

ID	Gene Name	FDR (pre&postnatal)	FDR (postnatal)
2210408I21Rik	RIKEN cDNA 2210408I21 gene	8.93E-07	0.038155606
A530032D15Rik	RIKEN cDNA A530032D15Rik gene	0.038008176	2.09E-05
Acacb	acetyl-Coenzyme A carboxylase beta	1.07E-14	3.43E-05
Ank1	ankyrin 1, erythroid	6.76E-08	0.037369502
Ank3	ankyrin 3, epithelial	0.025089193	0.03170677
Ano2	anoctamin 2	5.40E-18	4.32E-07
Apool	apolipoprotein O-like	0.001118347	0.016145928
Atus2	autism susceptibility candidate 2	5.36E-16	0.000136714
C130026I21Rik	similar to SP140 nuclear body protein family member	0.021802715	0.000372029
Cdk5rap2	CDK5 regulatory subunit associated protein 2	1.78E-07	0.047926553
Chd9	chromodomain helicase DNA binding protein 9	0.048521886	0.002718363
Chl1	cell adhesion molecule with homology to L1CAM	4.67E-09	1.51E-11
Cpeb1	cytoplasmic polyadenylation element binding protein 1	0.042573761	0.040368177
Csda	cold shock domain protein A	1.06E-14	3.43E-05
Eif4a2	eukaryotic translation initiation factor 4A2	0.044916064	0.036176643
Fbxw4	F-box and WD-40 domain protein 4	0.033310937	0.000184038
Fgf12	fibroblast growth factor 12	0.039388541	0.000184038
Gpr19	G protein-coupled receptor 19	0.037900534	0.038098746
Ing4	inhibitor of growth family, member 4	0.02856405	0.02847679
Izumo1	izumo sperm-egg fusion 1	3.56E-16	5.68E-06
Kcnq1	potassium voltage-gated channel, subfamily Q, member 1	1.14E-05	0.04566623
Lage3	L antigen family, member 3	0.029330973	0.003353947
Lars2	leucyl-tRNA synthetase, mitochondrial	0.00103869	0.010982124
Lipc	lipase, hepatic	9.43E-06	1.17E-05
Litaf	LPS-induced TN factor	1.06E-05	0.015501719
Mbnl1	muscleblind-like 1 (Drosophila)	0.014790903	0.012125092
Mdga2	MAM domain containing glycosylphosphatidylinositol anchor 2	3.74E-11	0.017296099
Mef2c	myocyte enhancer factor 2C	0.008353399	0.002577155
Ntm	neurotrimin	0.011985522	0.044375612

Rabgap1l	RAB GTPase activating protein 1-like	0.044469567	0.001785805
Rin2	similar to Ras and Rab interactor 2; Ras and Rab interactor 2	4.61E-09	2.11E-08
Sepsecs	Sep (O-phosphoserine) tRNA	6.53E-07	0.00153469
Slc35a2	solute carrier family 35 (UDP-galactose transporter), member A2	0.007163381	0.006114679
Sorbs2	sorbin and SH3 domain containing 2	0.003283078	0.000776979
Sorcs1	VPS10 domain receptor protein SORCS 1	0.001037955	0.009029728
Sp110	predicted gene 15753; Sp110 nuclear body protein	0.003851627	0.001195924
Syt4	synaptotagmin IV	0.013634086	0.037736076
Zfp658	cDNA sequence BC043301	0.013288823	0.012528656
Zfp71-rs1	zinc finger protein 71, related sequence	0.041686509	0.034138712

Supplementary Table 1. 39 common gene loci identified from pre & postnatal nicotine and postnatal nicotine treated group (adj.p<0.05)

