

Supplementary Materials for

Deciphering potential vascularization factors of on-chip co-cultured hiPSC-derived cerebral organoids

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Table S1

Table S1.

Angiogenesis-related genes with altered expression at days 31 and 35 of CO-VB co-culture identified with DAVID functional annotation clustering and GeneClip (GC) literature search. Growth factors are labeled with yellow.

GenBank	Gene Name	31/28	P value	35/28	P value	DAVID	GC
NM_002613	3-phosphoinositide dependent protein kinase 1 (PDPK1)	NA	NA	0.2	0.038		Y
NM_001611	acid phosphatase 5, tartrate resistant (ACP5)	NA	NA	2.1	0.031		Y
NM_207197	ADAM metalloproteinase domain 15 (ADAM15)	2.6	0.011	0.7	0.071	Y	Y
NM_000681	adrenoceptor alpha 2A (ADRA2A)	0.3	0.011	0.3	0.022		Y
NM_001124	Adrenomedullin (ADM)	17.8	0.002	NA	NA	Y	Y
NM_198576	Agrin (AGRN)	2.1	0.026	0.8	0.186		Y
NM_144497	A-kinase anchoring protein 12 (AKAP12)	2.4	0.021	0.3	0.035		Y
NM_006738	A-kinase anchoring protein 13 (AKAP13)	2.1	0.001	0.4	0.121	Y	
NM_005163	AKT serine/threonine kinase 1 (AKT1)	2.2	0.044	1.3	0.077	Y	Y
NM_001628	aldo-keto reductase family 1, member B (AKR1B1)	1.7	0.403	0.2	0.044		Y
NM_019109	ALG1, chitobiosyldiphosphodolichol beta-mannosyltransferase (ALG1)	2.1	0.000	0.2	0.056		Y
NM_004757	aminoacyl tRNA synthetase complex interacting multifunctional protein 1 (AIMP1)	1.4	0.115	0.3	0.022		Y
NM_139314	angiopoietin like 4 (ANGPTL4)	15.9	0.008	NA	NA	Y	Y
NM_001002857	annexin A2 (ANXA2)	8.9	0.034	1.0	0.154	Y	Y
NM_005883	APC2, WNT signaling pathway regulator (APC2)	0.5	0.047	0.5	0.091		Y
NM_001302688	apolipoprotein E(APOE)	6.8	0.047	3.2	0.473	Y	Y
NM_198098	aquaporin 1 (Colton blood group) (AQP1)	5.9	0.041	NA	NA	Y	Y
NM_020216	arginyl aminopeptidase (RNPEP)	2.1	0.026	0.4	0.059		Y
NM_012154	argonaute 2, RISC catalytic component (AGO2)	1.0	0.382	0.3	0.046		Y
NM_032467	aspartate beta-hydroxylase (ASPH)	4.7	0.019	1.1	0.172		Y
NM_001251888	ASPSCR1, UBX domain containing tether for SLC2A4 (ASPSCR1)	2.1	0.004	0.4	0.057		Y
NM_001681	ATPase sarcoplasmic/endoplasmic reticulum Ca ²⁺ transporting 2(ATP2A2)	NA	NA	0.3	0.026		Y

