259	peptidase

<b>ADAMTS13</b>	ADAM metalloproteinase with thrombospondin type 1 motif 13	0.00364	-1.376	peptidase
<b>ADGRG6</b>	adhesion G protein-coupled receptor G6	0.0179	-1.099	G-protein coupled receptor
<b>ADGRG7</b>	adhesion G protein-coupled receptor G7	0.00212	-2.874	G-protein coupled receptor
<b>ADH4</b>	alcohol dehydrogenase 4 (class II), pi polypeptide	0.00207	-1.75	enzyme
<b>ADH6</b>	alcohol dehydrogenase 6 (class V)	0.0167	-1.042	enzyme
<b>ADH1A</b>	alcohol dehydrogenase 1A (class I), alpha polypeptide	0.0374	-1.122	enzyme
<b>ADH1B</b>	alcohol dehydrogenase 1B (class I), beta polypeptide	0.00882	-1.999	enzyme
<b>ADH1C</b>	alcohol dehydrogenase 1C (class I), gamma polypeptide	0.0271	-1.594	enzyme
<b>ADRA1A</b>	adrenoceptor alpha 1A	0.0000827	-1.755	G-protein coupled receptor
<b>ADRB2</b>	adrenoceptor beta 2	0.032	-1.081	G-protein coupled receptor
<b>AFM</b>	afamin	0.00226	-1.379	transporter
<b>AGL</b>	amylase, alpha-1, 6-glucosidase, 4-alpha-glucanotransferase	0.0399	-0.884	enzyme
<b>AGTR1</b>	angiotensin II receptor type 1	0.00686	-0.921	G-protein coupled receptor
<b>AGXT2</b>	alanine--glyoxylate aminotransferase 2	0.0299	-1.274	enzyme
<b>AGXT</b>	alanine--glyoxylate and serine--pyruvate aminotransferase	0.0233	-1.188	enzyme
<b>AKR1B10</b>	aldo-keto reductase family 1 member B10	0.00261	1.593	enzyme
<b>AKR1D1</b>	aldo-keto reductase family 1 member D1	0.00759	-1.945	enzyme
<b>AKR7A3</b>	aldo-keto reductase family 7 member A3	0.0187	-1.574	enzyme
<b>ALB</b>	albumin	0.0318	-0.902	transporter
<b>ALDH1A3</b>	aldehyde dehydrogenase 1 family member A3	0.0459	-0.815	enzyme
<b>ALDH6A1</b>	aldehyde dehydrogenase 6 family member A1	0.0122	-1.038	enzyme
<b>ALDH8A1</b>	aldehyde dehydrogenase 8 family member A1	0.000261	-1.343	enzyme
<b>ALDOB</b>	aldolase, fructose-bisphosphate B	0.00366	-1.239	enzyme
<b>ALPL</b>	alkaline phosphatase, biomineralization associated	0.0167	-0.988	phosphatase
<b>AMDHD1</b>	amidohydrolase domain containing 1	0.015	-1.291	enzyme
<b>AMIGO2</b>	adhesion molecule with Ig like domain 2	0.0251	-0.957	other
<b>ANG</b>	angiogenin	0.00764	-1.021	enzyme
<b>ANGPTL1</b>	angiopoietin like 1	0.00605	-2.145	other
<b>ANGPTL3</b>	angiopoietin like 3	0.0266	-1.234	growth factor
<b>ANGPTL6</b>	angiopoietin like 6	0.00281	-1.783	other

<b>ANK3</b>	ankyrin 3	0.00668	-1.43	other
<b>ANKRD27</b>	ankyrin repeat domain 27	0.0267	0.919	other
<b>ANKRD55</b>	ankyrin repeat domain 55	0.00124	-0.828	transcription regulator
<b>ANKS6</b>	ankyrin repeat and sterile alpha motif domain containing 6	0.00354	0.784	other
<b>ANLN</b>	anillin actin binding protein	0.000599	2.398	other
<b>ANO1</b>	anoctamin 1	0.0143	-0.91	ion channel
<b>ANTXR2</b>	ANTXR cell adhesion molecule 2	0.00192	-0.86	transmembrane receptor
<b>ANXA3</b>	annexin A3	0.00404	-0.733	enzyme
<b>ANXA10</b>	annexin A10	0.00585	-1.589	other
<b>AOC3</b>	amine oxidase copper containing 3	0.011	-0.891	enzyme
<b>AP1M2</b>	adaptor related protein complex 1 subunit mu 2	0.0276	0.741	transporter
<b>APOA4</b>	apolipoprotein A4	0.0207	-1.154	transporter
<b>APOA5</b>	apolipoprotein A5	0.0243	-2.052	transporter
<b>APOF</b>	apolipoprotein F	0.00196	-2.468	transporter
<b>AQP3</b>	aquaporin 3 (Gill blood group)	0.0052	-0.785	transporter
<b>ARHGAP15</b>	Rho GTPase activating protein 15	0.00401	-0.934	other
<b>ARHGAP42</b>	Rho GTPase activating protein 42	0.0121	-0.705	other
<b>ARHGEF11</b>	Rho guanine nucleotide exchange factor 11	0.0145	0.748	other
<b>ARHGEF26</b>	Rho guanine nucleotide exchange factor 26	0.0142	-1.066	other
<b>ARMC6</b>	armadillo repeat containing 6	0.0211	-0.852	other
<b>ARMCX3</b>	armadillo repeat containing X-linked 3	0.0402	-1.006	other
<b>ART4</b>	ADP-ribosyltransferase 4 (Dombrock blood group)	0.00648	-1.112	enzyme
<b>ASF1B</b>	anti-silencing function 1B histone chaperone	0.00173	0.785	other
<b>ASPA</b>	aspartoacylase	0.0000237	-0.975	enzyme
<b>ASPG</b>	asparaginase	0.00942	-1.276	enzyme
<b>ASPM</b>	abnormal spindle microtubule assembly	0.0243	2.22	other
<b>ASPN</b>	asporin	0.0066	-0.917	other
<b>ASS1</b>	argininosuccinate synthase 1	0.0239	-1.081	enzyme
<b>ATAD2</b>	ATPase family AAA domain containing 2	0.0376	1.164	enzyme
<b>ATP11C</b>	ATPase phospholipid transporting 11C	0.0184	-1.206	transporter
<b>ATP9A</b>	ATPase phospholipid transporting 9A (putative)	0.038	0.844	transporter
<b>AURKA</b>	aurora kinase A	0.0123	1.809	kinase
<b>AVPR1A</b>	arginine vasopressin receptor 1A	0.000128	-1.014	G-protein coupled receptor
<b>AZGP1P1</b>	AZGP1 pseudogene 1	0.0161	-1.003	other
<b>B3GAT1</b>	beta-1,3-glucuronyltransferase 1	0.0108	-0.993	enzyme
<b>B9D1</b>	B9 domain containing 1	0.0495	0.734	other
<b>BAIAP2-DT</b>	BAIAP2 divergent transcript	0.00927	0.749	other
<b>BARD1</b>	BRCA1 associated RING domain 1	0.00864	1.031	transcription regulator

<b>BASP1</b>	brain abundant membrane attached signal protein 1	0.0291	-0.704	transcription regulator
<b>BBOX1</b>	gamma-butyrobetaine hydroxylase 1	0.0475	-1.903	enzyme
<b>BCHE</b>	butyrylcholinesterase	0.00335	-1.959	enzyme
<b>BCKDHB</b>	branched chain keto acid dehydrogenase E1 subunit beta	0.036	-0.983	enzyme
<b>BCL9</b>	BCL9 transcription coactivator	0.000599	1.073	other
<b>BCO2</b>	beta-carotene oxygenase 2	0.00273	-1.938	enzyme
<b>BDH1</b>	3-hydroxybutyrate dehydrogenase 1	0.0428	-0.815	enzyme
<b>BDH2</b>	3-hydroxybutyrate dehydrogenase 2	0.0152	-1.089	enzyme
<b>BGN</b>	biglycan	0.0356	-0.994	other
<b>BHMT</b>	betaine--homocysteine S-methyltransferase	0.0294	-1.312	enzyme
<b>BIRC5</b>	baculoviral IAP repeat containing 5	0.00026	1.625	other
<b>BMP5</b>	bone morphogenetic protein 5	0.000264	-0.763	growth factor
<b>BMPER</b>	BMP binding endothelial regulator	0.00000399	-2.096	other
<b>BMPR1B</b>	bone morphogenetic protein receptor type 1B	0.00314	-0.821	kinase
<b>BMX</b>	BMX non-receptor tyrosine kinase	0.0225	-0.724	kinase
<b>BOLA2/BOLA2B</b>	bolA family member 2	0.021	0.824	enzyme
<b>BUB1</b>	BUB1 mitotic checkpoint serine/threonine kinase	0.00132	1.03	kinase
<b>BUB1B</b>	BUB1 mitotic checkpoint serine/threonine kinase B	0.00439	1.63	kinase
<b>C6</b>	complement C6	0.0128	-1.065	other
<b>C7</b>	complement C7	0.013	-1.855	other
<b>C9</b>	complement C9	0.00429	-3.332	other
<b>C11orf96</b>	chromosome 11 open reading frame 96	0.031	-1.247	other
<b>C12orf75</b>	chromosome 12 open reading frame 75	0.0246	1.012	other
<b>C14orf180</b>	chromosome 14 open reading frame 180	0.00243	-1.093	other
<b>C1orf112</b>	chromosome 1 open reading frame 112	0.00831	0.863	other
<b>C1orf162</b>	chromosome 1 open reading frame 162	0.00337	-1.26	transporter
<b>C1QA</b>	complement C1q A chain	0.0216	-0.709	other
<b>C1QB</b>	complement C1q B chain	0.016	-0.805	other
<b>C1R</b>	complement C1r	0.0151	-0.856	peptidase
<b>C1RL</b>	complement C1r subcomponent like	0.00267	-0.992	peptidase
<b>C21orf91</b>	chromosome 21 open reading frame 91	0.0115	-0.983	other
<b>C3P1</b>	complement component 3 precursor pseudogene	0.00552	-2.17	other
<b>C4BPA</b>	complement component 4 binding protein alpha	0.00839	-0.776	other
<b>C8A</b>	complement C8 alpha chain	0.00468	-1.315	other
<b>C8B</b>	complement C8 beta chain	0.00273	-1.023	other
<b>C9orf72</b>	C9orf72-SMCR8 complex subunit	0.0224	-0.838	other
<b>CA2</b>	carbonic anhydrase 2	0.00309	-1.051	enzyme
<b>CA5A</b>	carbonic anhydrase 5A	0.0465	-0.745	enzyme
<b>CABYR</b>	calcium binding tyrosine phosphorylation regulated	0.0115	0.858	other
<b>CACNA1D</b>	calcium voltage-gated channel subunit alpha1 D	0.00912	0.972	ion channel

<b>CALHM6</b>	calcium homeostasis modulator family member 6	0.00249	-1.179	other
<b>CAMK4</b>	calcium/calmodulin dependent protein kinase IV	0.00166	-0.842	kinase
<b>CAP2</b>	cyclase associated actin cytoskeleton regulatory protein 2	0.00713	1.575	other
<b>CAPN3</b>	calpain 3	0.0495	-1.64	peptidase
<b>CARD8</b>	caspase recruitment domain family member 8	0.0261	0.726	other
<b>CARMIL3</b>	capping protein regulator and myosin 1 linker 3	0.00381	-1.16	other
<b>CAVIN2</b>	caveolae associated protein 2	0.0302	-0.753	other
<b>CBFA2T2</b>	CBFA2/RUNX1 partner transcriptional co-repressor 2	0.0377	1.058	transcription regulator
<b>CBR4</b>	carbonyl reductase 4	0.0353	-0.82	enzyme
<b>CBX4</b>	chromobox 4	0.000854	0.83	transcription regulator
<b>CBX5</b>	chromobox 5	0.009	0.889	transcription regulator
<b>CCBE1</b>	collagen and calcium binding EGF domains 1	0.000118	-2.128	other
<b>CCDC3</b>	coiled-coil domain containing 3	0.0415	-0.971	other
<b>CCDC34</b>	coiled-coil domain containing 34	0.0141	1.044	other
<b>CCDC196</b>	coiled-coil domain containing 196	0.00781	-2.263	other
<b>CCL3</b>	C-C motif chemokine ligand 3	0.00258	-1.162	cytokine
<b>CCL4</b>	C-C motif chemokine ligand 4	0.00785	-0.872	cytokine
<b>CCL19</b>	C-C motif chemokine ligand 19	0.045	-0.856	cytokine
<b>CCL21</b>	C-C motif chemokine ligand 21	0.00805	-0.73	cytokine
<b>CCL23</b>	C-C motif chemokine ligand 23	0.0000169	-2.343	cytokine
<b>CCN1</b>	cellular communication network factor 1	0.0444	-1.069	other
<b>CCNA2</b>	cyclin A2	0.00308	1.252	other
<b>CCNB1</b>	cyclin B1	0.00259	2.239	kinase
<b>CCNB2</b>	cyclin B2	0.00175	1.659	other
<b>CCNE1</b>	cyclin E1	0.00143	0.736	transcription regulator
<b>CCNE2</b>	cyclin E2	0.00521	0.878	other
<b>CCR1</b>	C-C motif chemokine receptor 1	0.00634	-1.083	G-protein coupled receptor
<b>CCT3</b>	chaperonin containing TCP1 subunit 3	0.0099	0.811	other
<b>CD4</b>	CD4 molecule	0.00288	-1.092	transmembrane receptor
<b>CD14</b>	CD14 molecule	0.00132	-0.835	transmembrane receptor
<b>CD34</b>	CD34 molecule	0.00511	0.798	other
<b>CD69</b>	CD69 molecule	0.0256	-0.716	transmembrane receptor
<b>CD109</b>	CD109 molecule	0.0183	1.329	other
<b>CD160</b>	CD160 molecule	0.00109	-0.958	transmembrane receptor

<b>CD163</b>	CD163 molecule	0.0256	-1.019	transmembrane receptor
<b>CD200</b>	CD200 molecule	0.0264	1.28	other
<b>CD244</b>	CD244 molecule	0.000219	-0.865	transmembrane receptor
<b>CD302</b>	CD302 molecule	0.00213	-0.822	transmembrane receptor
<b>CD1D</b>	CD1d molecule	0.0178	-1.174	other
<b>CD300A</b>	CD300a molecule	0.00195	-0.984	transmembrane receptor
<b>CD5L</b>	CD5 molecule like	0.0000637	-3.23	transmembrane receptor
<b>CDA</b>	cytidine deaminase	0.00671	-1.119	enzyme
<b>CDC20</b>	cell division cycle 20	0.00974	1.396	other
<b>CDC25C</b>	cell division cycle 25C	0.000285	0.936	phosphatase
<b>CDC37L1</b>	cell division cycle 37 like 1	0.00412	-1.106	other
<b>CDCA3</b>	cell division cycle associated 3	0.00252	1.139	other
<b>CDCA5</b>	cell division cycle associated 5	0.000663	1.235	other
<b>CDCA7</b>	cell division cycle associated 7	0.00768	1.204	other
<b>CDCA8</b>	cell division cycle associated 8	0.00536	0.712	other
<b>CDH13</b>	cadherin 13	0.00508	0.764	other
<b>CDH19</b>	cadherin 19	0.0303	-1.667	other
<b>CDHR2</b>	cadherin related family member 2	0.00583	-1.118	other
<b>CDK1</b>	cyclin dependent kinase 1	0.00928	2.215	kinase
<b>CDK5RAP2</b>	CDK5 regulatory subunit associated protein 2	0.0228	0.808	other
<b>CDKN3</b>	cyclin dependent kinase inhibitor 3	0.0111	1.875	phosphatase
<b>CDKN2A</b>	cyclin dependent kinase inhibitor 2A	0.000509	1.898	transcription regulator
<b>CDT1</b>	chromatin licensing and DNA replication factor 1	0.0024	0.846	other
<b>CELSR3</b>	cadherin EGF I AG seven-pass G-type receptor 3	0.000688	0.891	G-protein coupled receptor
<b>CEMIP</b>	cell migration inducing hyaluronidase 1	0.0341	0.784	enzyme
<b>CENPA</b>	centromere protein A	0.00175	1.317	other
<b>CENPE</b>	centromere protein E	0.00156	1.009	other
<b>CENPF</b>	centromere protein F	0.00136	1.348	other
<b>CENPH</b>	centromere protein H	0.0204	0.9	other
<b>CENPK</b>	centromere protein K	0.00181	1.36	other
<b>CENPL</b>	centromere protein L	0.00894	1.094	other
<b>CENPM</b>	centromere protein M	0.000582	1.038	other
<b>CENPW</b>	centromere protein W	0.00984	1.292	other
<b>CEP41</b>	centrosomal protein 41	0.00696	0.703	other
<b>CEP55</b>	centrosomal protein 55	0.00074	1.246	other
<b>CES5A</b>	carboxylesterase 5A	0.0369	-1.839	enzyme
<b>CETP</b>	cholesteryl ester transfer protein	0.00315	-1.722	enzyme
<b>CFAP43</b>	cilia and flagella associated protein 43	0.000113	1.308	other
<b>CFD</b>	complement factor D	0.00232	-0.707	peptidase