ID	Gene Name	FDR (pre&postnatal)	FDR (postnatal)
2210408I21Rik	RIKEN cDNA 2210408I21 gene	8.93E-07	0.038155606
A530032D15Rik	RIKEN cDNA A530032D15Rik gene	0.038008176	2.09E-05
Acacb	acetyl-Coenzyme A carboxylase beta	1.07E-14	3.43E-05
Adam12	a disintegrin and metalloproteinase domain 12 (meltrin alpha)	6.76E-08	0.037369502
Aldh1b1	aldehyde dehydrogenase 1 family, member B1	0.065952838	0.088568177
Ank1	ankyrin 1, erythrocytic	6.76E-08	0.037369502
Ank3	ankyrin 3, node of Ranvier (ankyrin G)	0.025089193	0.03170677
Ano2	anoctamin 2	5.40E-18	4.32E-07
Apool	apolipoprotein O-like	0.001118347	0.016145928
Atp5g1	ATP synthase, H ⁺ transporting, mitochondrial F0 complex, subunit C1 (subunit 9)	0.079697042	0.079697042
Atrnl1	attractin-like 1	1.49E-05	0.080044326
AU015836	expressed sequence AU015836	0.050596023	0.01451473
Auts2	autism susceptibility candidate 2	5.36E-16	0.000136714
C130026I21Rik	RIKEN cDNA C130026I21 gene	0.021802715	0.000372029
Cdc73	Cell division control protein 73	0.073836761	0.088726114
Cdk5rap2	CDK5 regulatory subunit associated protein 2	1.78E-07	0.047926553
Chd9	chromodomain helicase DNA binding protein 9	0.048521886	0.002718363
Chl1	cell adhesion molecule with homology to L1CAM	4.67E-09	1.51E-11
Cpeb1	cytoplasmic polyadenylation element binding protein 1	0.042573761	0.040368177
Csda	cold shock domain protein A	1.06E-14	3.43E-05
D6Wsu163e	DNA segment, Chr 6, Wayne State University 163, expressed	0.071347961	0.04566623
Dlg2	discs, large homolog 2	0.057139925	0.049376395
Eif4a2	eukaryotic translation initiation factor 4A2	0.044916064	0.036176643
Elavl2	ELAV (embryonic lethal, abnormal vision)-like 2 (Hu antigen B)	0.004157577	0.051964561
Fam19a3	family with sequence similarity 19 (chemokine (C-C motif)-like), member A3	0.08058543	0.002718363
Fastkd2	FAST kinase domains 2	0.055335149	0.077897659
Fbxw4	F-box and WD repeat domain containing 4	0.033310937	0.000184038
Fgf12	fibroblast growth factor 12	0.039388541	0.000184038
Gas8	growth arrest-specific 8	0.097730225	0.063671548
Glis3	GLIS family zinc finger 3	0.088618788	0.004125082
Gm13152	predicted gene 13152	0.037492077	0.062014274
Gpr19	G protein-coupled receptor 19	0.037900534	0.038098746
Hdac10	histone deacetylase 10	0.075936628	0.061014668
Ing4	inhibitor of growth family, member 4	0.02856405	0.02847679
Izumo1	izumo sperm-egg fusion 1	3.56E-16	5.68E-06
Kcnq1	potassium voltage-gated channel, KQT-like subfamily, member 1	1.14E-05	0.04566623
Lage3	L antigen family, member 3	0.029330973	0.003353947
Lars2	leucyl-tRNA synthetase 2, mitochondrial	0.00103869	0.010982124
Lipc	lipase, hepatic	9.43E-06	1.17E-05