NM_017749	autophagy and beclin 1 regulator 1 (AMBRA1)	1.4	0.040	0.2	0.032		Y
NM_004655	axin 2 (AXIN2)	2.5	0.104	0.3	0.018	Y	
NM_001728	basigin (Ok blood group) (BSG)	4.7	0.008	0.8	0.131		Y
NM_001170714	BCAR1, Cas family scaffolding protein (BCAR1)	2.1	0.024	0.5	0.068		Y
NM_004326	B-cell CLL/lymphoma 9 (BCL9)	0.8	0.131	0.3	0.033		Y
NM_014739	BCL2 associated transcription factor 1 (BCLAF1)	1.2	0.297	0.1	0.017		Y
NM_004052	BCL2 interacting protein 3 (BNIP3)	4.2	0.032	1.8	0.364		Y
NM_004048	beta-2-microglobulin (B2M)	6.7	0.035	0.8	0.162		Y
NM_001145783	BLOC-1 related complex subunit 8 (BORCS8)	0.6	0.054	0.3	0.040	Y	
NM_001719	bone morphogenetic protein 7 (BMP7)	10.4	0.032	NA	NA	Y	Y
NM_004329	bone morphogenetic protein receptor type 1A (BMPR1A)	1.5	0.178	0.3	0.031	Y	Y
NM_004333	B-Raf proto-oncogene, serine/threonine kinase (BRAF)	NA	NA	0.5	0.030		Y
NM_006317	brain abundant membrane attached signal protein 1 (BASP1)	0.6	0.065	0.4	0.049	Y	Y
NM_005504	branched chain amino acid transaminase 1 (BCAT1)	1.2	0.299	0.3	0.029		Y
NM_001018055	BRCA1/BRCA2-containing complex subunit 3 (BRCC3)	1.2	0.000	0.3	0.043		Y
NM_206866	BTB domain and CNC homolog 1 (BACH1)	1.0	0.182	0.2	0.028		Y
NM_006763	BTG anti-proliferation factor 2 (BTG2)	2.2	0.032	0.7	0.105		Y
NM_001007793	BUB3, mitotic checkpoint protein (BUB3)	1.3	0.185	0.3	0.027		Y
NM_006333	C1D nuclear receptor corepressor (C1D)	1.2	0.427	0.2	0.033		Y
NM_007236	calcineurin like EF-hand protein 1 (CHP1)	1.3	0.362	0.5	0.034		Y
NM_001748	calpain 2 (CAPN2)	2.1	0.043	0.5	0.078		Y
NM_004343	Calreticulin (CALR)	2.8	0.005	0.8	0.220	Y	Y
NM_033181	cannabinoid receptor 1 (CNR1)	0.5	0.117	0.3	0.040		Y
NM_001190991	canopy FGF signaling regulator 2 (CNPY2)	2.2	0.026	0.6	0.100		Y
NM_000067	carbonic anhydrase 2 (CA2)	8.7	0.049	NA	NA		Y
NM_001873	carboxypeptidase E (CPE)	1.0	0.291	0.3	0.045	Y	
NM_004346	caspase 3 (CASP3)	0.7	0.134	0.3	0.035		Y
NM_001904	catenin beta 1 (CTNNB1)	1.3	0.066	0.3	0.042	Y	Y
NM_002991	C-C motif chemokine ligand 24 (CCL24)	2.4	0.016	0.6	0.100	Y	
NM_005760	CCAAT/enhancer binding protein zeta (CEBPZ)	NA	NA	0.3	0.035		Y

NM_003418	CCHC-type zinc finger nucleic acid binding protein (CNBP)	2.2	0.005	0.5	0.073		Y
NM_004357	CD151 molecule (Raph blood group) (CD151)	2.8	0.030	0.7	0.151		Y
NM_001004196	CD200 molecule (CD200)	0.3	0.017	0.5	0.080		Y
NM_013230	CD24 molecule (CD24)	0.4	0.038	0.3	0.042		Y
NM_198793	CD47 molecule (CD47)	2.6	0.021	1.1	0.294		Y
NM_001257389	CD63 molecule (CD63)	2.6	0.037	0.5	0.069		Y
NM_004356	CD81 molecule (CD81)	2.0	0.019	0.7	0.145		Y
NM_006889	CD86 molecule (CD86)	2.2	0.000	0.5	0.040		Y
NM_018451	centromere protein J (CENPJ)	0.8	0.127	0.3	0.037		Y
NM_000729	Cholecystokinin (CCK)	22.4	0.035	NA	NA		Y
NM_001130861	claudin 5 (CLDN5)	22.4	0.041	NA	NA	Y	Y
NM_005507	cofilin 1 (CFL1)	0.8	0.103	0.3	0.038		Y
NM_000089	collagen type I alpha 2 chain (COL1A2)	10.9	0.046	0.7	0.201	Y	
NM_000093	collagen type V alpha 1 chain (COL5A1)	6.7	0.030	NA	NA	Y	
NM_001848	collagen type VI alpha 1 chain (COL6A1)	3.4	0.037	0.9	0.176		Y
NM_030582	collagen type XVIII alpha 1 chain (COL18A1)	9.4	0.040	0.9	0.430	Y	Y
NM_005694	COX17, cytochrome c oxidase copper chaperone (COX17)	1.2	0.272	0.4	0.025	Y	
NM_181715	CREB regulated transcription coactivator 2 (CRTC2)	2.3	0.001	NA	NA		Y
NM_021198	CTD small phosphatase 1 (CTDSP1)	2.3	0.020	1.4	0.415		Y
NM_001913	cut like homeobox 1 (CUX1)	2.3	0.029	0.5	0.095		Y
NM_016463	CXXC finger protein 5 (CXXC5)	2.8	0.019	0.4	0.049		Y
NM_001786	cyclin dependent kinase 1 (CDK1)	2.1	0.008	0.4	0.030	Y	
NM_000076	cyclin dependent kinase inhibitor 1C (CDKN1C)	2.5	0.049	0.3	0.034		Y
NM_004060	cyclin G1 (CCNG1)	3.4	0.017	NA	NA		Y
NM_000100	cystatin B (CSTB)	2.3	0.042	0.4	0.071		Y
NM_001554	cysteine rich angiogenic inducer 61 (CYR61)	12.4	0.012	NA	NA	Y	Y
NM_006825	cytoskeleton associated protein 4 (CKAP4)	2.1	0.025	0.4	0.041		Y
NM_003836	delta like non-canonical Notch ligand 1 (DLK1)	1.8	0.162	0.3	0.040		Y
NM_001927	Desmin (DES)	3.7	0.020	NA	NA		Y
NM_001195573	dicer 1, ribonuclease III (DICER1)	0.9	0.147	0.3	0.028		Y