<b>CFHR3</b>	complement factor H related 3	0.0235	-1.29	other
<b>CFHR4</b>	complement factor H related 4	0.0154	-1.645	transporter
<b>CGREF1</b>	cell growth regulator with EF-hand domain 1	0.00238	1.098	other
<b>CHEK1</b>	checkpoint kinase 1	0.00139	0.857	kinase
<b>CHST4</b>	carbohydrate sulfotransferase 4	0.00088	-1.508	enzyme
<b>CHST9</b>	carbohydrate sulfotransferase 9	0.0115	-1.39	enzyme
<b>CIDEB</b>	cell death inducing DFFA like effector b	0.0222	-1.426	other
<b>CKAP5</b>	cytoskeleton associated protein 5	0.026	0.721	transcription regulator
<b>CKAP2L</b>	cytoskeleton associated protein 2 like	0.00391	0.776	other
<b>CKS1B</b>	CDC28 protein kinase regulatory subunit 1B	0.0163	0.756	kinase
<b>CLDN10</b>	claudin 10	0.000212	-1.917	other
<b>CLDN14</b>	claudin 14	0.0105	-1.251	other
<b>CLEC10A</b>	C-type lectin domain containing 10A	0.0158	-0.84	other
<b>CLEC1B</b>	C-type lectin domain family 1 member B	0.0265	-4.122	transmembrane receptor
<b>CLEC4G</b>	C-type lectin domain family 4 member G	0.0331	-4.212	other
<b>CLEC4M</b>	C-type lectin domain family 4 member M	0.00767	-3.689	other
<b>CLGN</b>	calmegin	0.00225	0.975	peptidase
<b>CLRN3</b>	clarin 3	0.0285	-2.256	other
<b>CNDP1</b>	carnosine dipeptidase 1	0.0057	-3.046	peptidase
<b>CNGA1</b>	cyclic nucleotide gated channel subunit alpha 1	0.00187	-0.794	ion channel
<b>CNIH4</b>	cornichon family AMPA receptor auxiliary protein 4	0.0177	0.815	other
<b>CNNM1</b>	cyclin and CBS domain divalent metal cation transport mediator 1	0.000995	1.204	other
<b>CNTLN</b>	centlein	0.00772	-0.711	other
<b>CNTN3</b>	contactin 3	0.0263	-1.163	other
<b>COBLL1</b>	cordon-bleu WH2 repeat protein like 1	0.0481	-0.709	other
<b>COCH</b>	cochlin	0.0000338	1.274	other
<b>COL15A1</b>	collagen type XV alpha 1 chain	0.00162	1.789	other
<b>COL4A1</b>	collagen type IV alpha 1 chain	0.0285	0.949	other
<b>COL4A2</b>	collagen type IV alpha 2 chain	0.00685	0.812	other
<b>COL6A3</b>	collagen type VI alpha 3 chain	0.0151	-1.079	other
<b>COL6A6</b>	collagen type VI alpha 6 chain	0.000277	-1.46	other
<b>COLCA2</b>	colorectal cancer associated 2	0.00596	0.976	other
<b>COLEC10</b>	collectin subfamily member 10	0.000102	-2.583	other
<b>COLEC11</b>	collectin subfamily member 11	0.00336	-1.469	other
<b>COX7B2</b>	cytochrome c oxidase subunit 7B2	0.0067	0.931	enzyme
<b>CP</b>	ceruloplasmin	0.0285	-0.85	enzyme
<b>CPEB3</b>	cytoplasmic polyadenylation element binding protein 3	0.0125	-1.709	translation regulator
<b>CPED1</b>	cadherin like and PC-esterase domain containing 1	0.0137	-1.487	other
<b>CPN1</b>	carboxypeptidase N subunit 1	0.0388	-0.799	peptidase
<b>CRHBP</b>	corticotropin releasing hormone binding protein	0.000244	-2.689	other

<b>CRISPLD2</b>	cysteine rich secretory protein LCCL domain containing 2	0.0378	-1.138	other
<b>CRNDE</b>	colorectal neoplasia differentially expressed	0.039	1.746	other
<b>CRP</b>	C-reactive protein	0.0194	-1.808	other
<b>CRYBG1</b>	crystallin beta-gamma domain containing 1	0.0114	-1.317	other
<b>CRYBG2</b>	crystallin beta-gamma domain containing 2	0.000316	0.829	other
<b>CSRNP1</b>	cysteine and serine rich nuclear protein 1	0.0122	-1.121	transcription regulator
<b>CTBS</b>	chitobiase	0.0431	-0.767	enzyme
<b>CTH</b>	cystathionine gamma-lyase	0.0356	-1.716	enzyme
<b>CTHRC1</b>	collagen triple helix repeat containing 1	0.0441	1.789	other
<b>CTNNA3</b>	catenin alpha 3	0.0182	-2.238	other
<b>CTSA</b>	cathepsin A	0.00535	0.701	peptidase
<b>CTSS</b>	cathepsin S	0.00761	-0.791	peptidase
<b>CXCL12</b>	C-X-C motif chemokine ligand 12	0.000369	-1.754	cytokine
<b>CXCL14</b>	C-X-C motif chemokine ligand 14	0.000018	-2.801	cytokine
<b>CYP1A1</b>	cytochrome P450 family 1 subfamily A member 1	0.00424	-1.655	enzyme
<b>CYP1A2</b>	cytochrome P450 family 1 subfamily A member 2	0.0119	-2.716	enzyme
<b>CYP26A1</b>	cytochrome P450 family 26 subfamily A member 1	0.0203	-3.1	enzyme
<b>CYP2A6 (includes others)</b>	cytochrome P450 family 2 subfamily A member 6	0.0106	-2.368	enzyme
<b>CYP2B6</b>	cytochrome P450 family 2 subfamily B member 6	0.000813	-1.271	enzyme
<b>CYP2B7P</b>	cytochrome P450 family 2 subfamily B member 7, pseudogene	0.0148	-2.404	other
<b>CYP2C8</b>	cytochrome P450 family 2 subfamily C member 8	0.00039	-1.099	enzyme
<b>CYP2C9</b>	cytochrome P450 family 2 subfamily C member 9	0.00191	-1.089	enzyme
<b>CYP2C18</b>	cytochrome P450 family 2 subfamily C member 18	0.00938	-1.081	enzyme
<b>CYP2E1</b>	cytochrome P450 family 2 subfamily E member 1	0.00574	-1.692	enzyme
<b>CYP2J2</b>	cytochrome P450 family 2 subfamily J member 2	0.0084	-0.777	enzyme
<b>CYP39A1</b>	cytochrome P450 family 39 subfamily A member 1	0.00479	-2.875	enzyme
<b>CYP3A7-CYP3A51P</b>	CYP3A7-CYP3A51P readthrough	0.0367	-1.251	enzyme
<b>CYP4A11</b>	cytochrome P450 family 4 subfamily A member 11	0.0329	-1.125	enzyme
<b>CYP4F2</b>	cytochrome P450 family 4 subfamily F member 2	0.0122	-0.846	enzyme
<b>CYP4X1</b>	cytochrome P450 family 4 subfamily X member 1	0.0352	-1.264	enzyme
<b>CYP4Z1</b>	cytochrome P450 family 4 subfamily Z member 1	0.00019	-0.766	enzyme



<b>DACH1</b>	dachshund family transcription factor 1	0.00338	-1.118	transcription regulator
<b>DBF4</b>	DBF4 zinc finger	0.0291	0.719	kinase
<b>DBH</b>	dopamine beta-hydroxylase	0.000151	-1.94	enzyme
<b>DBH-AS1</b>	DBH antisense RNA 1	0.0363	-0.916	other
<b>DCLRE1B</b>	DNA cross-link repair 1B	0.00875	0.797	enzyme
<b>DCN</b>	decorin	0.0000448	-1.496	other
<b>DEPDC1</b>	DEP domain containing 1	0.000214	1.371	transcription regulator
<b>DEPDC7</b>	DEP domain containing 7	0.0408	-1.359	other
<b>DEPDC1B</b>	DEP domain containing 1B	0.0225	0.825	other
<b>DGAT2</b>	diacylglycerol O-acyltransferase 2	0.0294	-0.855	enzyme
<b>DHODH</b>	dihydroorotate dehydrogenase (quinone)	0.00115	-0.913	enzyme
<b>DIO3OS</b>	DIO3 opposite strand upstream RNA	0.00304	-1.098	other
<b>DIS3L2</b>	DIS3 like 3'-5' exoribonuclease 2	0.0324	0.758	enzyme
<b>DKK1</b>	dickkopf WNT signaling pathway inhibitor 1	0.00206	0.769	growth factor
<b>DLG5</b>	discs large MAGUK scaffold protein 5	0.0176	1.127	other
<b>DLGAP5</b>	DLG associated protein 5	0.00134	1.822	phosphatase
<b>DMD</b>	dystrophin	0.0255	-0.919	other
<b>DMGDH</b>	dimethylglycine dehydrogenase	0.0185	-1.101	enzyme
<b>DNAH6</b>	dynein axonemal heavy chain 6	0.0185	-0.732	other
<b>DNAJC6</b>	DnaJ heat shock protein family (Hsp40) member C6	0.00487	1.553	other
<b>DNASE1L3</b>	deoxyribonuclease 1 like 3	0.000175	-1.92	enzyme
<b>DNMT3A</b>	DNA methyltransferase 3 alpha	0.0211	0.773	enzyme
<b>DPF3</b>	double PHD fingers 3	0.0128	-1.414	other
<b>DPT</b>	dermatopontin	0.000538	-1.209	other
<b>DSE</b>	dermatan sulfate epimerase	0.042	-1.058	enzyme
<b>DSEL</b>	dermatan sulfate epimerase like	0.00116	-0.77	enzyme
<b>DSN1</b>	DSN1 component of MIS12 kinetochore complex	0.0494	0.703	other
<b>DSTYK</b>	dual serine/threonine and tyrosine protein kinase	0.0439	0.808	kinase
<b>DTL</b>	denticleless E3 ubiquitin protein ligase homolog	0.013	2.01	other
<b>DTNA</b>	dystrobrevin alpha	0.00244	1.217	other
<b>DTX1</b>	deltex E3 ubiquitin ligase 1	0.0178	-0.976	transcription regulator
<b>DUXAP10</b>	double homeobox A pseudogene 10	0.0144	1.847	other
<b>E2F8</b>	E2F transcription factor 8	0.00134	1.17	transcription regulator
<b>EBF1</b>	EBF transcription factor 1	0.0143	1.286	transcription regulator
<b>EBF2</b>	EBF transcription factor 2	0.0000117	1.281	transcription regulator
<b>ECM1</b>	extracellular matrix protein 1	0.0424	-1.78	transporter
<b>ECT2</b>	epithelial cell transforming 2	0.00394	1.42	other
<b>EDIL3</b>	EGF like repeats and discoidin domains 3	0.00243	0.816	other

<b>EFCAB2</b>	EF-hand calcium binding domain 2	0.0421	0.779	other
<b>EGR1</b>	early growth response 1	0.00454	-0.964	transcription regulator
<b>EHD3</b>	EH domain containing 3	0.00373	-1.036	other
<b>EHMT2</b>	euchromatic histone lysine methyltransferase 2	0.00323	0.819	transcription regulator
<b>EML6</b>	EMAP like 6	0.00237	1.284	other
<b>ENAH</b>	ENAH actin regulator	0.00626	1.308	other
<b>ENO3</b>	enolase 3	0.0256	-1.395	enzyme
<b>EPB41L5</b>	erythrocyte membrane protein band 4.1 like 5	0.0168	-0.781	other
<b>EPB41L4B</b>	erythrocyte membrane protein band 4.1 like 4B	0.00381	-0.907	transporter
<b>EPHA2</b>	EPH receptor A2	0.0118	-0.787	kinase
<b>EPHB1</b>	EPH receptor B1	0.0195	-0.863	kinase
<b>EPHX2</b>	epoxide hydrolase 2	0.00774	-0.701	enzyme
<b>EPS8L3</b>	EPS8 like 3	0.000253	2.116	other
<b>ERAP1</b>	endoplasmic reticulum aminopeptidase 1	0.0233	-0.884	peptidase
<b>ESM1</b>	endothelial cell specific molecule 1	0.00388	1.242	growth factor
<b>ESR1</b>	estrogen receptor 1	0.00000383	-0.726	ligand-dependent nuclear receptor
<b>ETFDH</b>	electron transfer flavoprotein dehydrogenase	0.022	-1.365	enzyme
<b>ETFRF1</b>	electron transfer flavoprotein regulatory factor 1	0.0191	-0.739	other
<b>ETNPPL</b>	ethanolamine-phosphate phospho-lyase	0.024	-0.762	enzyme
<b>EVA1A</b>	eva-1 homolog A, regulator of programmed cell death	0.0177	-1.032	other
<b>EVI2B</b>	ecotropic viral integration site 2B	0.00571	-0.941	other
<b>EXO1</b>	exonuclease 1	0.00342	0.817	enzyme
<b>EXOC3L4</b>	exocyst complex component 3 like 4	0.0182	-0.864	other
<b>EZH2</b>	enhancer of zeste 2 polycomb repressive complex 2 subunit	0.0345	1.13	transcription regulator
<b>F3</b>	coagulation factor III, tissue factor	0.0138	-0.779	transmembrane receptor
<b>F8</b>	coagulation factor VIII	0.0109	-0.855	other
<b>F9</b>	coagulation factor IX	0.0145	-1.599	peptidase
<b>F11</b>	coagulation factor XI	0.0172	-1.413	peptidase
<b>F13B</b>	coagulation factor XIII B chain	0.0463	-0.815	enzyme
<b>FAAH</b>	fatty acid amide hydrolase	0.0294	-0.717	enzyme
<b>FABP1</b>	fatty acid binding protein 1	0.0106	-1.106	transporter
<b>FABP2</b>	fatty acid binding protein 2	0.000142	-0.971	transporter
<b>FAM151A</b>	family with sequence similarity 151 member A	0.0382	-1.687	other
<b>FAM169A</b>	family with sequence similarity 169 member A	0.0292	1.005	other
<b>FAM222A</b>	family with sequence similarity 222 member A	0.00409	0.871	other

<b>FAM83D</b>	family with sequence similarity 83 member D	0.0238	1.522	other
<b>FAM83H</b>	family with sequence similarity 83 member H	0.0394	1.021	other
<b>FAM9B</b>	family with sequence similarity 9 member B	0.00852	-1.824	other
<b>FANCD2</b>	FA complementation group D2	0.0014	0.887	other
<b>FANCI</b>	FA complementation group I	0.00283	0.821	other
<b>FBLN5</b>	fibulin 5	0.0119	-0.874	other
<b>FBP1</b>	fructose-bisphosphatase 1	0.00327	-1.733	phosphatase
<b>FBXL18</b>	F-box and leucine rich repeat protein 18	0.0012	0.782	enzyme
<b>FBXL21P</b>	F-box and leucine rich repeat protein 21, pseudogene	0.0067	0.726	enzyme
<b>FBXO45</b>	F-box protein 45	0.0398	0.735	other
<b>FCGR2B</b>	Fc fragment of IgG receptor IIb	0.00398	-2.046	transmembrane receptor
<b>FCN2</b>	ficolin 2	0.000358	-3.312	other
<b>FCN3</b>	ficolin 3	0.00777	-2.98	other
<b>FEN1</b>	flap structure-specific endonuclease 1	0.0142	0.895	enzyme
<b>FEZ1</b>	fasciculation and elongation protein zeta 1	0.0188	-0.989	other
<b>FGB</b>	fibrinogen beta chain	0.00128	-0.971	other
<b>FGFR1</b>	fibroblast growth factor receptor 1	0.00844	-0.82	kinase
<b>FGFR2</b>	fibroblast growth factor receptor 2	0.000538	-0.763	kinase
<b>FGL2</b>	fibrinogen like 2	0.00363	-1.24	peptidase
<b>FIGNL1</b>	fidgetin like 1	0.00705	1.108	enzyme
<b>FILIP1L</b>	filamin A interacting protein 1 like	0.0348	-0.702	other
<b>FITM1</b>	fat storage inducing transmembrane protein 1	0.0391	-1.27	other
<b>FLVCR1</b>	feline leukemia virus subgroup C cellular receptor 1	0.027	1.371	transporter
<b>FLVCR1-DT</b>	FLVCR1 divergent transcript	0.00167	1.17	other
<b>FMO4</b>	flavin containing dimethylaniline monooxygenase 4	0.0375	-0.801	enzyme
<b>FNIP2</b>	folliculin interacting protein 2	0.00541	-0.726	other
<b>FOPNL</b>	FGFR1OP N-terminal like	0.0193	0.827	other
<b>FOS</b>	Fos proto-oncogene, AP-1 transcription factor subunit	0.000495	-1.553	transcription regulator
<b>FOSB</b>	FosB proto-oncogene, AP-1 transcription factor subunit	0.00925	-2.139	transcription regulator
<b>FOXM1</b>	forkhead box M1	0.000299	1.21	transcription regulator
<b>FOXO1</b>	forkhead box O1	0.00783	-0.908	transcription regulator
<b>FOXP2</b>	forkhead box P2	0.0044	-2.051	transcription regulator
<b>FPR1</b>	formyl peptide receptor 1	0.0146	-0.751	G-protein coupled receptor
<b>FREM2</b>	FRAS1 related extracellular matrix 2	0.00316	-2.275	other
<b>FRMD3</b>	FERM domain containing 3	0.0336	0.766	other

