

Supplementary Table 6. Biological process analysis of differentially downregulated genes.

GO.ID	Term	Ontology	Count	Pop.Hits	List.Total	Pop.Total	Fold.Enrichment	Pvalue	FDR	Enrichment.Score	GENES
GO:0044238	primary metabolic process	Biological process	75	7712	168	23448	1.3573466212211	0.000948705527999735	1	3.02286856882715	HHEX / SIX1 / TCF25 / FOXO6 / PDE6H / TERF2 / NKX3-1 / HIST3H2A / CIRA / RNF220 / MIB2 / BAG1L2 / CHST2 / CHST1 / GALK1 / ACPP / NME5 / RASL12 / TUBG2 / ATP7B / KATNAL2 / MBD4 / TTC5 / A73001 / LOIRIK / HMG1 / RUNX1T1 / FOXO6 / PIAS2 / PITX1 / REX2 / ZBTB1 / ZEP2 / ZFP62 / HEYL / CEAL3 / SEC14L2 / SMARCC2 / CASZ1 / ZFP618 / MKL1 / CEAL5 / LSM6 / SREK1P1 / ESRP2 / PCSK5 / LATS1 / LATS2 / STK35 / DYRK2 / ACVR1C / IP6K3 / PDP1 / ADAM23 / TRFR2 / CAPN9 / PRSS23 / BCO3 / I665 / PRSS48 / TPH2 / MGLL / SERINC5 / LIPH / AGPAT1 / ALOX8 / GALR2 / PRDX6 / ABAT / CDA / CIRBP / CHDH / ITGB1BP3 / SERPINB7 / ADRA2C / CCL24 / MAGI3
GO:0030521	androgen receptor signaling pathway	Biological process	3	35	168	23448	11.9632653061224	0.001998035880065	1	2.69939671712389	PIAS2 / HEYL / NKX3-1
GO:0060766	negative regulation of androgen receptor signaling pathway	Biological process	2	10	168	23448	27.9142857142857	0.00221125885371372	1	2.65536041519638	PIAS2 / HEYL
GO:0048518	positive regulation of bioleical process	Biological process	34	3029	168	23448	1.56666509456209	0.00495129307169558	1	2.30528136660868	SIX1 / AGPAT1 / NKX3-1 / CCL24 / ADRA2C / CIRA / GALR2 / MBD4 / EMID2 / ECM2 / GRIN2B / STMN2 / CIRBP / HMG1 / PIAS2 / ZBTB17 / SMARCC2 / MKL1 / HHEX / KCP / COLPH3 / TERF2 / LATS1 / ADRA2C / DYRK2 / ACVR1C / MIB2 / SEC14L2 / HEYL / PDE6H / ISLR2 / PITX1 / FOXO6 / UBASH3A
GO:0006825	copper ion transport	Biological process	2	16	168	23448	17.4464285714286	0.00573261788449944	1	2.24164700575438	ATP7B / HEPH
GO:0060765	regulation of androgen receptor signaling pathway	Biological process	2	16	168	23448	17.4464285714286	0.00573261788449944	1	2.24164700575438	PIAS2 / HEYL
GO:0051145	smooth muscle cell differentiation	Biological process	3	53	168	23448	7.90026954177897	0.00650988712365872	1	2.18642654169251	FOXO6 / SIX1 / MKL1
GO:0034621	cellular macromolecular complex subunit organization	Biological process	9	466	168	23448	2.69558553034948	0.00659295791554832	1	2.18091969645461	HIST3H2A / SMARCC2 / STMN2 / ACVR1C / LATS1 / LMA1 / CCL24 / CIRBP / TUBG2
GO:0045736	negative regulation of cyclin-dependent protein kinase activity	Biological process	2	18	168	23448	15.5079365079365	0.00724081474869849	1	2.1402125635051	LATS1 / LATS2
GO:0045742	positive regulation of epidermal growth factor receptor signaling pathway	Biological process	2	18	168	23448	15.5079365079365	0.00724081474869849	1	2.1402125635051	ADRA2C / PDE6H
GO:0001964	startle response	Biological process	2	19	168	23448	14.6917293233083	0.00805482309558691	1	2.09394399335204	CTNNA2 / GRIN2B
GO:0030878	thyroid gland development	Biological process	2	19	168	23448	14.6917293233083	0.00805482309558691	1	2.09394399335204	HHEX / SIX1