NM_001098424	discs large MAGUK scaffold protein 1 (DLG1)	2.7	0.008	0.3	0.053		Y
NM_019058	DNA damage inducible transcript 4 (DDIT4)	4.9	0.027	1.8	0.305		Y
NM_005147	DnaJ heat shock protein family (Hsp40) member A3 (DNAJA3)	1.9	0.018	0.4	0.039		Y
NM_004734	doublecortin like kinase 1 (DCLK1)	NA	NA	0.4	0.047		Y
NM_001946	dual specificity phosphatase 6 (DUSP6)	3.7	0.001	0.9	0.217		Y
NM_001363	dyskerin pseudouridine synthase 1 (DKC1)	1.6	0.051	0.3	0.012		Y
NM_004021	Dystrophin (DMD)	3.9	0.039	0.4	0.096		Y
NM_001964	early growth response 1 (EGR1)	3.4	0.056	0.4	0.027	Y	Y
NM_001039348	EGF containing fibulin like extracellular matrix protein 1 (EFEMP1)	5.0	0.017	NA	NA		Y
NM_001167890	EGF like domain multiple 6 (EGFL6)	4.7	0.046	NA	NA		Y
NM_001419	ELAV like RNA binding protein 1 (ELAVL1)	NA	NA	0.3	0.039		Y
NM_004456	enhancer of zeste 2 polycomb repressive complex 2 subunit (EZH2)	0.7	0.069	0.2	0.028		Y
NM_001005862	erb-b2 receptor tyrosine kinase 2 (ERBB2)	2.1	0.008	10.4	0.163	Y	Y
NM_000123	ERCC excision repair 5, endonuclease (ERCC5)	1.4	0.435	0.3	0.023		Y
NM_001172705	eukaryotic translation initiation factor 4 gamma 2 (EIF4G2)	0.7	0.074	0.2	0.038	Y	
NM_001968	eukaryotic translation initiation factor 4E (EIF4E)	0.9	0.327	0.3	0.029		Y
NM_014722	family with sequence similarity 65 member B (FAM65B)	0.4	0.038	0.4	0.086		Y
NM_001291303	FAT atypical cadherin 4 (FAT4)	NA	NA	0.3	0.032	Y	
NM_018994	F-box protein 42 (FBXO42)	2.1	0.053	0.4	0.048		Y
NM_001134999	fermitin family member 2 (FERMT2)	2.4	0.021	0.9	0.147		Y
NM_004114	fibroblast growth factor 13 (FGF13)	0.4	0.032	0.2	0.028		Y
NM_023110	fibroblast growth factor receptor 1 (FGFR1)	2.8	0.006	0.9	0.227	Y	Y
NM_022970	fibroblast growth factor receptor 2 (FGFR2)	5.6	0.041	0.6	0.067	Y	Y
NM_000142	fibroblast growth factor receptor 3 (FGFR3)	1.2	0.429	0.4	0.038		Y
NM_006486	fibulin 1 (FBLN1)	3.9	0.018	1.0	0.262		Y
NM_001110556	filamin A (FLNA)	5.3	0.000	0.5	0.058		Y
NM_007085	follistatin like 1 (FSTL1)	6.7	0.048	1.2	0.286		Y
NM_001244808	forkhead box P1 (FOXP1)	2.7	0.014	0.7	0.144	Y	
NM_025135	formin homology 2 domain containing 3 (FHOD3)	1.5	0.455	0.4	0.045	Y	
NM_003505	frizzled class receptor 1 (FZD1)	3.1	0.065	0.4	0.046	Y	