<b>FRMD4B</b>	FERM domain containing 4B	0.0268	-0.827	other
<b>FTCD</b>	formimidoyltransferase cyclodeaminase	0.0415	-0.938	enzyme
<b>FXN</b>	frataxin	0.0474	-0.833	kinase
<b>FXYD1</b>	FXYD domain containing ion transport regulator 1	0.0419	-1.736	ion channel
<b>FYB2</b>	FYN binding protein 2	0.00864	-0.78	other
<b>GABRP</b>	gamma-aminobutyric acid type A receptor pi subunit	0.000465	-0.846	ion channel
<b>GADD45B</b>	growth arrest and DNA damage inducible beta	0.000724	-1.243	other
<b>GASK1A</b>	golgi associated kinase 1A	0.02	-0.986	other
<b>GBA3</b>	glucosylceramidase beta 3 (gene/pseudogene)	0.0044	-2.173	enzyme
<b>GBA</b>	glucosylceramidase beta	0.00346	0.979	enzyme
<b>GBAP1</b>	glucosylceramidase beta pseudogene 1	0.00639	0.83	other
<b>GBP1</b>	guanylate binding protein 1	0.00403	-0.923	enzyme
<b>GCDH</b>	glutaryl-CoA dehydrogenase	0.0262	-0.802	enzyme
<b>GCGR</b>	glucagon receptor	0.0232	-0.811	G-protein coupled receptor
<b>GCH1</b>	GTP cyclohydrolase 1	0.0085	-1.437	enzyme
<b>GCHFR</b>	GTP cyclohydrolase I feedback regulator	0.0499	-0.775	other
<b>GDAP1</b>	ganglioside induced differentiation associated protein 1	0.0221	0.894	other
<b>GDF2</b>	growth differentiation factor 2	0.000149	-2.563	growth factor
<b>GDPD1</b>	glycerophosphodiester phosphodiesterase domain containing 1	0.0439	0.753	enzyme
<b>GGT5</b>	gamma-glutamyltransferase 5	0.0114	-1.339	enzyme
<b>GHR</b>	growth hormone receptor	0.0118	-2.361	transmembrane receptor
<b>GIHCG</b>	GIHCG inhibitor of miR-200b/200a/429 expression	0.00236	0.856	other
<b>GINS1</b>	GINS complex subunit 1	0.0107	1.779	other
<b>GJB2</b>	gap junction protein beta 2	0.0167	-0.915	transporter
<b>GJC1</b>	gap junction protein gamma 1	0.00311	1.343	ion channel
<b>GLMP</b>	glycosylated lysosomal membrane protein	0.0192	0.816	transcription regulator
<b>GLS2</b>	glutaminase 2	0.0153	-2.629	enzyme
<b>GLT1D1</b>	glycosyltransferase 1 domain containing 1	0.0261	-0.902	enzyme
<b>GLYAT</b>	glycine-N-acyltransferase	0.00927	-2.097	enzyme
<b>GLYATL1</b>	glycine-N-acyltransferase like 1	0.00349	-2.11	other
<b>GMNN</b>	geminin DNA replication inhibitor	0.00594	0.769	transcription regulator
<b>GNA14</b>	G protein subunit alpha 14	0.00186	-1.664	enzyme
<b>GNAL</b>	G protein subunit alpha L	0.00932	0.809	enzyme
<b>GNAZ</b>	G protein subunit alpha z	0.000545	0.917	enzyme
<b>GNE</b>	glucosamine (UDP-N-acetyl)-2-epimerase/N-acetylmannosamine kinase	0.0485	-0.831	kinase
<b>GNMT</b>	glycine N-methyltransferase	0.00524	-1.789	enzyme
<b>GOLPH3L</b>	golgi phosphoprotein 3 like	0.0163	0.855	other

<b>GORASP2</b>	golgi reassembly stacking protein 2	0.013	0.744	other
<b>GOT1</b>	glutamic-oxaloacetic transaminase 1	0.0122	-0.827	enzyme
<b>GPC3</b>	glypican 3	0.00291	2.426	other
<b>GPM6A</b>	glycoprotein M6A	0.014	-2.751	ion channel
<b>GPR158</b>	G protein-coupled receptor 158	0.00107	1.496	G-protein coupled receptor
<b>GPR182</b>	G protein-coupled receptor 182	0.000248	-1.48	G-protein coupled receptor
<b>GPRASP1</b>	G protein-coupled receptor associated sorting protein 1	0.0151	-0.724	transporter
<b>GPSM2</b>	G protein signaling modulator 2	0.00198	1.371	other
<b>GPT2</b>	glutamic-pyruvic transaminase 2	0.0418	-1.014	enzyme
<b>GRAMD1C</b>	GRAM domain containing 1C	0.00902	-1.515	other
<b>GREM2</b>	gremlin 2, DAN family BMP antagonist	0.0121	-1.653	other
<b>GRHPR</b>	glyoxylate and hydroxypyruvate reductase	0.0373	-0.787	enzyme
<b>GSTA3</b>	glutathione S-transferase alpha 3	0.0414	-1.032	enzyme
<b>GSTA4</b>	glutathione S-transferase alpha 4	0.0247	0.928	enzyme
<b>GSTZ1</b>	glutathione S-transferase zeta 1	0.0052	-1.471	enzyme
<b>GTF2IRD1</b>	GTF2I repeat domain containing 1	0.021	0.867	transcription regulator
<b>GTPBP2</b>	GTP binding protein 2	0.0436	0.811	enzyme
<b>GTSE1</b>	G2 and S-phase expressed 1	0.00532	1.337	other
<b>GUCY1A1</b>	guanylate cyclase 1 soluble subunit alpha 1	0.0279	-1.005	enzyme
<b>GYS2</b>	glycogen synthase 2	0.00155	-1.453	enzyme
<b>H2AC17</b>	H2A clustered histone 17	0.00235	0.711	other
<b>H2AX</b>	H2A.X variant histone	0.00948	0.95	transcription regulator
<b>H2BC7</b>	H2B clustered histone 7	0.00862	0.872	other
<b>H2BC21</b>	H2B clustered histone 21	0.0188	0.764	other
<b>H3C10</b>	H3 clustered histone 10	0.000655	1.191	other
<b>HAO</b>	3-hydroxyanthranilate 3,4-dioxygenase	0.016	-1.062	enzyme
<b>HABP2</b>	hyaluronan binding protein 2	0.012	-1.7	peptidase
<b>HAGLR</b>	HOXD antisense growth-associated long non-coding RNA	0.0134	0.789	other
<b>HAL</b>	histidine ammonia-lyase	0.00543	-0.934	enzyme
<b>HAMP</b>	hepcidin antimicrobial peptide	0.013	-3.657	other
<b>HAND2-AS1</b>	HAND2 antisense RNA 1	0.000234	-1.727	other
<b>HAO1</b>	hydroxyacid oxidase 1	0.0335	-0.865	enzyme
<b>HAO2</b>	hydroxyacid oxidase 2	0.00174	-1.781	enzyme
<b>HBA1/HBA2</b>	hemoglobin subunit alpha 2	0.00903	-1.959	transporter
<b>HBB</b>	hemoglobin subunit beta	0.0176	-1.747	transporter
<b>HBD</b>	hemoglobin subunit delta	0.00202	-1.142	transporter
<b>HBG1</b>	hemoglobin subunit gamma 1	0.000516	-1.538	other
<b>HDAC11</b>	histone deacetylase 11	0.0117	0.75	transcription regulator
<b>HELLS</b>	helicase, lymphoid specific	0.0205	1.298	enzyme

<b>HGF</b>	hepatocyte growth factor	0.00501	-2.419	growth factor
<b>HGFAC</b>	HGF activator	0.00739	-2.87	peptidase
<b>HHAT</b>	hedgehog acyltransferase	0.00716	0.701	enzyme
<b>HHIP</b>	hedgehog interacting protein	0.00239	-3.417	other
<b>HHIP-AS1</b>	HHIP antisense RNA 1	0.00419	-0.982	other
<b>HJURP</b>	Holliday junction recognition protein	0.000129	1.468	other
<b>HK1</b>	hexokinase 1	0.0203	-1.24	kinase
<b>HK3</b>	hexokinase 3	0.000941	-1.321	kinase
<b>HMGA1</b>	high mobility group AT-hook 1	0.0102	0.887	transcription regulator
<b>HMGB3</b>	high mobility group box 3	0.0208	1.041	other
<b>HMGCL</b>	3-hydroxy-3-methylglutaryl-CoA lyase	0.0272	-0.731	enzyme
<b>HMOX1</b>	heme oxygenase 1	0.0131	-1.073	enzyme
<b>HOOK1</b>	hook microtubule tethering protein 1	0.00921	-0.772	other
<b>HOXA3</b>	homeobox A3	0.00651	0.8	transcription regulator
<b>HOXA13</b>	homeobox A13	0.00616	1.481	transcription regulator
<b>HPD</b>	4-hydroxyphenylpyruvate dioxygenase	0.02	-0.907	enzyme
<b>HPGD</b>	15-hydroxyprostaglandin dehydrogenase	0.033	-1.502	enzyme
<b>HPS5</b>	HPS5 biogenesis of lysosomal organelles complex 2 subunit 2	0.0179	-0.8	other
<b>HRG</b>	histidine rich glycoprotein	0.0101	-1.434	other
<b>HSD17B2</b>	hydroxysteroid 17-beta dehydrogenase 2	0.00737	-1.452	enzyme
<b>HSD17B6</b>	hydroxysteroid 17-beta dehydrogenase 6	0.0388	-0.907	enzyme
<b>HSPB1</b>	heat shock protein family B (small) member 1	0.0228	0.734	other
<b>ID1</b>	inhibitor of DNA binding 1, HLH protein	0.00725	-1.492	transcription regulator
<b>ID4</b>	inhibitor of DNA binding 4, HLH protein	0.00341	-0.791	transcription regulator
<b>ID11</b>	isopentenyl-diphosphate delta isomerase 1	0.0204	0.747	enzyme
<b>IDO2</b>	indoleamine 2,3-dioxygenase 2	0.00197	-2.457	enzyme
<b>IGF1</b>	insulin like growth factor 1	0.000155	-1.38	growth factor
<b>IGF2BP1</b>	insulin like growth factor 2 mRNA binding protein 1	0.00511	0.789	translation regulator
<b>IGFALS</b>	insulin like growth factor binding protein acid labile subunit	0.0322	-2.007	other
<b>IGFBP3</b>	insulin like growth factor binding protein 3	0.015	-1.457	other
<b>IGHG3</b>	immunoglobulin heavy constant gamma 3 (G3m marker)	0.0231	-1.319	other
<b>IGHM</b>	immunoglobulin heavy constant mu	0.0133	-2.029	transmembrane receptor
<b>IGLC1</b>	immunoglobulin lambda constant 1	0.000346	-1.011	other
<b>IGLJ3</b>	immunoglobulin lambda joining 3	0.0252	-1.524	other
<b>IL10</b>	interleukin 10	0.00423	-0.706	cytokine
<b>IL33</b>	interleukin 33	0.00335	-1.539	cytokine
<b>IL13RA2</b>	interleukin 13 receptor subunit alpha 2	0.00868	-2.356	transmembrane receptor

<b>IL18R1</b>	interleukin 18 receptor 1	0.00177	-1.104	transmembrane receptor
<b>IL1RAP</b>	interleukin 1 receptor accessory protein	0.0141	-2.194	transmembrane receptor
<b>IL1RL1</b>	interleukin 1 receptor like 1	0.00333	-1.293	transmembrane receptor
<b>INMT</b>	indolethylamine N-methyltransferase	0.00184	-1.473	enzyme
<b>IPO9</b>	importin 9	0.00266	0.9	transporter
<b>IQGAP3</b>	IQ motif containing GTPase activating protein 3	0.0169	0.941	other
<b>IRF8</b>	interferon regulatory factor 8	0.0147	-0.823	transcription regulator
<b>ITGA6</b>	integrin subunit alpha 6	0.0102	0.71	transmembrane receptor
<b>ITGA9</b>	integrin subunit alpha 9	0.0143	-1.541	other
<b>ITGAD</b>	integrin subunit alpha D	0.000948	-0.709	other
<b>ITLN1</b>	intelectin 1	0.000215	-1.437	other
<b>IVD</b>	isovaleryl-CoA dehydrogenase	0.0284	-0.819	enzyme
<b>JCAD</b>	junctional cadherin 5 associated	0.00751	1.178	other
<b>JCHAIN</b>	joining chain of multimeric IgA and IgM	0.0087	-1.959	other
<b>JUN</b>	Jun proto-oncogene, AP-1 transcription factor subunit	0.00716	-0.717	transcription regulator
<b>KALRN</b>	kalirin RhoGEF kinase	0.0174	-0.864	kinase
<b>KANK4</b>	KN motif and ankyrin repeat domains 4	0.034	-1.235	other
<b>KAZN</b>	kazrin, periplakin interacting protein	0.00136	-1.185	other
<b>KBTBD11</b>	kelch repeat and BTB domain containing 11	0.0135	-2.006	other
<b>KCND3</b>	potassium voltage-gated channel subfamily D member 3	0.015	-1.775	ion channel
<b>KCNN2</b>	potassium calcium-activated channel subfamily N member 2	0.0141	-1.954	ion channel
<b>KCNN3</b>	potassium calcium-activated channel subfamily N member 3	0.00136	0.813	ion channel
<b>KDM8</b>	lysine demethylase 8	0.0123	-1.856	enzyme
<b>KDM5B</b>	lysine demethylase 5B	0.0297	0.81	transcription regulator
<b>KIAA0040</b>	KIAA0040	0.0278	-0.724	other
<b>KIAA1841</b>	KIAA1841	0.00357	0.772	other
<b>KIF11</b>	kinesin family member 11	0.00313	1.07	other
<b>KIF14</b>	kinesin family member 14	0.000821	1.498	enzyme
<b>KIF15</b>	kinesin family member 15	0.00177	0.91	other
<b>KIF23</b>	kinesin family member 23	0.000199	1.04	other
<b>KIF18A</b>	kinesin family member 18A	0.00162	0.825	enzyme
<b>KIF20A</b>	kinesin family member 20A	0.00343	1.617	other
<b>KIF2C</b>	kinesin family member 2C	0.000865	1.198	other
<b>KIF4A</b>	kinesin family member 4A	0.000709	1.747	other
<b>KLF4</b>	Kruppel like factor 4	0.0134	-0.937	transcription regulator
<b>KLHL2</b>	kelch like family member 2	0.0112	-0.724	other
<b>KLHL15</b>	kelch like family member 15	0.0439	-0.731	other

<b>KLK4</b>	kallikrein related peptidase 4	0.00645	-0.759	peptidase
<b>KLKB1</b>	kallikrein B1	0.00798	-1.465	peptidase
<b>KLRB1</b>	killer cell lectin like receptor B1	0.0197	-0.711	transmembrane receptor
<b>KLRF1</b>	killer cell lectin like receptor F1	0.000597	-1.233	transmembrane receptor
<b>KMO</b>	kynurenine 3-monooxygenase	0.00616	-2.534	enzyme
<b>KNG1</b>	kininogen 1	0.00802	-0.862	other
<b>KNL1</b>	kinetochore scaffold 1	0.044	0.886	other
<b>KNTC1</b>	kinetochore associated 1	0.0145	0.801	other
<b>KRTCAP3</b>	keratinocyte associated protein 3	0.0107	-0.821	other
<b>KYNU</b>	kynureninase	0.00482	-0.812	enzyme
<b>LAMC1</b>	laminin subunit gamma 1	0.00347	0.793	other
<b>LAPTM4B</b>	lysosomal protein transmembrane 4 beta	0.00937	1.425	other
<b>LARP1B</b>	La ribonucleoprotein domain family member 1B	0.00296	-0.788	other
<b>LCAT</b>	lecithin-cholesterol acyltransferase	0.00107	-1.949	enzyme
<b>LECT2</b>	leukocyte cell derived chemotaxin 2	0.036	-1.595	other
<b>LEF1</b>	lymphoid enhancer binding factor 1	0.0407	1.341	transcription regulator
<b>LEPR</b>	leptin receptor	0.0202	-1.455	transmembrane receptor
<b>LERFS</b>	lncRNA negative regulator of fibroblast-like synoviocyte migration, SYNCRIP interacting	0.00873	1.474	other
<b>LHX2</b>	LIM homeobox 2	0.00231	-1.435	transcription regulator
<b>LIFR</b>	LIF receptor subunit alpha	0.000169	-1.556	transmembrane receptor
<b>LILRA3</b>	leukocyte immunoglobulin like receptor A3	0.00855	-0.852	other
<b>LILRB5</b>	leukocyte immunoglobulin like receptor B5	0.000584	-1.028	transmembrane receptor
<b>LINC00421</b>	long intergenic non-protein coding RNA 421	0.00429	-0.829	other
<b>LINC01018</b>	long intergenic non-protein coding RNA 1018	0.041	-1.492	other
<b>LINC01093</b>	long intergenic non-protein coding RNA 1093	0.00508	-3.834	other
<b>LINC01138</b>	long intergenic non-protein coding RNA 1138	0.0127	0.752	other
<b>LINC01482</b>	long intergenic non-protein coding RNA 1482	0.000177	-1.535	other
<b>LINC01831</b>	long intergenic non-protein coding RNA 1831	0.0295	-1.393	other
<b>LINC02806</b>	long intergenic non-protein coding RNA 2806	0.0127	0.78	other
<b>LIPC</b>	lipase C, hepatic type	0.0372	-0.822	enzyme
<b>LIPG</b>	lipase G, endothelial type	0.0309	-1.091	enzyme
<b>LOC155060</b>	AI894139 pseudogene	0.00804	0.71	other
<b>LOC157273</b>	uncharacterized LOC157273	0.0371	-0.832	other
<b>LOC100499489</b>	uncharacterized LOC100499489	0.00617	0.701	other