Litaf	lipopolysaccharide-induced TNF factor	1.06E-05	0.015501719
Lrrtm4	leucine rich repeat transmembrane neuronal 4	0.093643174	0.030674136
MacroD2	MACRO domain-containing protein 2	0.029330973	0.058068612
Mapk10	mitogen-activated protein kinase 10	0.0029967	0.08626202
Mbnl1	muscleblind-like 1 (Drosophila)	0.014790903	0.012125092
Mdga2	MAM domain containing glycosylphosphatidylinositol anchor 2	3.74E-11	0.017296099
Mef2c	myocyte enhancer factor 2C	0.008353399	0.002577155
NcoA1	nuclear receptor coactivator 1	0.058187811	4.76E-05
Ngdn	neuroguidin, EIF4E binding protein	0.092853631	0.077296869
Nmt1	Glycylpeptide N-tetradecanoyltransferase	0.019774984	0.093523028
Npffr2	neuropeptide FF receptor 2	0.013729635	0.097636892
Ntm	neurotrimin	0.011985522	0.044375612
Pank1	pantothenate kinase 1	0.079488186	0.090827981
Pisd-ps1	phosphatidylserine decarboxylase, pseudogene 1	0.095486187	0.003564612
Ppil2	peptidylprolyl isomerase (cyclophilin)-like 2	0.034451154	0.087426372
Prickle2	prickle homolog 2 (Drosophila)	0.051082201	0.08177247
Psd3	pleckstrin and Sec7 domain containing 3	0.093039972	0.062014274
Rabgap1l	RAB GTPase activating protein 1-like	0.044469567	0.001785805
Rin2	Ras and Rab interactor 2	4.61E-09	2.11E-08
Sepsecs	Sep (O-phosphoserine) tRNA:Sec (selenocysteine) tRNA synthase	6.53E-07	0.00153469
Sh3pxd2a	SH3 and PX domains 2A	0.07258674	0.070588595
Slc35a2	solute carrier family 35 (UDP-galactose transporter), member A2	0.007163381	0.006114679
Sorbs2	sorbin and SH3 domain containing 2	0.003283078	0.000776979
Sorcs1	sortilin-related VPS10 domain containing receptor 1	0.001037955	0.009029728
Sp110	Sp110 nuclear body protein	0.003851627	0.001195924
Sumf2	sulfatase modifying factor 2	0.003851627	0.049635918
Syt4	synaptotagmin IV	0.013634086	0.037736076
Taz	tafazzin	0.09617633	0.003253765
Wdr34	WD repeat domain 34	0.058187811	0.040777754
Wwc2	WW and C2 domain containing 2	0.025783257	0.067486457
Zfp658	cDNA sequence BC043301	0.013288823	0.012528656
Zfp71-rs1	zinc finger protein 71, related sequence	0.041686509	0.034138712
Spag17-ps	sperm associated antigen 17 pseudogene	0.003680777	0.064997816
Rbfox2	RNA binding protein, fox-1 homolog	8.10E-05	0.086608937

Supplementary Table 2. 73 common gene loci identified from pre & postnatal nicotine and postnatal nicotine treated group (adj.p<0.05)

Gene Symbol	Gene Name	Gene Ontology Group					
		GO:0045202~synapse	GO:0044456~synapse part	GO:0014069~postsynaptic density	GO:0045211~postsynaptic membrane	GO:0030054~cell junction	GO:0044459~plasma membrane part
Ank3	Ankyrin 3	X					
Caly	Calcyon neuron-specific vesicular protein						X
Camk2a	Calcium/calmodulin-dependent protein kinase II alpha	X	X			X	X
Chrm1	Cholinergic receptor, muscarinic 1	X	X		X	X	X
Cldn23	claudin 23					X	X
Cog4	component of oligomeric golgi complex 4						X
Cpeb1	cytoplasmic polyadenylation element binding protein 1	X	X	X	X	X	X
Csda	Cold-shock domain protein A					X	X
Dlg2	discs, large homolog 2 (Drosophila)	X	X	X	X	X	X
Dlgap2	discs, large (Drosophila) homolog-associated protein 2	X	X	X	X	X	X
Dnmbp	dynamin binding protein	X	X			X	X
Ephbp3	EPH receptor B3						X
Gabra1	gamma-aminobutyric acid (GABA) A receptor, alpha 1	X	X		X	X	X
Gria3	glutamate receptor, ionotropic, AMPA 3	X	X	X	X	X	X
Grin1	glutamate receptor, ionotropic, N-methyl D-aspartate 1 (Zeta 1)	X	X	X	X	X	X
Kcnq1	potassium voltage-gated channel, KQT-like subfamily, member 1						X
Kctd16	potassium channel tetramerization domain containing 16						X
Litaf	lipopolysaccharide- induced TNF factor						X
Lrrk2	leucine-rich repeat kinase 2	X	X				
Magi2	membrane associated guanylate kinase, WW and PDZ domain contain	X				X	X
Npffr2	neuropeptide FF receptor 2						X
Ppt1	palmitoyl-protein thioesterase 1	X	X				
Prickle2	prickle homolog 2 (Drosophila)						X
Psd3	pleckstrin and Sec7 domain containing 3	X	X	X	X	X	X
Rab3c	member RAS oncogene family	X	X				X
Rims2	regulating synaptic membrane exocytosis 2	X				X	X
Shroom4	shroom family member 4						X
Slc4a10	solute carrier family 4, sodium bicarbonate transporter, member 10						X
Speed2	sprouty-related, EVH1 domain containing 2						X
Syt4	synaptotagmin IV	X	X			X	X
Syt12	synaptotagmin-like 2						X
Tnfrsf1	tumor necrosis factor, alpha-induced protein 1 (endothelial)						X
Vwf	von Willebrand factor 2						X
Xirp2	xin actin-binding repeat containing 2						X