NM_173794	FUN14 domain containing 1 (FUNDC1)	1.2	0.370	0.3	0.037		Y
NM_005274	G protein subunit gamma 5 (GNG5)	2.9	0.003	0.5	0.081	Y	
NM_032999	general transcription factor Iii (GTF2I)	0.7	0.069	0.4	0.047	Y	Y
NM_201397	glutathione peroxidase 1 (GPX1)	2.1	0.036	0.5	0.066	Y	Y
NM_000852	glutathione S-transferase pi 1 (GSTP1)	2.3	0.009	2.1	0.158		Y
NM_001164617	glypican 3 (GPC3)	16.6	0.043	1.1	0.210	Y	Y
NM_002087	granulin precursor (GRN)	2.8	0.017	0.8	0.174		Y
NM_002045	growth associated protein 43 (GAP43)	0.6	0.078	0.4	0.034		Y
NM_004864	growth differentiation factor 15 (GDF15)	25.8	0.021	1.8	0.494		Y
NM_001017963	heat shock protein 90 alpha family class A member 1 (HSP90AA1)	1.5	0.090	0.4	0.033		Y
NM_007355	heat shock protein 90 alpha family class B member 1 (HSP90AB1)	1.2	0.427	0.3	0.043		Y
NM_002154	heat shock protein family A (Hsp70) member 4 (HSPA4)	1.0	0.285	0.3	0.041		Y
NM_001540	heat shock protein family B (small) member 1 (HSPB1)	3.2	0.019	1.2	0.337	Y	Y
NM_002133	heme oxygenase 1 (HMOX1)	2.9	0.044	2.3	0.043	Y	Y
NM_001291860	heparan sulfate proteoglycan 2 (HSPG2)	9.4	0.017	0.9	0.225	Y	Y
NM_004494	hepatoma-derived growth factor (HDGF)	2.2	0.045	0.8	0.101		Y
NM_005968	heterogeneous nuclear ribonucleoprotein M (HNRNPM)	1.4	0.057	0.3	0.033		Y
NM_033500	hexokinase 1 (HK1)	2.4	0.022	1.3	0.184		Y
NM_000189	hexokinase 2 (HK2)	7.8	0.024	2.2	0.341		Y
NM_002128	high mobility group box 1 (HMGB1)	0.7	0.097	0.3	0.034	Y	Y
NM_004964	histone deacetylase 1 (HDAC1)	2.3	0.031	0.6	0.082		Y
NM_001527	histone deacetylase 2 (HDAC2)	0.7	0.051	0.3	0.045		Y
NM_152739	homeobox A9 (HOXA9)	2.7	0.007	0.2	0.031		Y
NM_198268	homeodomain interacting protein kinase 1 (HIPK1)	2.3	0.044	0.5	0.083	Y	
NM_002775	HtrA serine peptidase 1 (HTRA1)	4.9	0.039	1.4	0.480		Y
NM_033158	hyaluronoglucosaminidase 2 (HYAL2)	2.1	0.012	0.4	0.056		Y
NM_000183	hydroxyacyl-CoA dehydrogenase/3-ketoacyl-CoA thiolase/enoyl-CoA hydratase (trifunctional protein), beta subunit (HADHB)	2.8	0.032	0.9	0.186		Y
NM_181054	hypoxia inducible factor 1 alpha subunit (HIF1A)	3.3	0.059	0.2	0.041	Y	Y
NM_002165	inhibitor of DNA binding 1, HLH protein (ID1)	7.4	0.034	0.5	0.063	Y	Y

NM_002166	inhibitor of DNA binding 2, HLH protein (ID2)	2.8	0.022	0.6	0.110	Y	Y
NM_001546	inhibitor of DNA binding 4, HLH protein (ID4)	0.5	0.041	0.3	0.051		Y
NM_002221	inositol-trisphosphate 3-kinase B (ITPKB)	6.6	0.012	NA	NA		Y
NM_000875	insulin like growth factor 1 receptor (IGF1R)	1.3	0.190	0.2	0.039		Y
NM_006547	insulin like growth factor 2 mRNA binding protein 3 (IGF2BP3)	1.3	0.277	0.3	0.023		Y
NM_000612	insulin like growth factor 2 (IGF2)	6.5	0.045	4.6	0.122		Y
NM_000597	insulin like growth factor binding protein 2 (IGFBP2)	2.5	0.017	1.4	0.361		Y
NM_001013398	insulin like growth factor binding protein 3 (IGFBP3)	6.6	0.016	NA	NA		Y
NM_001253835	insulin like growth factor binding protein 7 (IGFBP7)	21.0	0.049	NA	NA		Y
NM_002210	integrin subunit alpha V (ITGAV)	3.4	0.019	0.6	0.091	Y	Y
NM_133376	integrin subunit beta 1 (ITGB1)	2.7	0.044	NA	NA	Y	Y
NM_000629	interferon alpha and beta receptor subunit 1 (IFNAR1)	NA	NA	0.2	0.045		Y
NM_003641	interferon induced transmembrane protein 1 (IFITM1)	7.5	0.042	5.4	0.232		Y
NM_015662	intraflagellar transport 172 (IFT172)	2.9	0.014	0.3	0.130	Y	
NM_003870	IQ motif containing GTPase activating protein 1 (IQGAP1)	3.4	0.036	1.4	0.499		Y
NM_002202	ISL LIM homeobox 1 (ISL1)	0.4	0.041	0.2	0.018	Y	Y
NM_145159	jagged 2 (JAG2)	3.2	0.015	1.1	0.165		Y
NM_002228	Jun proto-oncogene, AP-1 transcription factor subunit (JUN)	1.0	0.244	0.3	0.041	Y	Y
NM_000224	keratin 18 (KRT18)	7.4	0.041	NA	NA		Y
NM_005566	lactate dehydrogenase A (LDHA)	3.8	0.020	2.5	0.455		Y
NM_006562	ladybird homeobox 1 (LBX1)	2.1	0.026	0.6	0.155	Y	
NM_170707	lamin A/C (LMNA)	3.7	0.029	0.5	0.072	Y	Y
NM_004525	LDL receptor related protein 2 (LRP2)	2.4	0.125	0.3	0.021	Y	
NM_033300	LDL receptor related protein 8 (LRP8)	2.8	0.013	0.4	0.051		Y
NM_014319	LEM domain containing 3 (LEMD3)	NA	NA	0.3	0.028		Y
NM_005574	LIM domain only 2 (LMO2)	2.2	0.054	0.7	0.154		Y
NM_006769	LIM domain only 4 (LMO4)	1.8	0.172	0.3	0.027	Y	
NM_014387	linker for activation of T-cells (LAT)	NA	NA	0.4	0.027		Y
NM_006618	lysine demethylase 5B (KDM5B)	2.0	0.026	0.9	0.183		Y
NM_018407	lysosomal protein transmembrane 4 beta (LAPTM4B)	2.3	0.008	0.3	0.047		Y