<b>LOC101928505</b>	uncharacterized LOC101928505	0.0211	-0.731	other
<b>LOC102723701</b>	uncharacterized LOC102723701	0.00669	-0.709	other
<b>LONP2</b>	lon peptidase 2, peroxisomal	0.00167	-0.991	peptidase
<b>LOXL2</b>	lysyl oxidase like 2	0.0152	0.981	enzyme
<b>LPA</b>	lipoprotein(a)	0.000748	-2.002	other
<b>LPAL2</b>	lipoprotein(a) like 2, pseudogene	0.0106	-1.329	other
<b>LPL</b>	lipoprotein lipase	0.0054	0.715	enzyme
<b>LRAT</b>	lecithin retinol acyltransferase	0.00622	-1.082	enzyme
<b>LRP11</b>	LDL receptor related protein 11	0.00491	0.872	other
<b>LRRC1</b>	leucine rich repeat containing 1	0.0156	1.717	other
<b>LRRN3</b>	leucine rich repeat neuronal 3	0.00328	-0.849	other
<b>LTBP4</b>	latent transforming growth factor beta binding protein 4	0.00146	-0.828	growth factor
<b>LUM</b>	lumican	0.00458	-1.031	other
<b>LURAP1L</b>	leucine rich adaptor protein 1 like	0.0187	-0.92	other
<b>LY6E</b>	lymphocyte antigen 6 family member E	0.00923	-2.089	other
<b>LYVE1</b>	lymphatic vessel endothelial hyaluronan receptor 1	0.0139	-2.275	transmembrane receptor
<b>MACROH2A1</b>	macroH2A.1 histone	0.0146	0.815	other
<b>MAD2L1</b>	mitotic arrest deficient 2 like 1	0.000293	1.168	other
<b>MAGEA3/MAGEA6</b>	MAGE family member A6	0.0388	1.059	other
<b>MAN1C1</b>	mannosidase alpha class 1C member 1	0.0147	-1.76	enzyme
<b>MAP3K9</b>	mitogen-activated protein kinase kinase kinase 9	0.04	0.727	kinase
<b>MAPK8IP2</b>	mitogen-activated protein kinase 8 interacting protein 2	0.0118	0.793	other
<b>MARCO</b>	macrophage receptor with collagenous structure	0.00204	-3.28	transmembrane receptor
<b>MASP1</b>	mannan binding lectin serine peptidase 1	0.016	-1.882	peptidase
<b>MASP2</b>	mannan binding lectin serine peptidase 2	0.035	-1.347	peptidase
<b>MBL2</b>	mannose binding lectin 2	0.000114	-1.41	other
<b>MCC</b>	MCC regulator of WNT signaling pathway	0.0238	-1.276	other
<b>MCL1</b>	MCL1 apoptosis regulator, BCL2 family member	0.00666	-0.771	transporter
<b>MCM2</b>	minichromosome maintenance complex component 2	0.0185	1.023	enzyme
<b>MCM3</b>	minichromosome maintenance complex component 3	0.00809	0.949	enzyme
<b>MCM4</b>	minichromosome maintenance complex component 4	0.0423	0.871	enzyme
<b>MCM6</b>	minichromosome maintenance complex component 6	0.00531	0.92	enzyme
<b>MCM8</b>	minichromosome maintenance 8 homologous recombination repair factor	0.00516	1.088	enzyme
<b>MCM10</b>	minichromosome maintenance 10 replication initiation factor	0.0124	0.859	other
<b>MDK</b>	midkine	0.0167	1.317	growth factor
<b>MECOM</b>	MDS1 and EVI1 complex locus	0.0125	0.828	transcription regulator

<b>MELK</b>	maternal embryonic leucine zipper kinase	0.000789	1.26	kinase
<b>MFAP3</b>	microfibril associated protein 3	0.00874	0.778	other
<b>MFAP4</b>	microfibril associated protein 4	0.00334	-1.358	other
<b>MFAP3L</b>	microfibril associated protein 3 like	0.0259	-1.939	other
<b>MFSD2A</b>	major facilitator superfamily domain containing 2A	0.00707	-2.462	transporter
<b>MGAT4B</b>	alpha-1,3-mannosyl-glycoprotein 4-beta-N-acetylglucosaminyltransferase B	0.0189	0.74	enzyme
<b>MGLL</b>	monoglyceride lipase	0.00729	-0.845	enzyme
<b>MIB1</b>	mindbomb E3 ubiquitin protein ligase 1	0.00919	0.837	enzyme
<b>MIR22HG</b>	MIR22 host gene	0.012	-0.708	other
<b>MIR99AHG</b>	mir-99a-let-7c cluster host gene	0.00393	-0.753	other
<b>MKI67</b>	marker of proliferation Ki-67	0.000389	0.842	other
<b>MMAA</b>	metabolism of cobalamin associated A	0.00728	-0.885	enzyme
<b>MMP12</b>	matrix metalloproteinase 12	0.0241	0.916	peptidase
<b>MMUT</b>	methylmalonyl-CoA mutase	0.006	-0.801	enzyme
<b>MND1</b>	meiotic nuclear divisions 1	0.00736	0.886	other
<b>MOGAT2</b>	monoacylglycerol O-acyltransferase 2	0.00986	-1.061	enzyme
<b>MORC2</b>	MORC family CW-type zinc finger 2	0.00755	0.94	enzyme
<b>MPC1</b>	mitochondrial pyruvate carrier 1	0.013	-1.238	other
<b>MPDZ</b>	multiple PDZ domain crumbs cell polarity complex component	0.0288	-0.826	other
<b>MPEG1</b>	macrophage expressed 1	0.00316	-1.029	other
<b>MPZL1</b>	myelin protein zero like 1	0.0464	0.86	other
<b>MRAP2</b>	melanocortin 2 receptor accessory protein 2	0.000592	0.858	other
<b>MRC1</b>	mannose receptor C-type 1	0.0427	-1.255	transmembrane receptor
<b>MRO</b>	maestro	0.00219	-1.971	other
<b>MS4A7</b>	membrane spanning 4-domains A7	0.000622	-0.928	other
<b>MS4A6A</b>	membrane spanning 4-domains A6A	0.0126	-1.604	other
<b>MSH2</b>	mutS homolog 2	0.0242	0.89	enzyme
<b>MSH5</b>	mutS homolog 5	0.0462	0.925	enzyme
<b>MSTO1</b>	misato mitochondrial distribution and morphology regulator 1	0.00184	0.935	other
<b>MT1E</b>	metallothionein 1E	0.0072	-2.775	other
<b>MT1F</b>	metallothionein 1F	0.0269	-2.809	other
<b>MT1G</b>	metallothionein 1G	0.0129	-3.027	other
<b>MT1H</b>	metallothionein 1H	0.0136	-2.789	other
<b>MT1M</b>	metallothionein 1M	0.0216	-3.508	other
<b>MT1X</b>	metallothionein 1X	0.0101	-1.817	other
<b>MT2A</b>	metallothionein 2A	0.0195	-1.279	other
<b>MTFR2</b>	mitochondrial fission regulator 2	0.00111	0.968	other
<b>MTHFD1</b>	methylenetetrahydrofolate dehydrogenase, cyclohydrolase and formyltetrahydrofolate synthetase 1	0.0339	-1.037	enzyme
<b>MTMR11</b>	myotubularin related protein 11	0.0459	1.014	other
<b>MUC13</b>	mucin 13, cell surface associated	0.0161	1.281	other

<b>MXRA5</b>	matrix remodeling associated 5	0.00654	-0.83	other
<b>MYCT1</b>	MYC target 1	0.0167	-0.921	other
<b>MYLK-AS1</b>	MYLK antisense RNA 1	0.0109	1.127	other
<b>MYO1F</b>	myosin IF	0.00131	-0.815	other
<b>MYO5C</b>	myosin VC	0.0213	0.741	other
<b>MZT1</b>	mitotic spindle organizing protein 1	0.0276	0.716	other
<b>N4BP2L1</b>	NEDD4 binding protein 2 like 1	0.00288	-1.069	other
<b>NAA40</b>	N(alpha)-acetyltransferase 40, NatD catalytic subunit	0.0223	0.951	other
<b>NAAA</b>	N-acylethanolamine acid amidase	0.0131	-0.874	enzyme
<b>NAMPT</b>	nicotinamide phosphoribosyltransferase	0.0193	-1.178	cytokine
<b>NANOS1</b>	nanos C2HC-type zinc finger 1	0.000152	1.706	translation regulator
<b>NAP1L3</b>	nucleosome assembly protein 1 like 3	0.0163	-1.055	other
<b>NAPSB</b>	napsin B aspartic peptidase, pseudogene	0.00344	-1.017	other
<b>NAT2</b>	N-acetyltransferase 2	0.0132	-2.696	enzyme
<b>NAT8</b>	N-acetyltransferase 8 (putative)	0.0235	-1.238	transcription regulator
<b>NAT14</b>	N-acetyltransferase 14 (putative)	0.00139	0.87	other
<b>NAV1</b>	neuron navigator 1	0.00849	0.795	enzyme
<b>NCALD</b>	neurocalcin delta	0.0234	1.069	other
<b>NCAPH</b>	non-SMC condensin I complex subunit H	0.00104	0.85	other
<b>NCKAP1L</b>	NCK associated protein 1 like	0.00328	-0.85	other
<b>NCOA2</b>	nuclear receptor coactivator 2	0.0277	0.72	transcription regulator
<b>NGOR1</b>	nuclear receptor corepressor 1	0.00656	-0.759	transcription regulator
<b>NDC80</b>	NDC80 kinetochore complex component	0.0036	1.649	other
<b>NDRG2</b>	NDRG family member 2	0.012	-1.102	other
<b>NDRG3</b>	NDRG family member 3	0.00704	0.811	other
<b>NEAT1</b>	nuclear paraspeckle assembly transcript 1	0.0131	-1.014	other
<b>NEB</b>	nebulin	0.0079	1.103	other
<b>NEK2</b>	NIMA related kinase 2	0.00227	2.121	kinase
<b>NEU1</b>	neuraminidase 1	0.0193	0.954	enzyme
<b>NFAM1</b>	NFAT activating protein with ITAM motif 1	0.000162	-1	transmembrane receptor
<b>NFKBIZ</b>	NFKB inhibitor zeta	0.0259	-0.748	transcription regulator
<b>NFYA</b>	nuclear transcription factor Y subunit alpha	0.0454	0.718	transcription regulator
<b>NGFR</b>	nerve growth factor receptor	0.00525	-1.318	transmembrane receptor
<b>NMRAL2P</b>	NmrA like redox sensor 2, pseudogene	0.00118	1.768	other
<b>NMRK1</b>	nicotinamide riboside kinase 1	0.0303	-0.823	kinase
<b>NNMT</b>	nicotinamide N-methyltransferase	0.00234	-1.159	enzyme
<b>NOL4L</b>	nucleolar protein 4 like	0.0119	0.797	other
<b>NOSTRIN</b>	nitric oxide synthase trafficking	0.0211	-0.748	transcription regulator

<b>NOTCH3</b>	notch receptor 3	0.022	0.92	transcription regulator
<b>NPAS2</b>	neuronal PAS domain protein 2	0.00997	1.109	transcription regulator
<b>NPY1R</b>	neuropeptide Y receptor Y1	0.00011	-1.356	G-protein coupled receptor
<b>NR2C2AP</b>	nuclear receptor 2C2 associated protein	0.00331	0.745	other
<b>NR3C2</b>	nuclear receptor subfamily 3 group C member 2	0.0121	-0.875	ligand-dependent nuclear receptor
<b>NSD2</b>	nuclear receptor binding SET domain protein 2	0.00583	0.921	enzyme
<b>NSMCE2</b>	NSE2 (MMS21) homolog, SMC5-SMC6 complex SUMO ligase	0.00938	0.744	enzyme
<b>NT5DC2</b>	5'-nucleotidase domain containing 2	0.00241	0.715	other
<b>NTF3</b>	neurotrophin 3	0.0134	-1.217	growth factor
<b>NUDT6</b>	nudix hydrolase 6	0.043	-0.719	enzyme
<b>NUF2</b>	NUF2 component of NDC80 kinetochore complex	0.000187	1.855	other
<b>NUP62</b>	nucleoporin 62	0.0149	0.747	transporter
<b>NUSAP1</b>	nucleolar and spindle associated protein 1	0.0267	1.707	other
<b>OGDHL</b>	oxoglutarate dehydrogenase like	0.018	-0.816	enzyme
<b>OIP5</b>	Opa interacting protein 5	0.0117	0.92	other
<b>OIT3</b>	oncoprotein induced transcript 3	0.00674	-3.575	other
<b>OLA1</b>	Obg like ATPase 1	0.00602	1.026	enzyme
<b>OLFML3</b>	olfactomedin like 3	0.0304	-1.747	other
<b>OLFML2A</b>	olfactomedin like 2A	0.00539	0.982	other
<b>OLFML2B</b>	olfactomedin like 2B	0.0291	0.725	other
<b>OSBPL3</b>	oxysterol binding protein like 3	0.0265	0.837	other
<b>OTC</b>	ornithine carbamoyltransferase	0.0211	-1.29	enzyme
<b>OVOS2</b>	alpha-2-macroglobulin like 1 pseudogene	0.00116	1.381	other
<b>P2RY12</b>	purinergic receptor P2Y12	0.00432	-0.856	G-protein coupled receptor
<b>P2RY13</b>	purinergic receptor P2Y13	0.00526	-1.193	G-protein coupled receptor
<b>P3H2</b>	prolyl 3-hydroxylase 2	0.0129	-1.058	enzyme
<b>P4HA2</b>	prolyl 4-hydroxylase subunit alpha 2	0.0148	0.892	transporter
<b>PAFAH1B3</b>	platelet activating factor acetylhydrolase 1b catalytic subunit 3	0.00941	0.806	enzyme
<b>PAGE4</b>	PAGE family member 4	0.0366	0.971	transcription regulator
<b>PALLD</b>	palladin, cytoskeletal associated protein	0.0228	0.992	other
<b>PALM2</b>	--	0.0108	-0.993	other
<b>PALM3</b>	paralemmin 3	0.00793	-1.285	other
<b>PAMR1</b>	peptidase domain containing associated with muscle regeneration 1	0.0208	-1.496	peptidase

