

Supplementary Table 2. Genes differentially expressed in both the medial prefrontal cortex (mPFC) of Shn-2 KO mice and Brodmann area (BA) 10 of schizophrenia postmortem brains.

Bioset Rank in schizophrenia	Symbol	Probe ID	PFC in Shn-2 KO		BA10 in schizophrenia ¹		Association/linkage study ^{*1}	Other postmortem brain studies ^{*1, 2}	Neuron from iPS cell ⁵	Notes
			Fold change	P value	Probe ID	Fold change				
2	Serpina3n	1419100_at	1.54	3.6E-03	202376_at	2.85		↑ (2-4)	↓	inflammatory response
4	C1qb	1437726_x_at	1.37	8.0E-03	202953_at	2.38	(6)	↑ (7)		inflammatory response
4	C1qb	1417063_at	1.30	7.2E-03						
4	C1qb	1434366_x_at	1.27	1.2E-02						
8	C1qc	1449401_at	1.39	4.0E-04	225353_s_at	2.20				inflammatory response
17	C10orf10	1433837_at	1.25	4.8E-02	209183_s_at	2.01		↑ (7)		mitochondrion
22	Rgs4	1416286_at	-1.25	2.0E-02	204338_s_at	-1.96	(8, 9)	↓ (4, 10-13)		calmodulin binding, regulating the duration of postsynaptic signaling for G-coupled neurotransmitter receptors (14)
34	Ifitm2	1417460_at	1.31	2.6E-02	201315_x_at	1.82		↑ (2, 3, 10)	↑	interferon signaling, immune response
37	C1qa	1417381_at	1.31	1.9E-03	218232_at	1.78	(6)	↑ (7)		inflammatory response
46	Myt1l	1439702_at	1.22	3.2E-02	1554633_a_at	-1.70	(15)	↓ (4)	↑	cell differentiation
49	Tac1	1416783_at	-1.44	1.2E-02	206552_s_at	-1.68	(16, 17)	↓ (4, 11)		inflammatory response
54	Cebpd	1423233_at	1.40	3.5E-02	203973_s_at	1.67	(18)	↑ (4, 10, 19)		bZIP transcription factor
57	Frzb	1448424_at	-2.30	3.2E-02	203697_at	-1.65			↑	Wnt-protein binding
70	Ifitm1	1424254_at	1.53	1.0E-02	201601_x_at	1.62		↑ (3, 10)	↑	interferon signaling
73	Tgfbr1	1420895_at	1.20	1.7E-02	224793_s_at	1.61	(16)	↑ (7, 20)		immune system process
84	Frzb				203698_s_at	-1.59			↑	Wnt-protein binding
87	Ddit4	1428306_at	1.25	4.5E-03	202887_s_at	1.58		↑ (4, 11)	↑	response to hypoxia
87	Ifitm1				214022_s_at	1.58		↑ (3, 10)	↑	interferon signaling
96	Cbln4	1433607_at	-1.81	2.9E-03	234024_at	-1.56	(21)			synapse development and synaptic plasticity (22)
96	Tgm2	1437277_x_at	1.38	3.5E-02	201042_at	1.56	(23, 24)	↑ (7)		inflammatory response
96	Tgm2	1433428_x_at	1.36	2.6E-02						
96	Tgm2	1455900_x_at	1.34	2.7E-02						
96	Tgm2	1417500_a_at	1.21	5.0E-02						
123	Mal2	1427042_at	-1.35	1.0E-03	224650_at	-1.52			↑	oligodendrocyte (25)
123	Slc14a1	1428114_at	1.34	2.3E-02	205856_at	1.52		↑ (4, 26, 27)		urea transporter
138	Mthfd2	1419254_at	-1.29	2.8E-02	201761_at	1.50			↑	
150	Gfap	1426509_s_at	1.70	4.4E-02	229259_at	1.48	(28)	↓ (29, 30, 31)	↓	astrocyte marker, inflammation
150	Rgs4				204339_s_at	-1.48	(8, 9)	↓ (4, 10-13)		calmodulin binding, regulating the duration of postsynaptic signaling for G-coupled neurotransmitter receptors (14)
158	D0H4S114	1450839_at	-1.24	2.9E-02	201309_x_at	-1.47		↓ (4, 10, 11, 37)	↑	regulation of transforming growth factor beta receptor signaling pathway
173	Fbxo9	1432211_a_at	-1.23	1.8E-02	1566509_s_at	-1.46		↓ (4, 11)	↓	protein ubiquitination
181	Syn2	1435511_at	1.47	1.6E-02	210315_at	-1.45	(32)	↓ (4, 10)		synaptic transmission