Supplementary Table 3. Significant Gene Ontology Groups for H3MeK4 sequencing data of tissue from pre- and postnatal nicotine treated subjects.

Gene Symbol	Gene Name	Gene Ontology Group					
		GO:0045202--synapse	GO:0044456--synapse part	GO:0014069--postsynaptic density	GO:0045211--postsynaptic membrane	GO:0030054--cell junction	GO:0044459--plasma membrane part
Alk	anaplastic lymphoma receptor tyrosine kinase						X
Anks1b	ankyrin repeat and sterile alpha motif domain containing 1B	X	X	X	X	X	X
Arhgef2	ADP-ribosylation factor guanine nucleotide-exchange factor 2	X					X
Cacnb4	calcium channel, voltage-dependent, beta 4 subunit						X
Cdh13	cadherin 13 (T-cadherin)						X
Cdh4	Cadherin 4						X
Chrna3	cholinergic receptor, nicotinic, alpha 3 (neuronal)	X	X	X	X	X	X
Cpeb1	cytoplasmic polyadenylation element binding protein 1	X	X	X	X	X	X
Csda	Cold-shock domain protein A	X					X
Ctnna1	catenin (cadherin- associated protein), alpha 1	X					X
Cybrd1	cytochrome b reductase 1						X
Dlg2	discs, large homolog 2 (Drosophila)	X	X	X	X	X	X
Dsc1	desmocollin 1	X					X
Fblim1	filamin binding LIM protein 1	X					X
Fmn1	formin 1	X					X
Fn1	fibronectin 1						X
Grid2ip	glutamate receptor, ionotropic, delta 2 (Grid2) interacting protein	X	X	X	X	X	X
Grin2c	glutamate receptor, ionotropic, N-methyl D-aspartate 2C	X	X	X	X	X	X
Grin2d	glutamate receptor, ionotropic, N-methyl D-aspartate 2D,	X	X	X	X	X	X
Grip1	glutamate receptor interacting protein 1	X	X		X	X	X
Kcnc1	potassium voltage-gated channel, KQT-like subfamily, member 1						X
Lmo7	LIM domain only 7						X
Magi1	membrane associated guanylate kinase, WW and PDZ domain containing 1						X
Mmp16	matrix metalloproteinase 16 (membrane-inserted)						X
Mt3	metallothionein 3	X	X	X	X	X	X
Npffr2	neuropeptide FF receptor 2	X					X
Odz3	Oz/ten-m homolog 3 (Drosophila)	X				X	X
Prickle2	prickle homolog 2 (Drosophila)	X					X
Psd3	pleckstrin and Sec7 domain containing 3	X	X	X	X	X	X
Pvrl4	poliovirus receptor-related 4	X					X
Rimbp2	Rims binding protein 2	X				X	X
Scn1a	sodium channel, voltage -gated, type I, alpha subunit	X					X
Shank2	SH3 and multiple ankyrin repeat domains 2	X	X	X	X	X	X
Slc2a3	solute carrier family 2 (facilitated glucose transporter), member 3						X
Slc4a4	solute carrier family 4 (sodium bicarbonate cotransporter), member 4						X
Sorbs3	sorbin and SH3 domain containing 3	X					X
Spred2	sprouty-related, EVH1 domain containing 2						X
Syt4	synaptotagmin IV	X			X	X	X
Utrn	Utrophin	X				X	X
Vmn1r81	vomer nasal 1 receptor 81						X