<b>PANK1</b>	pantothenate kinase 1	0.02	-0.97	kinase
<b>PARPBP</b>	PARP1 binding protein	0.000176	0.735	other
<b>PBK</b>	PDZ binding kinase	0.00247	2.017	kinase
<b>PBLD</b>	phenazine biosynthesis like protein domain containing	0.0177	-1.104	enzyme
<b>PCDH9</b>	protocadherin 9	0.00336	-2.09	other
<b>PCK1</b>	phosphoenolpyruvate carboxykinase 1	0.00459	-1.297	kinase
<b>PCK2</b>	phosphoenolpyruvate carboxykinase 2, mitochondrial	0.0353	-0.842	kinase
<b>PCLAF</b>	PCNA clamp associated factor	0.0449	1.521	other
<b>PDE2A</b>	phosphodiesterase 2A	0.0252	-0.913	enzyme
<b>PDE7B</b>	phosphodiesterase 7B	0.0129	-1.469	enzyme
<b>PDGFRA</b>	platelet derived growth factor receptor alpha	0.000105	-1.49	kinase
<b>PDLIM5</b>	PDZ and LIM domain 5	0.0214	-0.74	other
<b>PEG10</b>	paternally expressed 10	0.00869	1.145	other
<b>PFKFB2</b>	6-phosphofructo-2-kinase/fructose-2,6-biphosphatase 2	0.0205	0.775	kinase
<b>PGLYRP2</b>	peptidoglycan recognition protein 2	0.00439	-2.186	transmembrane receptor
<b>PHGDH</b>	phosphoglycerate dehydrogenase	0.0365	-0.954	enzyme
<b>PHYHIPL</b>	phytanoyl-CoA 2-hydroxylase interacting protein like	0.00637	0.749	other
<b>PI15</b>	peptidase inhibitor 15	0.000211	0.789	other
<b>PIAS3</b>	protein inhibitor of activated STAT 3	0.00746	0.72	transcription regulator
<b>PIK3C2G</b>	phosphatidylinositol-4-phosphate 3-kinase catalytic subunit type 2 gamma	0.00808	-0.863	kinase
<b>PITPNM3</b>	PITPNM family member 3	0.000565	-1.096	enzyme
<b>PKD1</b>	polycystin 1, transient receptor potential channel interacting	0.0368	-1.008	ion channel
<b>PLA2G2A</b>	phospholipase A2 group IIA	0.0351	-2.037	enzyme
<b>PLAC8</b>	placenta associated 8	0.00358	-2.481	other
<b>PLCE1</b>	phospholipase C epsilon 1	0.0158	1.465	enzyme
<b>PLD1</b>	phospholipase D1	0.0285	-0.795	enzyme
<b>PLEK2</b>	pleckstrin 2	0.0317	-1.406	other
<b>PLG</b>	plasminogen	0.00513	-1.184	peptidase
<b>PLGLB1/PLGLB2</b>	plasminogen like B2	0.00287	-1.915	peptidase
<b>PLPP4</b>	phospholipid phosphatase 4	0.0044	-0.874	phosphatase
<b>PLSCR4</b>	phospholipid scramblase 4	0.0154	-1.164	enzyme
<b>PLVAP</b>	plasmalemma vesicle associated protein	0.0198	1.195	other
<b>PODXL</b>	podocalyxin like	0.0373	0.942	kinase
<b>POGK</b>	pogo transposable element derived with KRAB domain	0.0445	0.839	other
<b>PON1</b>	paraoxonase 1	0.00524	-1.966	phosphatase
<b>PON3</b>	paraoxonase 3	0.0212	-0.845	enzyme
<b>PPBP</b>	pro-platelet basic protein	0.0303	-1.799	cytokine
<b>PPID</b>	peptidylprolyl isomerase D	0.0412	-0.902	enzyme
<b>PPP1R1A</b>	protein phosphatase 1 regulatory inhibitor subunit 1A	0.0159	-0.84	phosphatase

<b>PRC1</b>	protein regulator of cytokinesis 1	0.00615	1.993	other
<b>PRELP</b>	proline and arginine rich end leucine rich repeat protein	0.0433	-0.838	other
<b>PRG4</b>	proteoglycan 4	0.0149	-1.692	other
<b>PRKAA2</b>	protein kinase AMP-activated catalytic subunit alpha 2	0.0224	1.602	kinase
<b>PRKAR2B</b>	protein kinase cAMP-dependent type II regulatory subunit beta	0.00177	-1.028	kinase
<b>PRKDC</b>	protein kinase, DNA-activated, catalytic subunit	0.00227	0.703	kinase
<b>PRODH2</b>	proline dehydrogenase 2	0.0334	-1.02	enzyme
<b>PROZ</b>	protein Z, vitamin K dependent plasma glycoprotein	0.025	-1.196	peptidase
<b>PRR11</b>	proline rich 11	0.0155	1.55	other
<b>PRR18</b>	proline rich 18	0.0351	-0.703	other
<b>PRR34-AS1</b>	PRR34 antisense RNA 1	0.0248	0.834	other
<b>PRRG4</b>	proline rich and Gla domain 4	0.0229	-0.868	other
<b>PRSS8</b>	serine protease 8	0.00794	-1.325	peptidase
<b>PRUNE1</b>	prune exopolyphosphatase 1	0.0107	0.95	enzyme
<b>PSAT1</b>	phosphoserine aminotransferase 1	0.0256	-1.568	enzyme
<b>PSMD4</b>	proteasome 26S subunit, non-ATPase 4	0.0483	0.951	other
<b>PTCRA</b>	pre T cell antigen receptor alpha	0.00383	-0.855	other
<b>PTGFRN</b>	prostaglandin F2 receptor inhibitor	0.00394	0.709	other
<b>PTGIS</b>	prostaglandin I2 synthase	0.0345	-1.494	enzyme
<b>PTH1R</b>	parathyroid hormone 1 receptor	0.0104	-1.336	G-protein coupled receptor
<b>PTPN13</b>	protein tyrosine phosphatase non-receptor type 13	0.00159	-0.877	phosphatase
<b>PTPRS</b>	protein tyrosine phosphatase receptor type S	0.0134	-0.998	phosphatase
<b>PTTG1</b>	PTTG1 regulator of sister chromatid separation, securin	0.00382	1.826	transcription regulator
<b>PUS10</b>	pseudouridine synthase 10	0.0169	-0.704	other
<b>PVALB</b>	parvalbumin	0.00223	-0.743	other
<b>PWWP3B</b>	PWWP domain containing 3B	0.000513	-1.694	other
<b>PXMP2</b>	peroxisomal membrane protein 2	0.0338	-1.028	other
<b>PYCR3</b>	pyrroline-5-carboxylate reductase 3	0.00528	0.859	enzyme
<b>PYROXD2</b>	pyridine nucleotide-disulphide oxidoreductase domain 2	0.0094	-1.032	other
<b>PZP</b>	PZP alpha-2-macroglobulin like	0.00188	-1.464	other
<b>RAB11FIP4</b>	RAB11 family interacting protein 4	0.0122	0.966	other
<b>RAB3B</b>	RAB3B, member RAS oncogene family	0.0058	1.378	enzyme
<b>RACGAP1</b>	Rac GTPase activating protein 1	0.0206	1.877	transporter
<b>RAD51AP1</b>	RAD51 associated protein 1	0.0163	1.022	other
<b>RAD54B</b>	RAD54 homolog B	0.0058	0.77	enzyme
<b>RAMP3</b>	receptor activity modifying protein 3	0.0063	-0.855	other
<b>RASGRP2</b>	RAS guanyl releasing protein 2	0.0306	-0.997	other
<b>RASSF4</b>	Ras association domain family member 4	0.0281	0.744	other

<b>RBM24</b>	RNA binding motif protein 24	0.00589	1.69	other
<b>RBM12B</b>	RNA binding motif protein 12B	0.0439	0.715	other
<b>RBMS3</b>	RNA binding motif single stranded interacting protein 3	0.000312	-0.896	other
<b>RBP5</b>	retinol binding protein 5	0.0275	-1.028	transporter
<b>RCAN1</b>	regulator of calcineurin 1	0.0085	-1.478	transcription regulator
<b>RCL1</b>	RNA terminal phosphate cyclase like 1	0.0373	-1.166	enzyme
<b>RDH16</b>	retinol dehydrogenase 16	0.01	-2.412	enzyme
<b>RELN</b>	reelin	0.0472	-0.736	peptidase
<b>RET</b>	ret proto-oncogene	0.0299	-0.796	kinase
<b>RETREG1</b>	reticulophagy regulator 1	0.03	-2.216	other
<b>RFC4</b>	replication factor C subunit 4	0.0287	0.887	other
<b>RGN</b>	regucalcin	0.0106	-0.821	enzyme
<b>RHNO1</b>	RAD9-HUS1-RAD1 interacting nuclear orphan 1	0.0297	0.762	other
<b>RIDA</b>	reactive intermediate imine deaminase A homolog	0.00226	-0.77	enzyme
<b>RIPOR3</b>	RIPOR family member 3	0.0086	-1.894	other
<b>RMI2</b>	RecQ mediated genome instability 2	0.0396	0.736	other
<b>RNASEH2A</b>	ribonuclease H2 subunit A	0.0151	0.858	enzyme
<b>RND3</b>	Rho family GTPase 3	0.000645	-0.996	enzyme
<b>RNF43</b>	ring finger protein 43	0.0201	0.836	enzyme
<b>RNF125</b>	ring finger protein 125	0.0123	-1.211	enzyme
<b>RNF165</b>	ring finger protein 165	0.00564	-1.119	enzyme
<b>RNFT2</b>	ring finger protein, transmembrane 2	0.000658	0.886	other
<b>ROBO1</b>	roundabout guidance receptor 1	0.00357	1.206	transmembrane receptor
<b>RRAGD</b>	Ras related GTP binding D	0.0102	0.942	enzyme
<b>RSPO3</b>	R-spondin 3	0.000637	-2.664	kinase
<b>S100A8</b>	S100 calcium binding protein A8	0.00748	-1.397	other
<b>SAA4</b>	serum amyloid A4, constitutive	0.0172	-1.54	transporter
<b>SAC3D1</b>	SAC3 domain containing 1	0.0137	1.067	other
<b>SACS</b>	sacsin molecular chaperone	0.00836	0.79	other
<b>SAE1</b>	SUMO1 activating enzyme subunit 1	0.0125	0.88	enzyme
<b>SAMD5</b>	sterile alpha motif domain containing 5	0.0251	-1.26	other
<b>SAMD4A</b>	sterile alpha motif domain containing 4A	0.012	-0.969	translation regulator
<b>SAMSN1</b>	SAM domain, SH3 domain and nuclear localization signals 1	0.0105	-0.853	other
<b>SAPCD2</b>	suppressor APC domain containing 2	0.00595	0.733	other
<b>SARDH</b>	sarcosine dehydrogenase	0.0437	-0.876	enzyme
<b>SATB1</b>	SATB homeobox 1	0.0366	-0.73	transcription regulator
<b>SBNO1</b>	strawberry notch homolog 1	0.00743	0.749	enzyme
<b>SCARA5</b>	scavenger receptor class A member 5	0.00835	-1.417	transmembrane receptor
<b>SCD</b>	stearoyl-CoA desaturase	0.00971	0.706	enzyme
<b>SDHB</b>	succinate dehydrogenase complex iron sulfur subunit B	0.0116	-0.73	enzyme

<b>SDS</b>	serine dehydratase	0.00575	-1.2	enzyme
<b>SEC14L4</b>	SEC14 like lipid binding 4	0.0484	-0.808	transporter
<b>SERPINA4</b>	serpin family A member 4	0.00436	-1.153	other
<b>SERPINA10</b>	serpin family A member 10	0.0184	-0.714	other
<b>SERPINB9</b>	serpin family B member 9	0.00954	-0.909	other
<b>SESN3</b>	sestrin 3	0.0294	-1.122	other
<b>SESTD1</b>	SEC14 and spectrin domain containing 1	0.0217	0.951	other
<b>SETDB1</b>	SET domain bifurcated histone lysine methyltransferase 1	0.00526	0.788	enzyme
<b>SEZ6</b>	seizure related 6 homolog	0.0102	0.813	other
<b>SF3B4</b>	splicing factor 3b subunit 4	0.0113	0.963	other
<b>SFRP4</b>	secreted frizzled related protein 4	0.00737	1.05	transmembrane receptor
<b>SFRP5</b>	secreted frizzled related protein 5	0.00164	-1.132	transmembrane receptor
<b>SGO2</b>	shugoshin 2	0.00315	1.34	other
<b>SH2D1B</b>	SH2 domain containing 1B	0.0000629	-0.724	other
<b>SHBG</b>	sex hormone binding globulin	0.00631	-2.323	other
<b>SHC1</b>	SHC adaptor protein 1	0.0441	0.74	other
<b>SIGLEC1</b>	sialic acid binding Ig like lectin 1	0.00322	-0.915	other
<b>SIGLEC7</b>	sialic acid binding Ig like lectin 7	0.0000785	-0.784	transmembrane receptor
<b>SIGLEC11</b>	sialic acid binding Ig like lectin 11	0.00601	-1.109	other
<b>SKAP1</b>	src kinase associated phosphoprotein 1	0.0487	-1.052	kinase
<b>SLC10A1</b>	solute carrier family 10 member 1	0.0164	-2.092	transporter
<b>SLC17A1</b>	solute carrier family 17 member 1	0.033	-0.838	transporter
<b>SLC17A2</b>	solute carrier family 17 member 2	0.016	-1.47	transporter
<b>SLC19A3</b>	solute carrier family 19 member 3	0.0233	-0.986	transporter
<b>SLC1A1</b>	solute carrier family 1 member 1	0.0297	-1.198	transporter
<b>SLC1A4</b>	solute carrier family 1 member 4	0.0395	0.88	transporter
<b>SLC22A1</b>	solute carrier family 22 member 1	0.001	-2.631	transporter
<b>SLC25A18</b>	solute carrier family 25 member 18	0.0437	-0.788	transporter
<b>SLC25A47</b>	solute carrier family 25 member 47	0.000378	-2.613	other
<b>SLC26A2</b>	solute carrier family 26 member 2	0.031	1.001	transporter
<b>SLC27A2</b>	solute carrier family 27 member 2	0.011	-1.105	transporter
<b>SLC2A2</b>	solute carrier family 2 member 2	0.0348	-0.906	transporter
<b>SLC35D1</b>	solute carrier family 35 member D1	0.0177	-0.846	transporter
<b>SLC38A2</b>	solute carrier family 38 member 2	0.00834	-1.027	transporter
<b>SLC38A4</b>	solute carrier family 38 member 4	0.00329	-1.029	transporter
<b>SLC38A6</b>	solute carrier family 38 member 6	0.0196	0.731	transporter
<b>SLC39A5</b>	solute carrier family 39 member 5	0.0353	-0.75	transporter
<b>SLC41A2</b>	solute carrier family 41 member 2	0.0199	-1.122	transporter
<b>SLC46A3</b>	solute carrier family 46 member 3	0.0124	-1.045	other
<b>SLC4A4</b>	solute carrier family 4 member 4	0.0331	-0.802	transporter
<b>SLC51A</b>	solute carrier family 51 alpha subunit	0.0377	-0.724	transporter
<b>SLC5A1</b>	solute carrier family 5 member 1	0.000245	-0.872	transporter
<b>SLC6A12</b>	solute carrier family 6 member 12	0.0365	-0.799	transporter
<b>SLC7A2</b>	solute carrier family 7 member 2	0.0255	-0.953	transporter



<b>SLC7A11</b>	solute carrier family 7 member 11	0.0208	1.176	transporter
<b>SLC9A9</b>	solute carrier family 9 member A9	0.00547	-0.704	transporter
<b>SLC9B2</b>	solute carrier family 9 member B2	0.0352	-0.735	transporter
<b>SLCO1B1</b>	solute carrier organic anion transporter family member 1B1	0.0438	-1.031	transporter
<b>SLCO1B3</b>	solute carrier organic anion transporter family member 1B3	0.0156	-3.788	transporter
<b>SLCO4C1</b>	solute carrier organic anion transporter family member 4C1	0.0102	-1.068	transporter
<b>SLITRK6</b>	SLIT and NTRK like family member 6	0.00501	-1.04	other
<b>SMC2</b>	structural maintenance of chromosomes 2	0.00692	0.761	transporter
<b>SMC4</b>	structural maintenance of chromosomes 4	0.0333	0.801	transporter
<b>SMIM2-AS1</b>	SMIM2 antisense RNA 1	0.00955	-1.08	other
<b>SMPX</b>	small muscle protein X-linked	0.000794	1.185	other
<b>SMYD3</b>	SET and MYND domain containing 3	0.0228	0.919	enzyme
<b>SOCS2</b>	suppressor of cytokine signaling 2	0.011	-1.882	other
<b>SOCS7</b>	suppressor of cytokine signaling 7	0.0423	0.888	other
<b>SOCS2-AS1</b>	SOCS2 antisense RNA 1	0.0223	-0.903	other
<b>SPARCL1</b>	SPARC like 1	0.0327	0.759	other
<b>SPART</b>	spartin	0.0247	-1.361	other
<b>SPATA18</b>	spermatogenesis associated 18	0.000156	-0.802	other
<b>SPATC1L</b>	spermatogenesis and centriole associated 1 like	0.0029	0.804	other
<b>SPATS2</b>	spermatogenesis associated serine rich 2	0.00508	1.19	other
<b>SPDL1</b>	spindle apparatus coiled-coil protein 1	0.00368	1.15	other
<b>SPINK1</b>	serine peptidase inhibitor, Kazal type 1	0.0108	1.475	other
<b>SPP2</b>	secreted phosphoprotein 2	0.000593	-1.585	other
<b>SQSTM1</b>	sequestosome 1	0.0122	1.077	transcription regulator
<b>SRD5A1</b>	steroid 5 alpha-reductase 1	0.00447	-0.96	enzyme
<b>SRD5A2</b>	steroid 5 alpha-reductase 2	0.00284	-1.527	enzyme
<b>SRGN</b>	serglycin	0.0311	-0.749	other
<b>SRPX</b>	sushi repeat containing protein X-linked	0.0117	-2.329	other
<b>SSUH2</b>	ssu-2 homolog	0.00164	1.172	other
<b>SSX1</b>	SSX family member 1	0.0167	0.989	transcription regulator
<b>ST18</b>	ST18 C2H2C-type zinc finger transcription factor	0.000000162	-1.2	transcription regulator
<b>ST6GAL2</b>	ST6 beta-galactoside alpha-2,6-sialyltransferase 2	0.00104	-1.737	enzyme
<b>STAB1</b>	stabilin 1	0.0485	-0.755	transporter
<b>STAB2</b>	stabilin 2	0.000273	-3.604	transmembrane receptor
<b>STARD5</b>	StAR related lipid transfer domain containing 5	0.0138	-1.002	transporter
<b>STAU2</b>	staufen double-stranded RNA binding protein 2	0.00538	0.932	other
<b>STC1</b>	stanniocalcin 1	0.0144	0.853	kinase