NM_002116	major histocompatibility complex, class I, A (HLA-A)	3.7	0.015	1.3	0.342		Y
NM_005514	major histocompatibility complex, class I, B (HLA-B)	4.3	0.036	1.2	0.317		Y
NM_002127	major histocompatibility complex, class I, G (HLA-G)	4.0	0.013	1.2	0.350		Y
NM_006039	mannose receptor C type 2 (MRC2)	2.2	0.011	0.6	0.127		Y
NM_002417	marker of proliferation Ki-67 (MKI67)	1.9	0.203	0.4	0.034		Y
NM_001190839	matrix Gla protein (MGP)	11.2	0.027	NA	NA		Y
NM_018848	McKusick-Kaufman syndrome (MKKS)	1.3	0.152	0.3	0.042	Y	
NM_014060	MCTS1, re-initiation and release factor (MCTS1)	0.8	0.106	0.3	0.034		Y
NM_002393	MDM4, p53 regulator (MDM4)	1.0	0.489	0.4	0.035		Y
NM_006010	mesencephalic astrocyte derived neurotrophic factor (MANF)	2.5	0.003	0.46	0.067		Y
NM_002402	mesoderm specific transcript (MEST)	2.2	0.045	0.3	0.049		Y
NM_178812	Metadherin (MTDH)	1.3	0.050	0.4	0.046	Y	Y
NM_005953	metallothionein 2A (MT2A)	3.2	0.009	0.3	0.023		Y
NM_004689	metastasis associated 1 (MTA1)	2.2	0.020	0.5	0.079		Y
NM_019852	methyltransferase like 3 (METTL3)	0.9	0.151	0.3	0.033		Y
NM_001012334	midkine (neurite growth-promoting factor 2) (MDK)	2.2	0.046	0.4	0.054		Y
BX648603	mitogen-activated protein kinase 4 (MAPK4)	2.5	0.010	0.8	0.110		Y
NM_001278548	mitogen-activated protein kinase 8 (MAPK8)	NA	NA	0.3	0.042		Y
NM_002752	mitogen-activated protein kinase 9 (MAPK9)	NA	NA	0.2	0.034		Y
NM_030662	mitogen-activated protein kinase kinase 2 (MAP2K2)	2.1	0.010	0.3	0.103		Y
NM_002444	Moesin (MSN)	2.7	0.016	0.5	0.062		Y
NM_000179	mutS homolog 6 (MSH6)	1.1	0.403	0.4	0.041		Y
NM_004641	myeloid/lymphoid or mixed-lineage leukemia; translocated to, 10 (MLLT10)	NA	NA	2.6	0.041		Y
NM_005920	myocyte enhancer factor 2D (MEF2D)	3.5	0.014	0.6	0.104	Y	Y
NM_144772	NAD(P)HX epimerase (NAXE)	1.4	0.248	0.2	0.032		Y
NM_021074	NADH:ubiquinone oxidoreductase core subunit V2 (NDUFV2)	0.9	0.245	0.3	0.048	Y	
NM_004553	NADH:ubiquinone oxidoreductase subunit S6 (NDUFS6)	1.3	0.115	0.3	0.045	Y	
NR_024388	NCBP2 antisense RNA 2 (head to head) (NCBP2-AS2)	1.3	0.228	0.4	0.048		Y
NM_001042724	nectin cell adhesion molecule 2 (NECTIN2)	3.3	0.009	0.4	0.129		Y