Supplementary Table 4. Significant Gene Ontology Groups for H3MeK4 sequencing data of tissue from postnatal-only nicotine treated subjects.

ChIP-PCR primers (H3K4me3)

Target	Forward	Reverse
Acacb	5'-ggaagtgactcatgcctgt-3'	5'-gagcagtcgggtgctcttac-3'
Ank1	5'-ctcgtggccattttcctaa-3'	5'-cccgtgcagtaagttctc-3'
Ank3	5'-cctcagtgattctgggaga-3'	5'-aacactggggcagaacatc-3'
Ano2	5'-ccagtggcttccgattgtat-3'	5'-gaatggaatggagcaggcta-3'
Apool	5'-ttaatccctgctgggtaactg-3'	5'-ttttgtctgtttgccaca-3'
Auts2	5'-ccaagtgagcctctggtt-3'	5'-gatcctaaacggcagcagag-3'
Cdk5rap2	5'-ataggccgaggtgcagtaga-3'	5'-ccacccattgttacctgtc-3'
Chd9	5'-gaacaaatgtacgccctcgt-3'	5'-atgacatcaacctgccttc-3'
Chl1	5'-ccttgctgaaagattgctg-3'	5'-cctgaattgttagccgcaat-3'
Cpeb1	5'-gcttgatacctgcctctg-3'	5'-cagaggtgggaaaagcat-3'
Csda	5'-tccagattgtgcaggtga-3'	5'-tagccctccttaggccttc-3'
Eif4a2	5'-gactccagatgtggggaga-3'	5'-cccctctcgacagaacccta-3'
Fbxw4	5'-taactcggagccatctct-3'	5'-cggcctcactcactagaag-3'
Fgf12	5'-tcacacgtttgtgacct-3'	5'-gatcaaggagctggctatcg-3'
Gpr19	5'-agcacgagagggaaagaa-3'	5'-tgcttgctgctgtgtatc-3'
Ing4	5'-ctcgtgtagatgaccgtga-3'	5'-aatacatcccagcagccatc-3'
Izumo1	5'-acgtggaagtcctgaccatc-3'	5'-cctgtctgggctagcatttc-3'
Kcnq1	5'-cccactttctctcagcctg-3'	5'-aaaacgggcaagagagttga-3'
Lage3	5'-aatccctggagagtcctct-3'	5'-tgctgtcctccttcaacc-3'
Lars2	5'-gctgtacctgtgcaaacct-3'	5'-agcagctcatgcctagctc-3'
Lipc	5'-agaggccggaggattactgt-3'	5'-cttgagcccagaagtccaag-3'
Litaf	5'-gcagatgctgggtatcggtt-3'	5'-agatggctctgctggctgt-3'
Mbnl1	5'-acaaactccatcgaaatc-3'	5'-tcagccgtgtgctcagtaac-3'
Mdga2	5'-attacgagggtgggaagt-3'	5'-aaaatgccagcacagaaacc-3'
Mef2c	5'-acacacgcacacttcgtctc-3'	5'-gcctgaagtgcttctccac-3'
Rabgap1l	5'-ctgccgggagattcttaca-3'	5'-aggaggaccgagtcacctt-3'
Rin2	5'-ccatgatattccaccaagg-3'	5'-tctttccctggggttctt-3'
Sepsecs	5'-tgggactattcaggccaac-3'	5'-gctgatttggagcctgag-3'
Slc35a	5'-ggagcaacggaaccaataaa-3'	5'-atttcaaatgggtggcttcg-3'
Sorbs2	5'-gcggttatccaactgcatct-3'	5'-ttcctcctgaaaacgtcac-3'
Sorcs1	5'-attaaacgcgtcaagcacct-3'	5'-cgtgtcttcagcttctcc-3'
Sp110	5'-ttgcttggtcctctcactct-3'	5'-gtatcaccgcaggatgtgtg-3'
Syt4	5'-tgctttggcctcgtctca-3'	5'-gcggtttaccctcactcac-3'
Zfp658	5'-ggccatgacagctcctaaa-3'	5'-atatgaccgctcgagaccac-3'
Zfp71-rs1	5'-ccgaactccttggtgtgtt-3'	5'-atccaaaccaagacactcg-3'