<b>STEAP3</b>	STEAP3 metalloredutase	0.00452	-1.245	transporter
<b>STEAP4</b>	STEAP4 metalloredutase	0.00000113	-1.401	enzyme
<b>STIL</b>	STIL centriolar assembly protein	0.0018	1.041	other
<b>STK39</b>	serine/threonine kinase 39	0.0244	1.173	kinase
<b>STMN1</b>	stathmin 1	0.00483	0.904	other
<b>STXBP6</b>	syntaxin binding protein 6	0.000141	1.004	other
<b>SUCNR1</b>	succinate receptor 1	0.0205	-0.926	G-protein coupled receptor
<b>SUCO</b>	SUN domain containing ossification factor	0.0474	0.972	other
<b>SULT1A2</b>	sulfotransferase family 1A member 2	0.0179	-0.891	enzyme
<b>SULT1B1</b>	sulfotransferase family 1B member 1	0.0225	-1.498	enzyme
<b>SULT1E1</b>	sulfotransferase family 1E member 1	0.0377	-0.966	enzyme
<b>SUSD4</b>	sushi domain containing 4	0.02	0.848	other
<b>SYNPO2</b>	synaptopodin 2	0.00533	-0.893	other
<b>SYTL5</b>	synaptotagmin like 5	0.0178	-1.343	other
<b>TACSTD2</b>	tumor associated calcium signal transducer 2	0.009	-1.566	other
<b>TARBP1</b>	TAR (HIV-1) RNA binding protein 1	0.0424	0.707	transcription regulator
<b>TAT</b>	tyrosine aminotransferase	0.0077	-1.901	enzyme
<b>TBC1D31</b>	TBC1 domain family member 31	0.0159	0.974	other
<b>TBXA2R</b>	thromboxane A2 receptor	0.000196	-0.862	G-protein coupled receptor
<b>TCF12</b>	transcription factor 12	0.0217	-0.776	transcription regulator
<b>TCF19</b>	transcription factor 19	0.0103	0.873	transcription regulator
<b>TCF21</b>	transcription factor 21	0.00745	-0.826	transcription regulator
<b>TCIM</b>	transcriptional and immune response regulator	0.0111	-1.536	other
<b>TCTEX1D1</b>	Tctex1 domain containing 1	0.00254	-0.828	other
<b>TDGF1</b>	teratocarcinoma-derived growth factor 1	0.0135	0.736	growth factor
<b>TDO2</b>	tryptophan 2,3-dioxygenase	0.00461	-1.621	enzyme
<b>TDRKH</b>	tudor and KH domain containing	0.0149	1.067	other
<b>TENM1</b>	teneurin transmembrane protein 1	0.00648	-2.339	transmembrane receptor
<b>TERB2</b>	telomere repeat binding bouquet formation protein 2	0.0138	-0.861	other
<b>TEX37</b>	testis expressed 37	0.00419	-0.899	other
<b>TFF2</b>	trefoil factor 2	0.0318	-0.841	other
<b>TFPI2</b>	tissue factor pathway inhibitor 2	0.000037	-1.569	other
<b>TGM3</b>	transglutaminase 3	0.00647	0.785	enzyme
<b>THBD</b>	thrombomodulin	0.00286	-0.787	transmembrane receptor
<b>THBS1</b>	thrombospondin 1	0.0219	-1.496	other
<b>THBS4</b>	thrombospondin 4	0.000288	1.471	other
<b>THRSP</b>	thyroid hormone responsive	0.00108	-1.632	other

<b>THSD7A</b>	thrombospondin type 1 domain containing 7A	0.0302	0.745	other
<b>TIAM1</b>	T cell lymphoma invasion and metastasis 1	0.0135	-0.93	other
<b>TIGD1</b>	tigger transposable element derived 1	0.0287	0.734	other
<b>TIMD4</b>	T cell immunoglobulin and mucin domain containing 4	0.0000745	-2.315	other
<b>TJP2</b>	tight junction protein 2	0.0326	-0.749	kinase
<b>TK1</b>	thymidine kinase 1	0.000962	0.839	kinase
<b>TKT</b>	transketolase	0.0285	0.76	enzyme
<b>TLCD1</b>	TLC domain containing 1	0.0207	0.724	other
<b>TLCD4</b>	TLC domain containing 4	0.00653	-0.839	other
<b>TLR2</b>	toll like receptor 2	0.0122	-0.766	transmembrane receptor
<b>TLR3</b>	toll like receptor 3	0.0139	-0.976	transmembrane receptor
<b>TLR4</b>	toll like receptor 4	0.0000217	-0.898	transmembrane receptor
<b>TM6SF2</b>	transmembrane 6 superfamily member 2	0.0335	-1.256	other
<b>TMEM65</b>	transmembrane protein 65	0.0373	0.779	other
<b>TMEM98</b>	transmembrane protein 98	0.0194	1.127	other
<b>TMEM106C</b>	transmembrane protein 106C	0.014	0.807	other
<b>TMEM131L</b>	transmembrane 131 like	0.0422	-0.728	other
<b>TMEM167B</b>	transmembrane protein 167B	0.00575	0.735	other
<b>TMEM38B</b>	transmembrane protein 38B	0.0368	0.802	ion channel
<b>TMEM45A</b>	transmembrane protein 45A	0.00355	-1.017	other
<b>TMPRSS2</b>	transmembrane serine protease 2	0.00938	-0.738	peptidase
<b>TNFRSF19</b>	TNF receptor superfamily member 19	0.00219	0.736	transmembrane receptor
<b>TNFRSF11B</b>	TNF receptor superfamily member 11b	0.0411	-0.805	transmembrane receptor
<b>TNXA</b>	tenascin XA (pseudogene)	0.0273	-0.777	other
<b>TOMM40L</b>	translocase of outer mitochondrial membrane 40 like	0.0486	1.065	other
<b>TOP2A</b>	DNA topoisomerase II alpha	0.00116	1.922	enzyme
<b>TPR</b>	translocated promoter region, nuclear basket protein	0.00367	0.761	other
<b>TPX2</b>	TPX2 microtubule nucleation factor	0.00226	0.916	other
<b>TRAF5</b>	TNF receptor associated factor 5	0.0349	0.845	transporter
<b>TRIM16</b>	tripartite motif containing 16	0.0329	1.349	transcription regulator
<b>TRIO</b>	trio Rho guanine nucleotide exchange factor	0.0146	0.732	kinase
<b>TRIP13</b>	thyroid hormone receptor interactor 13	0.000665	1.392	transcription regulator
<b>TSKU</b>	tsukushi, small leucine rich proteoglycan	0.0314	-0.73	other
<b>TSLP</b>	thymic stromal lymphopoietin	0.0312	-0.985	cytokine
<b>TSPAN12</b>	tetraspanin 12	0.0424	-0.914	other
<b>TTC36</b>	tetratricopeptide repeat domain 36	0.0122	-2.566	other
<b>TTC39B</b>	tetratricopeptide repeat domain 39B	0.000866	-0.816	other

<b>TTK</b>	TTK protein kinase	0.00111	1.903	kinase
<b>TUBE1</b>	tubulin epsilon 1	0.0299	-1.464	other
<b>TUFT1</b>	tuftelin 1	0.024	1.237	other
<b>TXNRD1</b>	thioredoxin reductase 1	0.000174	1.082	enzyme
<b>UBAP2L</b>	ubiquitin associated protein 2 like	0.00288	0.751	other
<b>UBE2C</b>	ubiquitin conjugating enzyme E2 C	0.00122	1.752	enzyme
<b>UBE2S</b>	ubiquitin conjugating enzyme E2 S	0.0253	1.188	enzyme
<b>UBE2T</b>	ubiquitin conjugating enzyme E2 T	0.00504	1.883	enzyme
<b>UGT2B15</b>	UDP glucuronosyltransferase family 2 member B15	0.0471	-0.887	enzyme
<b>UGT3A1</b>	UDP glycosyltransferase family 3 member A1	0.00171	-0.979	enzyme
<b>UHRF1</b>	ubiquitin like with PHD and ring finger domains 1	0.00725	1.57	transcription regulator
<b>UPP2</b>	uridine phosphorylase 2	0.0248	-3.193	enzyme
<b>UROC1</b>	urocanate hydratase 1	0.00395	-0.715	enzyme
<b>USP2</b>	ubiquitin specific peptidase 2	0.0432	-0.842	peptidase
<b>USP12</b>	ubiquitin specific peptidase 12	0.00334	-0.756	peptidase
<b>USP45</b>	ubiquitin specific peptidase 45	0.00606	-0.835	peptidase
<b>UXS1</b>	UDP-glucuronate decarboxylase 1	0.0174	0.767	enzyme
<b>VIPR1</b>	vasoactive intestinal peptide receptor 1	0.00908	-1.533	C-protein coupled receptor
<b>VMO1</b>	vitelline membrane outer layer 1 homolog	0.000485	-1.143	other
<b>VNN1</b>	vanin 1	0.00396	-1.348	enzyme
<b>VPS45</b>	vacuolar protein sorting 45 homolog	0.0259	0.929	transporter
<b>VPS72</b>	vacuolar protein sorting 72 homolog	0.00262	0.873	transcription regulator
<b>VPS13B</b>	vacuolar protein sorting 13 homolog B	0.0235	0.76	transporter
<b>VSIG2</b>	V-set and immunoglobulin domain containing 2	0.00555	-0.728	other
<b>VSIG4</b>	V-set and immunoglobulin domain containing 4	0.0167	-1.062	other
<b>VWA8</b>	von Willebrand factor A domain containing 8	0.00472	-0.808	enzyme
<b>WASF1</b>	WASP family member 1	0.00801	0.744	other
<b>WDYHV1</b>	WDYHV motif containing 1	0.0395	0.925	enzyme
<b>WFDC1</b>	WAP four-disulfide core domain 1	0.0101	-1.427	other
<b>WHRN</b>	whirlin	0.000459	0.81	other
<b>XDH</b>	xanthine dehydrogenase	0.00942	-1.049	enzyme
<b>XK</b>	X-linked Kx blood group	0.0277	1.452	transporter
<b>XPO5</b>	exportin 5	0.00562	0.943	other
<b>ZBED8</b>	zinc finger BED-type containing 8	0.0249	0.852	other
<b>ZBTB12</b>	zinc finger and BTB domain containing 12	0.006	-0.754	transcription regulator
<b>ZEB1-AS1</b>	ZEB1 antisense RNA 1	0.00585	0.783	other
<b>ZFP1</b>	ZFP1 zinc finger protein	0.0379	-0.739	transcription regulator

<b>ZFPM2</b>	zinc finger protein, FOG family member 2	0.0247	-1.152	transcription regulator
<b>ZG16</b>	zymogen granule protein 16	0.0103	-1.918	other
<b>ZIC1</b>	Zic family member 1	0.000198	0.828	transcription regulator
<b>ZIC2</b>	Zic family member 2	0.00388	1.504	transcription regulator
<b>ZMIZ1</b>	zinc finger MIZ-type containing 1	0.0106	0.792	other
<b>ZMYND12</b>	zinc finger MYND-type containing 12	0.0271	-0.769	other
<b>ZNF330</b>	zinc finger protein 330	0.0208	-0.737	other
<b>ZNF347</b>	zinc finger protein 347	0.000359	-1.376	transcription regulator
<b>ZNF432</b>	zinc finger protein 432	0.005	1.058	transcription regulator
<b>ZNF623</b>	zinc finger protein 623	0.0249	0.846	transcription regulator
<b>ZSWIM5</b>	zinc finger SWIM-type containing 5	0.00349	1.072	other
<b>ZSWIM6</b>	zinc finger SWIM-type containing 6	0.00986	-0.778	other

Supplemental Table S2 Summary of 1,035 genes analyzed in Ingenuity Pathway Analysis. Analysis was restricted to genes that showed statistical significance ( $p < 0.05$ ) in both fixed and random effects models and had an absolute experimental log ratio greater than 0.7 between experimental (HCC) and control samples.

Top Disease and Function	P-Score	Focus Genes	Genes in Network
<b>Cell Cycle; Cellular Assembly and Organization; DNA Replication, Recombination and Repair</b>	46	33	BUB1, BUB1B, C4, C4BP, CENPA, CENPH, CENPK, CENPL, CENPM, CENPW, CNDP1, DSN1, ESR1, FCN2, FCN3, GGT5, HIST1H2BF, HJURP, HPS5, KNL1, LILRB5, MASP1, MASP2, MBL2, MND1, MPC1, NDC80, NUF2, OIP5, OVOS2, SLC1A4, TENM1, TUFT1, WHRN, XK
<b>Cancer; Cell Death and Survival; Organismal Injury and Abnormalities</b>	42	31	ANKS6, Ap1, AURKA, B9D1, BCKDHB, BOLA2/BOLA2B, CA5A, CBX5, CCT3, CDK1, CDKN2A, CEMIP, EPB41L5, estrogenreceptor, ETFRF1, EZH2, H2AFX, HIST1H2AM, HMGA1, KIF11, MCM2, MFAP4, MKI67, NAT2, NGFR, NT5DC2, PRKDC, Rnr, SETDB1, Smad2/3, TCF19, TK1, TMEM131L, TUBE1, ZSWIM5
<b>Cancer; Cell Cycle; Cellular Movement</b>	42	31	ATAD2, ATPase, BMP, BMP5, CCBE1, CEP55, CTH, DTL, ECT2, GORASP2, IGF2BP1,

			IL12 (family), IL18R1, IL1RAP, IPO9, KIF14, KIF23, LUM, MAP1LC3, MSH2, NAAA, NUP62, OLA1, PBLD, PLSCR4, RAD54B, SIGLEC1, STAU2, TEX37, TRAF5, TRIP13, VSIG2, VWA8, WDYHV1, XPO5
<b>Cell Morphology, Cellular Assembly and Organization, DNA Replication, Recombination, and Repair</b>	39	30	ACAA2, ARMC6, BCHE, C4BPA, CDCA3, CDCA8, CENPE, CENPF, Ciap, CRNDE, ENO3, Enolase, FOXM1, KALRN, KIF20A, KIF2C, KIF4A, LRAT, MAGEA3/MAGEA6, MZT1, NAV1, NEB, PRC1, RAS, RASGRP2, RASSF4, SESTD1, SGO2, SRD5A1, SRD5A2, Steroid 5 alpha-Reductase, TARBP1, TGM3, transglutaminase, TRIO
<b>Cancer; Organismal Injury and Abnormalities; Reproductive System Disease</b>	39	30	ANGPTL6, BMPER, Cysteine Protease, DPF3, EGLN, FNIP2, GCDH, GDF2, Granzyme B-Perforin-SRGN, GREM2, HMGCL, HOXA13, KIF15, LYVE1, MS4A7, MT1G, NOSTRIN, PCDH9, PDE7B, PLVAP, RNF125, RNF165, RRAGD, SERPINB9, SESN3, SLC7A2, Smad1/5/8, SPARCL1, SRGN, STC1, TPX2, TRIM16, Vegf, VSIG4, ZFP
<b>Cancer, Gastrointestinal Disease, Hepatic System Disease</b>	37	29	AKR1D1, ALDH, ALDH1A3, ALDH6A1, ALDH8A1, ANK3, CA2, COBLL1, CYP39A1, ENAH, ESM1, FOS, GBA, GLS2, GPM6A, GPSM2, GRHPR, GUCY1A1, HIST1H3H, histone-lysine N-methyltransferase, HOOK1, MECOM, NCKAP1L, NSD2, PALM2, PXMP2, Rab11, RAB11FIP4, sGC, SLC1A1, SMYD3, Sos, TSKU, UXS1
<b>DNA Replication, Recombination, and Repair,</b>	35	28	ACACA, acad, ACADL, ACADM, ACADSB, ACLY, acyl-CoA dehydrogenase, ADRB2,