NM_004495	neuregulin 1 (NRG1)	NA	NA	0.4	0.007	Y	Y
NM_001135659	neurexin 1 (NRXN1)	0.4	0.121	0.3	0.049	Y	Y
NM_004796	neurexin 3 (NRXN3)	NA	NA	0.3	0.011	Y	
NM_002524	neuroblastoma RAS viral oncogene homolog (NRAS)	NA	NA	0.2	0.003		Y
NM_001042492	neurofibromin 1(NF1)	NA	NA	0.2	0.012	Y	Y
NM_000905	neuropeptide Y (NPY)	0.7	0.308	0.3	0.036		Y
NM_020529	NFKB inhibitor alpha (NFKBIA)	2.6	0.025	0.8	0.160		Y
NM_007363	non-POU domain containing, octamer-binding (NONO)	1.4	0.214	0.4	0.047		Y
NM_017617	notch 1 (NOTCH1)	NA	NA	0.2	0.023	Y	Y
NM_024408	notch 2 (NOTCH2)	6.7	0.024	1.2	0.278	Y	
NM_000435	notch 3 (NOTCH3)	4.2	0.037	0.5	0.055	Y	Y
NM_003204	nuclear factor, erythroid 2 like 1 (NFE2L1)	2.1	0.026	1.0	0.140		Y
NM_006312	nuclear receptor corepressor 2 (NCOR2)	2.7	0.012	0.5	0.077		Y
NM_003269	nuclear receptor subfamily 2 group E member 1 (NR2E1)	NA	NA	0.4	0.043	Y	Y
NM_005654	nuclear receptor subfamily 2 group F member 1 (NR2F1)	2.8	0.030	0.4	0.053	Y	Y
NM_005381	Nucleolin (NCL)	1.1	0.169	0.3	0.049	Y	Y
NM_001037738	Nucleophosmin (NPM1)	1.6	0.006	0.4	0.044		Y
NM_138459	NUS1 dehydrololichyl diphosphate synthase subunit (NUS1)	2.0	0.036	0.2	0.044	Y	Y
NM_002412	O-6-methylguanine-DNA methyltransferase (MGMT)	3.3	0.033	NA	NA		Y
NM_001173408	obscurin like 1 (OBSL1)	2.0	0.034	NA	NA	Y	
NM_130837	OPA1, mitochondrial dynamin like GTPase (OPA1)	1.4	0.448	0.3	0.026		Y
NM_014476	PDZ and LIM domain 3 (PDLIM3)	5.1	0.026	NA	NA	Y	
NM_006457	PDZ and LIM domain 5 (PDLIM5)	4.3	0.017	0.9	0.095	Y	
NM_000285	peptidase D (PEPD)	1.5	0.011	0.4	0.048		Y
NM_001177306	peptidylglycine alpha-amidating monooxygenase (PAM)	2.4	0.024	0.6	0.109	Y	
NM_006623	phosphoglycerate dehydrogenase (PHGDH)	2.5	0.001	1.4	0.215		Y
NM_000291	phosphoglycerate kinase 1 (PGK1)	2.1	0.032	0.9	0.237		Y
NM_004339	pituitary tumor-transforming 1 interacting protein (PTTG1IP)	2.0	0.011	0.5	0.082		Y
NM_000930	plasminogen activator, tissue type (PLAT)	1.4	0.059	0.3	0.034		Y
NM_000430	platelet activating factor acetylhydrolase 1b regulatory subunit 1	2.9	0.014	0.4	0.117		Y

	(PAFAH1B1)						
NM_001265594	pleckstrin homology and RhoGEF domain containing G5 (PLEKHG5)	3.6	0.037	0.4	0.066		Y
NM_002825	Pleiotrophin (PTN)	8.0	0.032	1.3	0.357	Y	Y
NM_198389	Podoplanin (PDPN)	4.5	0.000	NA	NA	Y	Y
NM_004073	polo like kinase 3 (PLK3)	2.5	0.018	NA	NA		Y
NM_000238	potassium voltage-gated channel subfamily H member 2 (KCNH2)	0.4	0.037	0.3	0.054		Y
NM_153026	prickle planar cell polarity protein 1 (PRICKLE1)	NA	NA	0.3	0.030	Y	
NM_002583	pro-apoptotic WT1 regulator (PAWR)	3.4	0.012	NA	NA		Y
NM_001040202	progesterone and adipoQ receptor family member 3 (PAQR3)	0.7	0.031	0.4	0.043		Y
NM_002634	Prohibitin (PHB)	2.1	0.023	0.7	0.100		Y
NM_001142595	prolyl 4-hydroxylase subunit alpha 1 (P4HA1)	5.0	0.029	NA	NA		Y
NM_199418	Prolylcarboxypeptidase (PRCP)	2.9	0.040	0.7	0.112	Y	Y
NM_000954	prostaglandin D2 synthase (PTGDS)	6.4	0.039	NA	NA		Y
NM_020440	prostaglandin F2 receptor inhibitor (PTGFRN)	2.0	0.025	0.3	0.088		Y
NM_002806	proteasome 26S subunit, ATPase 6 (PSMC6)	1.1	0.474	0.3	0.038		Y
NM_002813	proteasome 26S subunit, non-ATPase 9 (PSMD9)	1.1	0.289	0.3	0.033		Y
NM_015568	protein phosphatase 1 regulatory subunit 16B (PPP1R16B)	NA	NA	0.3	0.047	Y	
NM_006742	protein serine kinase H1 (PSKH1)	3.5	0.014	0.2	0.037	Y	
NM_002834	protein tyrosine phosphatase, non-receptor type 11 (PTPN11)	2.0	0.225	0.4	0.030	Y	Y
NM_002823	prothymosin, alpha (PTMA)	1.1	0.262	0.4	0.027		Y
NM_182470	pyruvate kinase, muscle (PKM)	2.3	0.023	0.8	0.148		Y
NM_002826	quiescin sulfhydryl oxidase 1 (QSOX1)	2.3	0.018	0.6	0.061		Y
NM_014247	Rap guanine nucleotide exchange factor 2 (RAPGEF2)	0.9	0.184	0.4	0.047	Y	
NM_018890	ras-related C3 botulinum toxin substrate 1 (rho family, small GTP binding protein Rac1) (RAC1)	2.2	0.035	0.5	0.082		Y
NM_000321	RB transcriptional corepressor 1 (RB1)	1.3	0.090	0.3	0.035		Y
NM_006098	receptor for activated C kinase 1 (RACK1)	2.2	0.012	0.8	0.196		Y
NM_002928	regulator of G-protein signaling 16 (RGS16)	2.2	0.040	0.8	0.184		Y
NM_001024809	retinoic acid receptor alpha (RARA)	NA	NA	0.4	0.026	Y	Y
NM_005168	Rho family GTPase 3 (RND3)	0.8	0.112	0.4	0.043		Y