ChIP-PCR primers (Control GAPDH H3K4me3)

Target	Forward	Reverse
Gapdh (1)	5'-ccctgaactaaggggaaag-3'	5'-ttcatcctccagaaaccag-3'
Gapdh (2)	5'-acatcaccccatcactcat-3'	5'-tccccttagttcgaggact-3'

ChIP-PCR primers (Acetylation)

Target	Forward	Reverse
Mef2c	5'-cacgcatctcaccgcttgacg-3'	5'-caccagtgcccttctgcttctcc-3'

qRT-PCR primer list

Target	Forward	Reverse
Ash2L	5'-ccgaaagtggggatgcaaact-3'	5'-gtcagcgggtgaaccattttgt-3'
Cep192	5'-aaggtggatctttcaacacagac-3'	5'-cgataacaggggttcagcaat-3'
Cflar	5'-cagaggcaagatagccaagg-3'	5'-tggatgttcttcaggctttt-3'
Chsy3	5'-agtctttgctcctactacggc-3'	5'-gtcccgaaaactgggacct-3'
Ctnna1	5'-tcttctgcccctggtttctca-3'	5'-cctgtcccacacgctgaat-3'
Duox1	5'-aaaacaccaggaacggattgt-3'	5'-agaagacattgggctgtaggg-3'
Gmeb1	5'-gagaacccggaagacactaaaac-3'	5'-ggctacaactgctgcgctat-3'
Nrp	5'-tgggagccgtcatcgactt-3'	5'-gctcgacattacagctcactg-3'
Ntrk2	5'-ctggggcttatgcctgctg-3'	5'-aggctcagtacaccaaatccta-3'
Sucla2	5'-acccttcgctgcatgaatac-3'	5'-cctgtgcctttatcacaacatcc-3'
Tmem107	5'-aattcaccgccggaggaatacg-3'	5'-agggtttcttttcagcccaa-3'
Unc13b	5'-ccagaacgtgaagagcacia-3'	5'-cagtccttgttccacacct-3'
Zcchc11	5'-agagtgaactcgtctctcc-3'	5'-aacatacaacctcagtgaaattc-3'
Zfp597	5'-agcagagaagccccattgaag-3'	5'-tcagagtagtgaacaacgggt-3'
Zfp91	5'-gacctctatctctgccttcg-3'	5'-aaggagccagcttggacct-3'

Target	Forward	Reverse
Mef2c	5'-atcccgatgcagacgattcag-3'	5'-aacagcacacaatcttgcct-3'
Gapdh	5'-aggtcgggtgaacggatttg-3'	5'-ttagaccatgtagttgaggta-3'

pAAV-shRNA cloning primer

Target	Forward	Reverse
pAAV-shRNA	5'-cccctgaacctgaaacataaa-3'	5'-cacagactgtgggagaagc-3'

Supplementary Table 5. Primer list used in ChIP-PCR, qRT-PCR, and cloning