<b>Energy Production, Lipid Metabolism</b>			CD5L, CLEC4G, CLGN, EBF1, EBF2, GOT, H2AFY, HIST2H2BE, MCC, Mitochondrial complex 1, NCAPH, NFYA, Nr1h, PCK1, PEPCK, PRKAA, RBM24, RCL1, RSPO3, SCD, SDHB, SFRP4, SMC2, SMC4, STIL, THBS4, TKT
<b>Cancer, Gastrointestinal Disease, Organismal Injury and Abnormalities</b>	33	27	14-3-3, ACSM3, Adaptor protein, Adaptor protein 1, ANLN, AP1M2, ARHGEF11, ATP9A, AURK, BASP1, c-Src, CBX4, CD109, CDA, DNMT3A, EHMT2, EXO1, FAM83H, GTSE1, HP1, IL-2R, Importin alpha, MELK, MPZL1, MYO5C, P4HA2, PDE2A, PHGDH, SAMD4A, SHC1, SPATA18, STK39, SYNPO2, TMEM65, UHRF1
<b>Embryonic Development, Nervous System Development and Function, Organ Development</b>	31	26	BCL9, Betacatenin/TCF, CD160, CDT1, DNA-PK, GOLPH3L, GPC3, HAL, Hedgehog, HHAT, HHIP, Integrin $\alpha$ , I1GA9, I1GAD, JUN, Mcm, MCM6, MCM8, NAT14, PAGE4, Patched, PGLYRP2, RGN, RPA, SAE1, SLC22A1, SLC2A2, SLC39A5, SLC5A1, SUMO, TCF/LEF, TNFRSF11B, UGT2B15, ZIC1, ZIC2
<b>Cell Cycle, DNA Replication, Recombination, and Repair, Reproductive System Development and Function</b>	29	25	ABHD18, alcohol group acceptor phosphotransferase, APC (complex), BDH1, CCNB2, CD300A, CDC20, Cdc25, Cdk, CKS1B, CRHBP, Cyclin B, DEPDC1, DIS3L2, FEZ1, Gi-coupled receptor, GJB2, GLMP, Gq-coupled receptor, KIF18A, LRRN3, MAD2L1, MAP3K, MAP3K9, Mapk, MAPK8IP2, Mpf, NEK2, NUDT6, OLFML3, RMI2, SAC3D1, SAPCD2, TDGF1, TTK

<b>Drug Metabolism, Energy Production, Small Molecule Biochemistry</b>	29	25	AFM, Akt, AMIGO2, ANGPTL1, CAR ligand-CAR-Retinoic acid-RXR $\alpha$ , CFHR3, CLEC1B, COL4A1, COL4A2, COL6A3, COL6A6, Collagen type VI, CYP, CYP1A2, CYP2A6 (includes others), CYP2B6, Cyp2c, CYP2C18, CYP2C8, CYP2C9, CYP2E1, CYP2J2, CYP4A, CYP4X1, CYP4Z1, FKHR, FYB2, LAPTM4B, P3H2, Pdgf Ab, PXR ligand-PXR-Retinoic acid-RXR $\alpha$ , RETREG1, SLC46A3, TIGD1, unspecific monooxygenase
<b>Cardiovascular Disease, Lipid Metabolism, Small Molecule Biochemistry</b>	27	24	A1BG, ABHD6, ACADS, acylglycerol lipase, ASPG, C9, CLEC10A, CPEB3, CTBS, ENaC, FAAH, Ferritin, GDPD1, GNE, GNMT, HBA1/HBA2, HBB, HBD, HBG1, HDL, hemoglobin, hexokinase, HK1, HK3, IDO2, IL1RL1, INTERLEUKIN, lysophospholipase, MGLL, MIP1, Pkc(s), SAA4, SPATS2, STEAP3, Vdac
<b>Lipid Metabolism, Molecular Transport, Small Molecule Biochemistry</b>	27	24	ACAA1, ANGPTL3, APOA4, APOA5, APOF, arylesterase, CETP, CGREF1, GJC1, HDL-cholesterol, KYNU, LCAT, LDL-cholesterol, LIPC, LIPG, lipoprotein lipase, LPA, LPL, MGAT4B, NCOR-LXR-Oxysterol-RXR-9 cis RA, Nfatc, NFkB (complex), NFKBIZ, PON1, PON3, PPAR $\alpha$ -RXR $\alpha$ , PTGIS, ST18, STAB2, TCIM, triacylglycerol lipase, TTC39B, VLDL, VLDL-cholesterol, VNN1
<b>Cell Cycle, Developmental Disorder, DNA Replication, Recombination, and Repair</b>	27	24	AMPK, ASPM, BIRC5, CKAP5, COX7B2, CYP1A1, cytochrome-c oxidase, ECM1, FABP1, FABP2, FAM151A, FOXO1, G protein beta gamma, GADD45B, HLA Class I, HMOX1, JCHAIN, KLF4, MCL1, MMAA, MTORC1, MUT,



			NADPH oxidase, NNMT, Notch, NOTCH3, p70 S6k, PI3K (family), PKD1, Pld, PRODH2, Secretase gamma, SKAP1, TDO2, VPS13B
<b>Cancer, Developmental Disorder, Organismal Injury and Abnormalities</b>	27	24	ABCC10, Ap2, ATP11C, BMPR1B, Calcineurin protein(s), calpain, cAMP-dependent protein kinase, CG, CNNM1, Creb, DCLRE1B, EGR1, FXYD1, ID1, MAP2K1/2, NDRG3, NFAT (complex), NMDA Receptor, OSBPL3, PARP, PEG10, Pka catalytic subunit, PP2A, PRG4, PRKAR2B, PSMD4, RCAN1, RNASEH2A, SLC17A2, SLC4A4, SLC7A11, SQSTM1, TCF12, UBRQLN4, ZG16
<b>Molecular Transport, Organismal Injury and Abnormalities, Tissue Morphology</b>	25	23	Aconitase, ARIHGEF26, C5-C6-C7-C8-C9, C6, C7, C8, C8A, C8B, CALC, CD3 group, Cebp, coagulation factor, Complement, Dlg, DLG5, F11, F13B, F3, F8, F9, FOPNL, FXN, GLYAT, GPRASP1, HLA-DR group, KLKB1, LRRC1, MAC, MSTO1, P38 MAPK, PBK, phospholipase, PRELP, RELN, SLC6A12
<b>Developmental Disorder, Humoral Immune Response, Inflammatory Response</b>	24	22	20s proteasome, 26s Proteasome, APC/APC2, CK1, Ctbp, CTSA, DLGAP5, DUB, Dynein, Fanc, FANCI, FEN1, GCH1, GCHFR, Gsk3, KLHL2, MHC CLASS I (family), P glycoprotein, PCLAF, PTCRA, PTTG1, RAD51AP1, RFC4, SIGLEC7, SPART, TIP60, TPR, UBE2, UBE2C, UBE2S, UBE2T, Ubiquitin, USP12, USP2, USP45
<b>Cell Cycle, Cellular Assembly and Organization, Cellular Movement</b>	22	21	AADAT, BARD1, CARD8, caspase, CD14, CD3, CD4, CDC37L1, CNIH4, DKK1, EHD3, GBP1, GTF2IRD1, Histone h3, Hsp27, Hsp70, Hsp90, ID4, IFN Beta, Ige, IKK (complex), Interferon alpha,

			LARP1B, MHC II, MORC2, PARPBP, PLEK2, POGK, PPID, RNA polymerase II, TCR, TLR2, Tnf (family), TOP2A, VPS72
<b>Carbohydrate Metabolism, Lipid Metabolism, Molecular Transport</b>	22	21	ACSL1, ASF1B, ATP synthase, CBFA2T2, Cbp/p300, CD1D, Focal adhesion kinase, FOXP2, Hat, Hdac, HDAC11, HISTONE, histone deacetylase, Histone h4, HPGD, IDI1, LEF1, MEF2, MFSD2A, MSH5, N-cor, NAA40, NCOA2, NCOR1, NR3C2, Pias, PIAS3, SATB1, SLC27A2, Srebp, SSX1, TCF21, thymidine kinase, Top2, TXNRD1
<b>Cell-mediated Immune Response, Cellular Development, Cellular Function and Maintenance</b>	22	21	ADAMTS1, ADAMTS15, ADAMTS18, ADGRL3, ALB, ANKRD55, ATP5MC2, BCO2, C12orf75, CCR1, CD302, CTNNA3, Dnajb3, DNAJC25, FANCD2, FILIP1L, FSH, Growth hormone, HSPA12B, HSPB1, IQGAP3, IVD, LEPR, MIB1, NSMCE2, PHYHIPL, PRKAA2, PYCR3, RAB43, Rbmx11, SACS, SLC25A33, SLC7A9, SSTR1, STAB1
<b>Organismal Development, Organismal Functions, Organismal Injury and Abnormalities</b>	22	21	ABCA6, ADAMTS13, ALT, BGN, C1q, C1QA, C1QB, C1R, C1RL, CFHR4, CLEC4M, Complement component 1, CRP, Fc receptor, HPD, HRG, IFN type 1, IgD, IgG, IgG1, Igg3, IgG3 lambda, IGHG3, IGLC1, IL-17f dimer, IL10, IL17a dimer, Inflammasome (Nalp1, Asc, Casp1, Casp4), LECT2, LILRA3, MHC, MMR, RIDA, SLC25A47, SUSD4
<b>Cell-To-Cell Signaling and Interaction, Humoral Immune Response, Inflammatory Response</b>	20	20	ABI3BP, AGXT, Ahr-aryl hydrocarbon-Armt, ANXA3, B3GAT1, BHMT, CCDC3, CD163, DGAT2, ERK1/2, Esr1-Esr1-estrogen-estrogen, FGB, GC-GCR dimer, Glucocorticoid-GCR, GNA14, GOT1, GPT2, Hepatic

			Transaminase, IGFALS, IRS, ITLN1, JAK1/2, LIFR, NEU1, Nuclear factor 1, PLAC8, SOCS, SOCS7, Stat3-Stat3, Stat5 dimer, SWI-SNF, TAT, TFF2, TLR7/8, UGT
<b>Amino Acid Metabolism, Carbohydrate Metabolism, Small Molecule Biochemistry</b>	20	20	ADRA1, AQP3, CDCA5, Coup-Tf, CRYBG1, CYP26A1, CYP4A11, CYP4F2, DBH, DBH-AS1, DTX1, ERK, ETS, HSD17B2, JUN/JUNB/JUND, KLRB1, LY6E, NADH2 or NADPH2 1 atom incorporation:oxygen oxidoreductase, RAB3B, Rar, Rxr, SERCA, SLC10A1, SLC26A2, SLCO1B3, SMAD1/5, T3-TR-RXR, TACSTD2, TCF, Thioredoxin reductase, THRSP, thyroid hormone receptor, UGT3A1, VitaminD3-VDR-RXR, ZMIZ1
<b>Lipid Metabolism, Molecular Transport, Small Molecule Biochemistry</b>	20	20	CCL19, CCL21, CCL23, CCL3, CCL4, chemokine, COL15A1, Collagen type II, CXCL12, CXCL14, DNA-methyltransferase, elastase, EPB41L4B, FBXL21, HLA-DR, Ifn, Ifn gamma, IGHM, IL-1R/TLR, IL23, IL33, Laminin (family), LOXL2, MRO, MYCT1, plasminogen activator, PPBP, PROTEASE, S100A8, SIGLEC11, TH2 Cytokine, TLR2/3/4, TLR3, Tnf receptor, TSLP
<b>Cellular Movement, Hematological System Development and Function, Immune Cell Trafficking</b>	20	20	AMPK, ASPM, BIRC5, CKAP5, COX7B2, CYP1A1, cytochrome-c oxidase, ECM1, FABP1, FABP2, FAM151A, FOXO1, G protein beta gamma, GADD45B, HLA Class I, HMOX1, JCHAIN, KLF4, MCL1, MMAA, MTORC1, MUT, NADPH oxidase, NNMT, Notch, NOTCH3, p70 S6k, PI3K (family), PKD1, Pld, PRODH2,

Secretase gamma, SKAP1, TDO2, VPS13B

Supplemental Table S3 Top disease and functions identified by IPA Network analysis. P-score indicates statistical significance ( $p\text{-score} = -\log_{10}(p\text{-value})$ ) and the number of focus genes indicates the number of genes in our analysis that are a part of the respective network. See Table S1 for p-values, experimental log ratios, and other information on genes mentioned.

Upstream Regulator	Expr Log Ratio	Molecule Type	Predicted Activation State	Activation z-score	p-value of overlap
RABL6	0.377	other	Activated	5.196	1.53E-19
ERBB2	-0.075	kinase	Activated	4.107	7.03E-17
PTGER2	-0.341	G-protein coupled receptor	Activated	4.004	3.78E-20
TBX2	0.085	transcription regulator	Activated	3.998	2.3E-13
TAL1	-0.338	transcription regulator	Activated	3.948	0.00000537
E2f		group	Activated	3.937	1.13E-11
FOXM1	1.21	transcription regulator	Activated	3.724	1.37E-16
ESR1	-0.726	ligand-dependent nuclear receptor	Activated	3.2	8.39E-20
EP400	0.455	other	Activated	3.148	0.00000214
AREG	-0.087	growth factor	Activated	3.008	6.91E-12
HOXA10	0.451	transcription regulator	Activated	2.998	0.0000318
MYBL2	0.065	transcription regulator	Activated	2.913	9.51E-08
E2F1	0.184	transcription regulator	Activated	2.904	2.67E-12
ELAVL1	0.233	other	Activated	2.89	0.0000913

<b>CCND1</b>	-0.43	transcription regulator	Activated	2.836	7.57E-18
<b>NR0B2</b>	-0.975	ligand-dependent nuclear receptor	Activated	2.782	0.000767
<b>Hdac</b>		group	Activated	2.685	0.00451
<b>ACTL6A</b>	0.342	other	Activated	2.646	0.000274
<b>LIN9</b>	0.108	other	Activated	2.571	1.7E-11
<b>S100A6</b>	-0.139	transporter	Activated	2.53	0.000000367
<b>RUNX1</b>	0.599	transcription regulator	Activated	2.447	0.0437
<b>HGF</b>	-2.419	growth factor	Activated	2.411	1.55E-18
<b>SHC1</b>	0.74	other	Activated	2.4	0.037
<b>APOE</b>	0.016	transporter	Activated	2.356	0.0153
<b>Vegf</b>		group	Activated	2.245	9.08E-19
<b>SMOC2</b>	0.166	other	Activated	2.236	0.0000425
<b>MITF</b>	-0.113	transcription regulator	Activated	2.219	0.000000165
<b>PROC</b>	-0.38	peptidase	Activated	2.213	0.0592
<b>mir-181</b>		microRNA	Activated	2.213	0.0182
<b>mir-155</b>		microRNA	Activated	2.187	0.477
<b>mir-8</b>		microRNA	Activated	2.184	0.0359
<b>MAP4K4</b>	0.469	kinase	Activated	2.182	0.000341
<b>MYC</b>	-0.588	transcription regulator	Activated	2.182	5.46E-09
<b>SOCS3</b>	-0.579	phosphatase	Activated	2.179	0.0496
<b>TRAF2</b>	0.594	enzyme	Activated	2.178	0.0348
<b>NTRK2</b>	-0.288	kinase	Activated	2.137	0.000152
<b>NELFCD</b>	0.397	other	Activated	2	0.000269

<b>GCK</b>	-0.186	kinase	Activated	2	0.000344
<b>NQO1</b>	0.772	enzyme	Activated	2	0.0821
<b>PIAS4</b>	0.543	transcription regulator	Activated	2	0.00308
<b>NELFA</b>	0.329	other	Activated	2	0.000467
<b>MEOX2</b>	0.274	transcription regulator	Activated	2	0.103
<b>NONO</b>	0.44	transcription regulator	Activated	2	0.012
<b>ACTB</b>	0.291	other	Activated	2	0.00994
<b>NELFE</b>	0.547	other	Activated	2	0.000467
<b>PELP1</b>	0.032	other	Activated	2	0.319
<b>HNF4A</b>	0.14	transcription regulator	Inhibited	-5.483	1.62E-11
<b>TP53</b>	-0.006	transcription regulator	Inhibited	-5.299	1.22E-16
<b>NUPR1</b>	0.325	transcription regulator	Inhibited	-5.166	1.57E-10
<b>SMARCB1</b>	0.19	transcription regulator	Inhibited	-4.635	2.63E-15
<b>CDKN2A</b>	1.898	transcription regulator	Inhibited	-4.375	8.48E-11
<b>HNF1A</b>	-0.044	transcription regulator	Inhibited	-4.328	6.12E-17
<b>CXCL12</b>	-1.754	cytokine	Inhibited	-4.047	0.0047
<b>NR1H3</b>	-0.19	ligand-dependent nuclear receptor	Inhibited	-3.906	4.35E-20
<b>IL1B</b>	-0.206	cytokine	Inhibited	-3.877	5.5E-13
<b>IFNA2</b>	-0.004	cytokine	Inhibited	-3.851	0.00357
<b>IL4</b>	0.011	cytokine	Inhibited	-3.85	0.000000724

<b>IL15</b>	-0.016	cytokine	Inhibited	-3.818	0.0000142
<b>TLR3</b>	-0.976	transmembrane receptor	Inhibited	-3.794	0.017
<b>Irgm1</b>		other	Inhibited	-3.729	3.48E-08
<b>NFkB (complex)</b>		complex	Inhibited	-3.684	0.000997
<b>CEBPA</b>	0.28	transcription regulator	Inhibited	-3.672	3.93E-14
<b>let-7</b>	-0.074	microRNA	Inhibited	-3.562	5.89E-16
<b>BNIP3L</b>	-0.372	other	Inhibited	-3.464	0.00000594
<b>SMARCA4</b>	0.609	transcription regulator	Inhibited	-3.448	0.0000166
<b>TLR4</b>	-0.898	transmembrane receptor	Inhibited	-3.409	0.113
<b>OSM</b>	-0.306	cytokine	Inhibited	-3.407	0.00000962
<b>CDKN1A</b>	-0.055	kinase	Inhibited	-3.392	2.91E-27
<b>IKBKB</b>	0.164	kinase	Inhibited	-3.321	0.00000296
<b>SIM1</b>	0.02	transcription regulator	Inhibited	-3.317	0.392
<b>IFNG</b>	-0.124	cytokine	Inhibited	-3.302	3.29E-09
<b>TCR</b>		complex	Inhibited	-3.255	0.203
<b>TNF</b>	-0.047	cytokine	Inhibited	-3.251	1.05E-16
<b>IL12 (complex)</b>		complex	Inhibited	-3.241	0.000638
<b>Rb</b>		group	Inhibited	-3.217	3.14E-08
<b>NR1I3</b>	-0.338	ligand-dependent nuclear receptor	Inhibited	-3.194	0.00014
<b>RELA</b>	0.002	transcription regulator	Inhibited	-3.189	0.00166