NM_173728	Rho guanine nucleotide exchange factor 15 (ARHGEF15)	3.2	0.030	0.7	0.126	Y	
NM_014245	ring finger protein 7 (RNF7)	2.1	0.028	1.1	0.195		Y
NM_133631	roundabout guidance receptor 1 (ROBO1)	NA	NA	0.4	0.019	Y	Y
NM_002966	S100 calcium binding protein A10 (S100A10)	0.5	0.017	0.3	0.030		Y
NM_000232	sarcoglycan beta (SGCB)	0.7	0.145	0.3	0.043	Y	
NM_005505	scavenger receptor class B member 1 (SCARB1)	2.8	0.039	1.0	0.166		Y
NM_007190	SEC23 interacting protein (SEC23IP)	NA	NA	0.4	0.035		Y
NM_003012	secreted frizzled related protein 1 (SFRP1)	0.4	0.054	0.4	0.052	Y	Y
NM_003013	secreted frizzled related protein 2 (SFRP2)	NA	NA	0.3	0.034	Y	Y
NM_004636	semaphorin 3B (SEMA3B)	4.5	0.030	3.4	0.036		Y
NM_006640	septin 9 (SEPT9)	1.6	0.067	0.3	0.046		Y
NM_003017	serine and arginine rich splicing factor 3 (SRSF3)	1.0	0.319	0.2	0.021		Y
NM_000455	serine/threonine kinase 11 (STK11)	2.0	0.018	0.4	0.104	Y	Y
NM_006282	serine/threonine kinase 4 (STK4)	2.2	0.041	0.5	0.057	Y	
NM_002615	serpin family F member 1 (SERPINF1)	12.9	0.042	NA	NA	Y	Y
NM_001207014	serpin family H member 1 (SERPINH1)	6.6	0.024	1.9	0.231		Y
NR_033412	SH3 domain containing GRB2 like 1, endophilin A2 pseudogene 1 (SH3GL1P1)	NA	NA	0.4	0.009		Y
NM_005067	siah E3 ubiquitin protein ligase 2 (SIAH2)	1.2	0.159	0.4	0.049		Y
NM_173050	signal peptide, CUB domain and EGF like domain containing 1 (SCUBE1)	NA	NA	0.2	0.005	Y	Y
NM_003062	slit guidance ligand 3 (SLIT3)	9.0	0.032	NA	NA		Y
NM_005359	SMAD family member 4 (SMAD4)	2.1	0.047	0.7	0.112	Y	Y
NM_005631	smoothened, frizzled class receptor (SMO)	3.3	0.014	0.2	0.058	Y	Y
NM_006516	solute carrier family 2 member 1 (SLC2A1)	9.4	0.009	1.2	0.310		Y
NM_005415	solute carrier family 20 member 1 (SLC20A1)	2.8	0.031	0.7	0.115		Y
NM_001048	Somatostatin (SST)	0.2	0.028	0.4	0.055		Y
NM_003130	Sorcin (SRI)	NA	NA	0.5	0.018	Y	
NM_002970	spermidine/spermine N1-acetyltransferase 1 (SAT1)	3.3	0.012	0.7	0.155	Y	Y
NM_005066	splicing factor proline and glutamine rich (SFPQ)	1.3	0.114	0.3	0.027		Y