GO:0033144	negative regulation of intracellular steroid hormone receptor signaling pathway	Biological process	2	19	168	23448	14.6917293233083	0.00805482309558691	1	2.09394399335204	PIAS2 / HEYL
GO:0035329	hippo signaling cascade	Biological process	2	19	168	23448	14.6917293233083	0.00805482309558691	1	2.09394399335204	LATS1 / LATS2
GO:0035094	response to nicotine	Biological process	2	20	168	23448	13.9571428571429	0.00890796627355639	1	2.05022143591686	CHRNB4 / ABAT
GO:0009119	ribonucleoside metabolic process	Biological process	3	64	168	23448	6.54241071428571	0.0109349660656814	1	1.9611825603639	NME5 / CDA / ACPP

GO:0046131	pyrimidine ribonucleoside metabolic process	Biological process	2	23	168	23448	12.1366459627329	0.0116962799805782	1	1.93195224430509	NMES/CDA
GO:0048522	positive regulation of cellular process	Biological process	30	2753	168	23448	1.52093819729127	0.0125323737851017	1	1.90196666051981	NKX3-1/CCL24 //ADORA3/GALR2 //MBD4/EMID2 //ECM2/GRIN2B //STMN2/CIRBP //HMG1/PIAS2 //SIX1/ZBTB17 //SMARCC2/MKLL1 //HHEX //KCP/GOLPH3 //TERF2/LATS1 //ADRA2C/DYRK2 //ACVR1C/MIB2 //HEY1/PDE6H //ISLR2/PITX1 //FOXO6
GO:0008152	metabolic process	Biological process	81	9272	168	23448	1.21929310982374	0.0135170839666472	1	1.86911698840815	HHEX/SIX1/TCF25 //FOXO6/PDE6H //TERF2/CHST2 //CHST1/FAM109B //NKX3-1/HIST3H2A //CIRB2/RNF230 //MIB2/B4GALT2 //GALK1/CHDH //ALOX8/PRDX6 //HEPH1/PH2/ACPP //NMES/BASL12 //TUBG2/ATP7B //KATNAL2/MBD4 //TTC5 //A73001LO1RIK //HMG1/RUNX1T1 //HOXB6/PIAS2 //PITX1/REF2 //ZBTB17/ZFP2 //ZFP62/HEY1 //TCFAL3/SEC14L2 //SMARCC2/CASZ1 //ZFP618/MKLL1 //TCFAL3/SM6 //SREK1P/ESRP2 //PCSK5/LATS1 //LATS2/STK35 //DYRK2/ACVR1C //IP6K3/PDPI //ADAM23/TRFR2 //CAPN9/PRSS23 //BCD51665/PRSS48 //MGL1/SERINC5 //LPH/AGPAT1 //GALR2/ABAT //CDA/SERPINB7 //CIRBP/TGFB1BP3 //MAGI5/ADRA2C //CCL24/SLC16A9 //KIF9/NAGPA //NTSDC3
GO:0048854	brain morphogenesis	Biological process	2	25	168	23448	11.1657142857143	0.0137400793902946	1	1.86201075791204	HHEX/CTNNA2
GO:0006213	pyrimidine nucleoside metabolic process	Biological process	2	27	168	23448	10.3386243386243	0.0159265090579427	1	1.79787940706247	NMES/CDA
GO:0006284	base-excision repair	Biological process	2	27	168	23448	10.3386243386243	0.0159265090579427	1	1.79787940706247	HMG1/MBD4
GO:0009755	hormone-mediated signaling pathway	Biological process	3	74	168	23448	5.65830115830116	0.0161552604266273	1	1.79168603665992	NKX3-1/LATS1 //LATS2
GO:0030518	intracellular steroid hormone receptor signaling pathway	Biological process	3	74	168	23448	5.65830115830116	0.0161552604266273	1	1.79168603665992	PIAS2/NKX3-1 //HEY1
GO:0051258	protein polymerization	Biological process	4	136	168	23448	4.10504201680672	0.016699833006755	1	1.77728787164328	LATS1/CCL24 //STMN2/TUBG2
GO:0006974	response to DNA damage stimulus	Biological process	8	454	168	23448	2.45940843297671	0.0168938865089032	1	1.77227042768165	MBD4/TTC5 //A73001LO1RIK //HMG1/TERF2 //DYRK2/NKX3-1 //FOXO6