<b>TLR9</b>	-0.009	transmembrane receptor	Inhibited	-3.135	0.00595
<b>IL5</b>	-0.2	cytokine	Inhibited	-3.098	0.0143
<b>ADCYAP1</b>	-0.024	other	Inhibited	-3.078	0.00138
<b>IL33</b>	-1.539	cytokine	Inhibited	-3.042	0.000668
<b>RB1</b>	0.043	transcription regulator	Inhibited	-2.994	4.78E-08
<b>DYRK1A</b>	-0.168	kinase	Inhibited	-2.978	0.000000259
<b>IL1</b>		group	Inhibited	-2.962	7.59E-08
<b>RBL2</b>	-0.493	other	Inhibited	-2.96	0.0000579
<b>MAP2K1/2</b>		group	Inhibited	-2.959	0.00362
<b>YBX1</b>	0.136	transcription regulator	Inhibited	-2.955	0.0104
<b>NFATC2</b>	-0.212	transcription regulator	Inhibited	-2.954	0.0437
<b>MAPK7</b>	0.186	kinase	Inhibited	-2.951	0.000349
<b>IL1A</b>	0.134	cytokine	Inhibited	-2.935	0.00000352
<b>CD40LG</b>	-0.049	cytokine	Inhibited	-2.886	0.000848
<b>SLC13A1</b>	-0.005	transporter	Inhibited	-2.84	0.0000187
<b>mir-21</b>		microRNA	Inhibited	-2.817	5.48E-09
<b>Map3k7</b>		kinase	Inhibited	-2.804	0.00968
<b>CEBPD</b>	-0.659	transcription regulator	Inhibited	-2.799	0.0000404
<b>IL3</b>	0.001	cytokine	Inhibited	-2.787	0.0722
<b>HIF1A</b>	-0.16	transcription regulator	Inhibited	-2.783	0.0000635
<b>NFKB1</b>	-0.05	transcription regulator	Inhibited	-2.776	0.0853
<b>GPER1</b>	-0.135	G-protein coupled receptor	Inhibited	-2.738	6.02E-08



<b>IFN alpha/beta</b>		group	Inhibited	-2.733	0.00118
<b>TGFB1</b>	-0.054	growth factor	Inhibited	-2.659	2.75E-15
<b>Hsp27</b>		group	Inhibited	-2.646	0.000483
<b>SAMSN1</b>	-0.853	other	Inhibited	-2.646	0.126
<b>SELPLG</b>	-0.502	other	Inhibited	-2.646	0.000483
<b>IL21</b>	-0.007	cytokine	Inhibited	-2.634	0.0034
<b>HNF4α dimer</b>		complex	Inhibited	-2.63	0.00000111
<b>cytokine</b>		group	Inhibited	-2.618	0.0000805
<b>NFAT5</b>	-0.094	transcription regulator	Inhibited	-2.611	0.0187
<b>VitaminD3-VDR-RXR</b>		complex	Inhibited	-2.607	0.00477
<b>IL17A</b>	-0.035	cytokine	Inhibited	-2.603	0.000117
<b>Mapk</b>		group	Inhibited	-2.598	0.0257
<b>IL6R</b>	0.357	transmembrane receptor	Inhibited	-2.596	0.0603
<b>NCOA1</b>	0.063	transcription regulator	Inhibited	-2.577	0.0000138
<b>MAFB</b>	-0.161	transcription regulator	Inhibited	-2.569	0.000000323
<b>IRF3</b>	0.229	transcription regulator	Inhibited	-2.559	0.212
<b>Pdgf (complex)</b>		complex	Inhibited	-2.554	0.00196
<b>CD28</b>	0.091	transmembrane receptor	Inhibited	-2.549	0.0244
<b>APP</b>	-0.249	other	Inhibited	-2.548	0.000628
<b>KDM5B</b>	0.81	transcription regulator	Inhibited	-2.544	5.64E-10
<b>IL18</b>	-0.336	cytokine	Inhibited	-2.541	0.0096
<b>STAT5A</b>	-0.052	transcription regulator	Inhibited	-2.535	0.00434

<b>EPAS1</b>	-0.26	transcription regulator	Inhibited	-2.534	0.000979
<b>ERK</b>		group	Inhibited	-2.526	0.00084
<b>Pkc(s)</b>		group	Inhibited	-2.525	0.0128
<b>CFTR</b>	-0.617	ion channel	Inhibited	-2.514	0.0000238
<b>CHUK</b>	-0.035	kinase	Inhibited	-2.458	0.0000425
<b>IKBKG</b>	0.158	kinase	Inhibited	-2.456	0.186
<b>SMAD3</b>	0.41	transcription regulator	Inhibited	-2.435	0.0089
<b>CD14</b>	-0.835	transmembrane receptor	Inhibited	-2.423	0.0498
<b>DDX58</b>	-0.314	enzyme	Inhibited	-2.412	0.078
<b>SAA</b>		group	Inhibited	-2.412	0.00641
<b>GDF2</b>	-2.563	growth factor	Inhibited	-2.404	0.000264
<b>SELP</b>	-0.329	transmembrane receptor	Inhibited	-2.4	0.00417
<b>MIF</b>	0.262	cytokine	Inhibited	-2.399	0.0906
<b>CREB3L3</b>	-0.198	transcription regulator	Inhibited	-2.397	0.000108
<b>THRA</b>	-0.025	ligand-dependent nuclear receptor	Inhibited	-2.396	0.00121
<b>DBP</b>	0.007	transcription regulator	Inhibited	-2.393	0.000152
<b>MAP3K8</b>	0.083	kinase	Inhibited	-2.39	0.164
<b>PRL</b>	-0.094	cytokine	Inhibited	-2.386	0.0118
<b>MYD88</b>	-0.38	other	Inhibited	-2.384	0.000636
<b>Pka</b>		complex	Inhibited	-2.382	0.000851
<b>GH1</b>	0.077	growth factor	Inhibited	-2.354	0.00264
<b>POMC</b>	-0.132	other	Inhibited	-2.354	0.305

<b>IL22</b>	-0.02	cytokine	Inhibited	-2.346	0.00439
<b>NLRP3</b>	-0.012	other	Inhibited	-2.345	0.00233
<b>GCG</b>	0.03	other	Inhibited	-2.344	0.00000711
<b>CAMP</b>	-0.151	other	Inhibited	-2.335	0.0939
<b>PPARG</b>	0.206	ligand-dependent nuclear receptor	Inhibited	-2.322	0.00000104
<b>CEBPB</b>	-0.189	transcription regulator	Inhibited	-2.314	8.05E-12
<b>ATF4</b>	-0.017	transcription regulator	Inhibited	-2.302	0.000135
<b>PLG</b>	-1.184	peptidase	Inhibited	-2.27	0.003
<b>Interferon alpha</b>		group	Inhibited	-2.256	0.132
<b>ABCB6</b>	0.245	transporter	Inhibited	-2.243	0.000675
<b>LEP</b>	-0.015	growth factor	Inhibited	-2.24	2.09E-08
<b>TLR2</b>	-0.766	transmembrane receptor	Inhibited	-2.239	0.161
<b>Pkg</b>		group	Inhibited	-2.236	0.0028
<b>SQSTM1</b>	1.077	transcription regulator	Inhibited	-2.236	0.00477
<b>SMARCE1</b>	0.04	transcription regulator	Inhibited	-2.236	0.00028
<b>Hbb-b1</b>		transporter	Inhibited	-2.236	0.427
<b>VEGFA</b>	0.017	growth factor	Inhibited	-2.229	0.000000385
<b>PXR ligand-PXR-Retinoic acid-RXR<math>\alpha</math></b>		complex	Inhibited	-2.228	0.000405
<b>EPO</b>	-0.043	cytokine	Inhibited	-2.22	0.000955

<b>CX3CR1</b>	-0.119	G-protein coupled receptor	Inhibited	-2.219	0.00831
<b>IFIH1</b>	-0.048	enzyme	Inhibited	-2.219	0.0133
<b>TCF3</b>	0.13	transcription regulator	Inhibited	-2.218	5.47E-14
<b>KLF15</b>	0.066	transcription regulator	Inhibited	-2.214	0.0037
<b>IL10RA</b>	-0.388	transmembrane receptor	Inhibited	-2.214	4.89E-09
<b>cyclooxygenase</b>		group	Inhibited	-2.213	0.00139
<b>PF4</b>	-0.353	cytokine	Inhibited	-2.204	0.0166
<b>GNRH1</b>	0.06	other	Inhibited	-2.201	0.121
<b>ELF4</b>	0.219	transcription regulator	Inhibited	-2.2	0.0188
<b>ALOX15</b>	-0.013	enzyme	Inhibited	-2.2	0.0188
<b>IPMK</b>	0.035	kinase	Inhibited	-2.191	0.0028
<b>IL23</b>		complex	Inhibited	-2.183	0.0165
<b>CXCR4</b>	-0.14	G-protein coupled receptor	Inhibited	-2.183	0.142
<b>TGFBR1</b>	-0.058	kinase	Inhibited	-2.183	0.197
<b>PNPLA2</b>	-0.034	enzyme	Inhibited	-2.177	0.0322
<b>USF2</b>	-0.154	transcription regulator	Inhibited	-2.176	0.00805
<b>ACVRL1</b>	0.201	kinase	Inhibited	-2.171	0.0236
<b>P38 MAPK</b>		group	Inhibited	-2.17	0.000544
<b>RIPK2</b>	0.323	kinase	Inhibited	-2.164	0.000333
<b>SPIB</b>	-0.103	transcription regulator	Inhibited	-2.158	0.0393

<b>FOXO3</b>	-0.231	transcription regulator	Inhibited	-2.153	1.3E-11
<b>LEPR</b>	-1.455	transmembrane receptor	Inhibited	-2.138	0.014
<b>Ccl2</b>		cytokine	Inhibited	-2.138	0.000843
<b>TOB1</b>	0.118	transcription regulator	Inhibited	-2.137	0.0000541
<b>CCN2</b>	0.008	growth factor	Inhibited	-2.111	0.000324
<b>CREM</b>	-0.627	transcription regulator	Inhibited	-2.095	0.0524
<b>IL6</b>	-0.23	cytokine	Inhibited	-2.092	5.84E-21
<b>TCF7L2</b>	-0.189	transcription regulator	Inhibited	-2.073	0.000355
<b>HMGA1</b>	0.887	transcription regulator	Inhibited	-2.047	0.00153
<b>PGR</b>	-0.303	ligand-dependent nuclear receptor	Inhibited	-2.014	0.000233
<b>JAK1/2</b>		group	Inhibited	-2	0.414
<b>Ncoa-Nr1i3-Rxra</b>		complex	Inhibited	-2	0.00814
<b>Ncoa-Nr1i2-Rxra</b>		complex	Inhibited	-2	0.00994
<b>GC-GCR dimer</b>		complex	Inhibited	-2	0.00521
<b>CRNDE</b>	1.746	other	Inhibited	-2	0.0821
<b>HCAR2</b>	-0.283	G-protein coupled receptor	Inhibited	-2	0.00814
<b>TLR5</b>	0.223	transmembrane receptor	Inhibited	-2	0.0958
<b>CD86</b>	-0.404	transmembrane receptor	Inhibited	-2	0.188

<b>IFNE</b>	-0.001	cytokine	Inhibited	-2	0.126
<b>RUVBL1</b>	0.387	transcription regulator	Inhibited	-2	0.00942
<b>Hbb-b2</b>		other	Inhibited	-2	0.16
<b>IL17RA</b>	-0.165	transmembrane receptor	Inhibited	-2	0.0634
<b>TYROBP</b>	-0.231	transmembrane receptor	Inhibited	-2	0.0571
<b>ADORA3</b>	-0.428	G-protein coupled receptor	Inhibited	-2	0.0143

*Supplemental Table S4* Top upstream regulators with a positive activation pattern identified by IPA Network analysis. The p-values are based on the overlap of the known targets effector genes of the regulator featured in our analysis. The activation z-score illustrates the upstream regulator activation state, the magnitude of which represents likely activation states of upstream regulators. Experimental log ratios show how up or downregulated the genes are in HBV-related HCC samples compared to non-tumor control samples. Z-scores of an absolute value of 2 or greater are considered significant.

Genes	Expr p-value	Expr log ratio	Molecule Type	Predicted Activation
<b>BUB1</b>	0.00132	1.03	kinase	Activated
<b>BUB1B</b>	0.00439	1.63	kinase	Activated
<b>CCNA2</b>	0.00308	1.25	other	Activated
<b>CCNB1</b>	0.00259	2.24	kinase	Activated
<b>CCNE2</b>	0.00521	0.878	other	Activated
<b>CDC25C</b>	0.000285	0.936	phosphatase	Activated
<b>CENPF</b>	0.00136	1.35	other	Activated
<b>CHEK1</b>	0.00139	0.857	kinase	Activated
<b>CKS1B</b>	0.0163	0.756	kinase	Activated
<b>EZH2</b>	0.0345	1.13	transcription regulator	Activated
<b>FEN1</b>	0.0142	0.895	enzyme	Activated
<b>H2AX</b>	0.00948	0.96	transcription regulator	Activated
<b>HMOX1</b>	0.0131	-1.073	enzyme	Activated
<b>KIF23</b>	0.000199	1.04	other	Activated
<b>MAD2L1</b>	0.000293	1.168	other	Activated
<b>MCM10</b>	0.0124	0.859	other	Activated
<b>MCM2</b>	0.0185	1.023	enzyme	Activated
<b>MELK</b>	0.000789	1.26	kinase	Activated
<b>NDC80</b>	0.0036	1.649	other	Activated
<b>NEK2</b>	0.00227	2.121	kinase	Activated
<b>PBK</b>	0.00247	2.017	kinase	Activated
<b>PRC1</b>	0.00615	1.993	other	Activated
<b>RAD54B</b>	0.0058	0.77	enzyme	Activated
<b>TOP2A</b>	0.00116	1.922	enzyme	Activated
<b>TPX2</b>	0.00226	0.916	other	Activated
<b>TTK</b>	0.00111	1.903	kinase	Activated
<b>UBE2C</b>	0.00122	1.752	enzyme	Activated

Supplemental Table S5 Genes activated by RABL6; the gene identified by IPA as a top upstream regulator. Activation of genes implies that genes are up or downregulated in our dataset as they would be by RABL6 based on literature curated by IPA. Experimental log ratios, random p-values, and gene type are shown for convenience.

Genes	Expr p-value	Expr Log Ratio	Molecule Type	Prediction
<b>BCHE</b>	0.00335	-1.959	enzyme	Activated
<b>CFD</b>	0.00232	-0.707	peptidase	Activated
<b>COL15A1</b>	0.00162	1.789	other	Activated
<b>CYP2E1</b>	0.00574	-1.692	enzyme	Activated
<b>DKK1</b>	0.00206	0.769	growth factor	Activated
<b>GSTA3</b>	0.0414	-1.032	enzyme	Activated
<b>HBG1</b>	0.000516	-1.538	other	Activated
<b>ID1</b>	0.00725	-1.492	transcription regulator	Activated
<b>IGFBP3</b>	0.015	-1.457	other	Activated
<b>INMT</b>	0.00184	-1.473	enzyme	Activated
<b>LEPR</b>	0.0202	-1.455	transmembrane receptor	Activated
<b>NDRG2</b>	0.012	-1.102	other	Activated
<b>PHGDH</b>	0.0365	-0.954	enzyme	Activated
<b>THBD</b>	0.00286	-0.787	transmembrane receptor	Activated
<b>THRSP</b>	0.00108	-1.632	other	Activated
<b>XDH</b>	0.00942	-1.049	enzyme	Activated

Supplemental Table S6 Genes activated by HOXA10; the gene identified by IPA as one of the top upstream regulators. Activation of genes implies that genes are up or downregulated in our dataset as they would be by RABL6 based on literature curated by IPA. Experimental log ratios, random p-values, and gene type are shown for convenience.

**QIAGEN Digital Insights support**

August 20, 2021

To whom this may concern:

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If you have any questions, please contact QIAGEN Digital Insights support at [ts-bioinformatics@qiagen.com](mailto:ts-bioinformatics@qiagen.com)

Best regards,

(on behalf of QIAGEN Silicon Valley)

*Gaurav Kadu*

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