NM_001258038	sprouty RTK signaling antagonist 1 (SPRY1)	2.8	0.025	0.5	0.065		Y
NM_005842	sprouty RTK signaling antagonist 2 (SPRY2)	1.4	0.112	0.4	0.039		Y
NM_014390	staphylococcal nuclease and tudor domain containing 1 (SND1)	2.1	0.017	0.7	0.123		Y
NM_003102	superoxide dismutase 3, extracellular (SOD3)	4.8	0.037	NA	NA		Y
NM_003877	suppressor of cytokine signaling 2 (SOCS2)	0.9	0.208	0.3	0.038		Y
NM_000344	survival of motor neuron 1, telomeric (SMN1)	2.0	0.001	0.7	0.099		Y
NM_001006946	syndecan 1 (SDC1)	2.6	0.041	0.7	0.132		Y
NM_003182	tachykinin precursor 1 (TAC1)	0.3	0.195	0.2	0.025		Y
NR_110492	taurine up-regulated 1 (non-protein coding) (TUG1)	0.7	0.063	0.3	0.037		Y
NM_021961	TEA domain transcription factor 1 (TEAD1)	4.0	0.015	0.6	0.076		Y
NR_001566	telomerase RNA component (TERC)	2.9	0.047	0.8	0.147		Y
NM_012473	thioredoxin 2 (TXN2)	2.3	0.129	0.4	0.049		Y
NM_152295	threonyl-tRNA synthetase (TARS)	1.7	0.004	0.3	0.034		Y
NM_006288	Thy-1 cell surface antigen (THY1)	0.4	0.028	0.8	0.126	Y	Y
NM_003258	thymidine kinase 1 (TK1)	0.9	0.382	0.4	0.044		Y
NM_001071	thymidylate synthetase (TYMS)	1.5	0.022	0.4	0.050		Y
NM_001032283	Thymopoietin (TMPO)	NA	NA	0.3	0.032		Y
NM_014452	TNF receptor superfamily member 21 (TNFRSF21)	2.4	0.032	0.9	0.132		Y
NM_148965	TNF receptor superfamily member 25 (TNFRSF25)	1.5	0.078	0.2	0.041		Y
NR_024458	TPT1 antisense RNA 1 (TPT1-AS1)	2.5	0.034	0.7	0.092		Y
NM_003199	transcription factor 4 (TCF4)	2.6	0.024	0.9	0.160	Y	Y
NM_006521	transcription factor binding to IGHM enhancer 3 (TFE3)	3.3	0.008	0.7	0.134		Y
NM_003236	transforming growth factor alpha (TGFA)	3.2	0.013	NA	NA	Y	Y
NM_004621	transient receptor potential cation channel subfamily C member 6 (TRPC6)	3.0	0.016	0.4	0.052		Y
NM_001256530	translocator protein (TSPO)	5.4	0.028	1.2	0.289		Y
NM_000371	Transthyretin (TTR)	17.9	0.049	101.6	0.249		Y
NM_000391	tripeptidyl peptidase 1 (TPP1)	2.9	0.009	0.8	0.164		Y
NM_001018005	tropomyosin 1 (alpha) (TPM1)	3.4	0.033	0.2	0.095	Y	Y
NM_000368	tuberous sclerosis 1 (TSC1)	NA	NA	0.3	0.027	Y	Y

NM_001032288	ubiquitin conjugating enzyme E2 V1 (UBE2V1)	1.0	0.329	0.3	0.043		Y
NM_014517	upstream binding protein 1 (LBP-1a) (UBP1)	1.3	0.273	0.3	0.048	Y	
NM_018949	urotensin 2 receptor (UTS2R)	2.8	0.026	0.6	0.069	Y	
NM_003369	UV radiation resistance associated (UVRAG)	1.6	0.477	0.4	0.018		Y
NM_001025370	vascular endothelial growth factor A (VEGFA)	3.5	0.037	1.4	0.182	Y	Y
NM_014909	vasohibin 1 (VASH1)	2.0	0.014	0.5	0.062	Y	Y
NM_004385	Versican (VCAN)	0.5	0.064	0.2	0.025		Y
NM_002467	v-myc avian myelocytomatosis viral oncogene homolog (MYC)	NA	NA	0.3	0.005		Y
NM_007331	Wolf-Hirschhorn syndrome candidate 1 (WHSC1)	1.3	0.052	0.3	0.047	Y	Y
NM_005080	X-box binding protein 1 (XBP1)	3.0	0.025	0.5	0.087	Y	Y
NM_000380	XPA, DNA damage recognition and repair factor (XPA)	NA	NA	0.3	0.032		Y
NM_006297	X-ray repair cross complementing 1 (XRCC1)	1.3	0.142	0.4	0.047		Y
NM_003651	Y-box binding protein 3 (YBX3)	3.9	0.020	NA	NA		Y
NM_006106	Yes associated protein 1 (YAP1)	4.5	0.023	0.6	0.118	Y	Y
NM_004926	ZFP36 ring finger protein like 1 (ZFP36L1)	4.6	0.028	0.9	0.191	Y	