GO:0071844	cellular component assembly at cellular level	Biological process	12	832	168	23448	2.01304945054945	0.0169282362870275	1	1.77138828765082	ZBP2/HIST3H2A //LIMA1/ACVR1C //LATS1/CCL24 //STMN2/PRDX6 //CIRBP/HMG1 //BAIAP2L2/TUBG2
GO:0051148	negative regulation of muscle cell differentiation	Biological process	2	28	168	23448	9.96938775510204	0.0170718191011888	1	1.76772019982751	TGFB1BP3/FOXO6
GO:0009116	nucleoside metabolic process	Biological process	3	77	168	23448	5.4378478664193	0.0179500136710618	1	1.74593521631884	NMES/CDA//ACPP
GO:0006950	response to stress	Biological process	22	1913	168	23448	1.60510790829662	0.0184718239949093	1	1.73349021815952	PRDX6/NMES //GRIN2B/ABAT //ADORA3/IFNE //MBD4/TTC5 //A73001LO1RIK //HMG1/CHST2 //CCL24/CHST1 //FOXO6/TERF2 //ARPP21/DYRK2

GO:0044237	cellular metabolic process	Biological process	67	7615	168	23448	1.22800862958447	0.025549489760667	1	1.59261776857582	HHEX / SIX1 / TCF25 FOXO6 / PDE6H TERF2 / CHST2 CHST1 / FAM109B NKX3-1 / HIST3H2A RNF220 / MIB2 GALX1 / ACPP NME5 / RASL12 TUBG2 / ATP7B KATNAL2 / MBD4 TTC5 A73001101RIK HMG1 / RUNX1T1 HOXB6 / PIAS2 PTX1 / RFX2 ZFP2 / HEYL ZBTB17 / ZFP2 ZFP2 / HEYL TCEAL3 / SEC14L2 SMARCC2 / CASZ1 ZFP618 / MKL1 TCEAL3 / LSM6 SREK1P1 / ESRP2 PCSK5 / LATS1 LATS2 / STK35 DYRK2 / ACVR1C IPK3 / PDL1 / TPH2 MGL1 / AGPAT1 SERINC5 / ALOX8 GALR2 / PRDX6 ABAT / CDA / CIRBP ITGB1BP3 / MAGI3 CHDH / ADRA2C CCL24 / SLC16A9
GO:0030182	neuron differentiation	Biological process	11	785	168	23448	1.9557779799818	0.0262032672202246	1	1.58164455420509	CTNNA2 / STMN2 GALR2 / EFHD1 SIX1 / ADRA2C HEYL / ISLR2 / PIAS2 WHRN / PROM1
GO:007267	cell-cell signaling	Biological process	10	687	168	23448	2.03160740278644	0.0265815108982639	1	1.57542033730864	SIX1 / ADORA3 GALR2 / GRIN2B ABAT / ACVR1C CTNNA2 / CHRNB4 MGL1 / NKX3-1
GO:0030154	cell differentiation	Biological process	25	2336	168	23448	1.49370107632094	0.0272166096799688	1	1.56516597498075	HHEX / ZBP2 / SIX1 HEYL / NME5 CTNNA2 / STMN2 LATS1 / LATS2 HEPH / GALR2 EFHD1 / RUNX1T1 ITGB1BP3 / ADRA2C PIAS2 / ISLR2 / BESP1 PTX1 / MKL1 FOXO6 / WHRN PROM1 / ACVR1C EGFL7
GO:0014068	positive regulation of phosphatidylinositol 3-kinase cascade	Biological process	2	36	168	23448	7.75396825396825	0.0274136973027933	1	1.56203238693719	ADORA3 / NKX3-1
GO:0034623	cellular macromolecular complex disassembly	Biological process	3	91	168	23448	4.60125588697017	0.0277379884371028	1	1.55692503721885	SMARCC2 / STMN2 LIMA1
GO:0009891	positive regulation of biosynthetic process	Biological process	15	1217	168	23448	1.72027233243338	0.0288113956438605	1	1.54043570368603	GALR2 / CIRBP HMG1 / PIAS2 NKX3-1 / SIX1 ZBTB17 / SMARCC2 MKL1 / SEC14L2 DYRK2 / HHEX PTX1 / HEYL FOXO6
GO:0042058	regulation of epidermal growth factor receptor signaling pathway	Biological process	2	37	168	23448	7.54440154440154	0.0288460634080254	1	1.5399134461763	ADRA2C / PDE6H
GO:0045445	myoblast differentiation	Biological process	2	37	168	23448	7.54440154440154	0.0288460634080254	1	1.5399134461763	ITGB1BP3 / PTX1
GO:0009966	regulation of signal transduction	Biological process	17	1443	168	23448	1.64429264429264	0.03007060545502	1	1.5218578275321	PDE6H / ADORA3 NKX3-1 / HHEX KCP / GOLPH3 CCL24 / ADRA2C MIB2 / GRIN2B MAGI3 / UBASH3A PIAS2 / HEYL / LATS1 LATS2 / MGL1
GO:0008630	DNA damage response, signal transduction resulting in induction of apoptosis	Biological process	2	38	168	23448	7.34586466165413	0.030307788816352	1	1.51844588992056	DYRK2 / MBD4
GO:0048869	cellular developmental process	Biological process	26	2484	168	23448	1.46089256958822	0.0311322810951932	1	1.5067890569352	HHEX / ZBP2 / SIX1 HEYL / NME5 CTNNA2 / CCL24 STMN2 / ACVR1C EGFL7 / LATS1 LATS2 / HEPH GALR2 / EFHD1 RUNX1T1 ITGB1BP3 / ADRA2C PIAS2 / ISLR2 / BESP1

												//ZFP62//HEYL //TCEAL8//SEC14L2 //SMARCC2//CASZ1 //ZFP618//MKL1 //TCEAL5//LSM6 //SREK1P//ESRP2 //GALR2 //CDA//TIGB1BP3 //CCL24//CIRBP
GO:0043242	negative regulation of protein complex disassembly	Biological process	2	47	168	23448	5.93920972644377	0.0447050722441681	1	1.34964319895575		STMN2//LIMA1
GO:0022607	cellular component assembly	Biological process	14	1183	168	23448	1.65173288250211	0.0453550495170607	1	1.34337435457267		ZPBP2//HIST3H2A //LIMA1//ACVR1C //LATS1//CCL24 //STMN2//PRDX6 //CIRBP//HMGAI //BAIAP2L2//TUBG2 //CLOTNE6//CDA
GO:0048706	embryonic skeletal system development	Biological process	3	111	168	23448	3.77220077220077	0.0457209638685905	1	1.33988462258127		SIX1//HOXB6//PCSK5
GO:0043933	macromolecular complex subunit organization	Biological process	11	860	168	23448	1.78521594684385	0.0457937311600456	1	1.33919396978955		HIST3H2A//SMARCC2 //STMN2//ACVR1C //LATS1//LIMA1 //CCL24//CIRBP //TUBG2 //CLOTNE6//CDA
GO:0031328	positive regulation of cellular biosynthetic process	Biological process	14	1194	168	23448	1.63651591289782	0.048318475986726	1	1.31588677225516		GALR2//CIRBP //HMGAI//PIAS2 //NKX3-1//SIX1 //ZBTB17//SMARCC2 //MKL1//DYRK2 //HHEX//PTX1//HEYL //FOXO6
GO:0048731	system development	Biological process	28	2835	168	23448	1.37848324514991	0.0484770918286577	1	1.31446344166045		PTX1//EGFL7//HHEX //NKX3-1//SIX1 //PCSK5//HEYL //SMARCC2//ISLR2 //CTNNA2//GRIN2B //ATP7B//PROM1 //STMN2//FOXO6 //LATS1//LATS2 //HEPH//GALR2 //EFHD1//SERINC5 //TIGB1BP3//ADRA2C //CCL24//HOXB6 //PIAS2//WHRN //BFSPI
GO:0010557	positive regulation of macromolecule biosynthetic process	Biological process	13	1087	168	23448	1.66920751741359	0.0492429812434556	1	1.30765566210976		CIRBP//HMGAI //PIAS2//NKX3-1 //SIX1//ZBTB17 //SMARCC2//MKL1 //DYRK2//HHEX //PTX1//HEYL //FOXO6
GO:0048699	generation of neurons	Biological process	11	872	168	23448	1.76064875491481	0.0496698679622391	1	1.30390699449133		CTNNA2//STMN2 //GALR2//EFHD1 //SIX1//ADRA2C //HEYL//ISLR2//PIAS2 //WHRN//PROM1
GO:0001508	regulation of action potential	Biological process	3	115	168	23448	3.64099378881988	0.0498665725226402	1	1.30219048110305		SERINC5//GRIN2B //CHRN4
GO:0009206	purine ribonucleoside triphosphate biosynthetic process	Biological process	2	50	168	23448	5.58285714285714	0.049965059054712	1	1.30133359495142		NME5//ATP7B