190	Gadd45b	1449773_s_at	1.65	2.1E-02	207574_s_at	1.44		↑ (4, 10)		MAPKKK cascade, neural activity dependent (33)
190	Gadd45b	1450971_at	1.56	1.9E-02						
205	Chml	1422322_at	1.22	1.8E-02	226350_at	-1.43				
205	Gabra1	1421280_at	-1.32	8.2E-03	244118_at	-1.43	(34)	↓ (4)		GABA receptor
237	Car10	1445497_at	1.27	6.3E-03	220889_s_at	-1.41				
237	Cebpb	1418901_at	1.39	1.3E-02	212501_at	1.41		↑ (4)		inflammatory response
237	Cebpb	1427844_a_at	1.34	1.7E-02						
237	Rab3b	1422583_at	-1.25	2.6E-03	227123_at	-1.41		↓ (4)		synaptic vesicle protein, inhibitory synapse (35)
256	Tasp1	1424810_at	-1.24	2.0E-02	219443_at	-1.40		↓ (4)		
273	Hk2	1422612_at	1.25	2.2E-03	202934_at	1.39				
294	RP11-35N6.1	1436733_at	-1.20	2.1E-02	219732_at	-1.38			↑	
311	Gng4	1417943_at	-2.26	4.0E-04	1555867_at	-1.37				
311	Gng4	1447669_s_at	-2.21	3.0E-04						
311	Ms4a6b	1418826_at	1.31	2.6E-02	219666_at	1.37		↑ (4, 7)		
333	Kif10	1416029_at	1.65	3.0E-02	202393_s_at	-1.36				immune system process
366	Cbln4				242524_at	-1.35	(21)			synapse development and synaptic plasticity (22)
366	Fcgr3	1448620_at	1.27	1.0E-02	203561_at	1.35				
366	Nrxn3	1442423_at	-1.22	2.9E-02	215021_s_at	-1.35	(21)	↓ (4)	↑	synaptic transmission, cell adhesion
392	Ctsc	1416382_at	1.22	1.6E-02	201487_at	1.34			↑	immune response
392	Etv5	1450082_s_at	-1.33	3.9E-03	203348_s_at	-1.34		↑ (10)		
392	Glice	1428374_at	1.33	4.3E-02	213552_at	-1.34				
431	AI593442	1444026_at	-1.23	4.6E-02	236532_at	-1.33		↓ (10)		
431	C10orf10				209182_s_at	1.33		↑ (7)		
431	Fbxo9				210638_s_at	-1.33		↓ (4)	↓	
431	KIAA1199	1429987_at	-1.72	7.3E-05	212942_s_at	-1.33			↑	
431	Pdlim1	1416554_at	-1.35	7.2E-03	208690_s_at	1.33		↑ (4), ↓ (10)	↑	
431	Pygl	1417741_at	-1.24	4.6E-02	202990_at	1.33			↑	
431	Tyrobp	1450792_at	1.22	9.0E-04	204122_at	1.33				
490	Asph	1425274_at	-1.29	4.8E-03	225008_at	1.32		↑ (4), ↓ (10)		
490	Mbp	1425264_s_at	-1.30	2.8E-03	210136_at	-1.32	(28, 36)	↓ (4)		immune response, myelination
490	Ppp1r14c	1417701_at	-1.25	2.9E-03	226907_at	-1.32		↓ (4)	↑	inhibitor of protein phosphatase 1
523	Car10	1458123_at	1.24	2.0E-02	223550_s_at	-1.31				
523	Cyba	1454268_a_at	1.22	1.3E-02	203028_s_at	1.31		↑ (4)	↑	inflammatory response
523	Etv5	1428142_at	-1.25	1.0E-02	203349_s_at	-1.31		↑ (10)		
523	Fbxo9				212987_at	-1.31		↓ (4)	↓	
523	Kcnma1	1425987_a_at	-1.24	7.9E-03	221583_s_at	-1.31	(21)		↓	
523	Kcnma1	1424848_at	-1.20	5.5E-03						
559	Bcl11a	1446293_at	1.24	2.3E-02	222891_s_at	-1.30				immune system process
559	Ms4a6b				223280_x_at	1.30		↑ (4)		

612	Cacna1g	1423365_at	1.51	1.2E-02	210380_s_at	-1.29		↓(10)	↑	
612	Gabra1	1421281_at	-1.31	9.9E-03	206678_at	-1.29	(34)	↓(4), ↑(10)		GABA receptor
612	Gabra1	1436889_at	-1.20	9.5E-03						
612	H2-Ab1	1450648_s_at	1.27	2.7E-02	212998_x_at	1.29		↑(4)		immune response
669	Cxadr	1453282_at	-1.23	3.2E-02	226374_at	-1.28				
669	Hlf	1434735_at	-1.30	2.1E-02	204755_x_at	-1.28		↓(37)		
669	Hlf	1434736_at	-1.26	4.5E-02						
669	Lyn	1451318_a_at	1.24	1.0E-04	202625_at	1.28	(21)			immune system process
669	Ms4a6b				224356_x_at	1.28				
669	Tmem200a	1436304_at	1.27	9.7E-03	234994_at	-1.28				
730	Lbh	1429088_at	-1.26	1.1E-03	221011_s_at	-1.27		↓(4)		
730	Rgs4				204337_at	-1.27	(8, 9)	↓(4, 10-13)		calmodulin binding, regulating the duration of postsynaptic signaling for G-coupled neurotransmitter receptors (14)
730	S100a10	1456642_x_at	1.30	4.0E-03	200872_at	1.27				interact with 5-HT1bR, calcium ion binding, implicated in depression (38)
730	S100a10	1416762_at	1.26	5.7E-03						
797	Bcl11a				219497_s_at	-1.26				
797	Mbp				1554544_a_at	-1.26				immune response, myelination
797	Nnat	1423506_a_at	1.45	3.9E-02	204239_s_at	-1.26		↓(4)		
797	Pde10a	1419390_at	1.23	2.9E-02	205501_at	-1.26	(39)		↑	cAMP/PKA signaling, PDE10A inhibitors are currently being evaluated in clinical trials for the treatment of schizophrenia(40)
797	Tgfb1	1420653_at	1.32	2.1E-02	203085_s_at	1.26		↑(4)	↓	inflammatory response
797	Zbtb16	1439163_at	-1.21	2.7E-02	244697_at	1.26	(41)	↑(4)	↓	immune system development
894	9430020K01Rik	1428535_at	-1.21	4.9E-03	231841_s_at	-1.25	(42)	↓(4)		
894	Cntnap4	1419044_at	-1.21	3.2E-02	1553442_a_at	-1.25		↓(4)	↑	cell adhesion
894	Cntnap4				1554377_a_at	-1.25				
894	Csf1r	1419873_s_at	1.22	1.5E-02	203104_at	1.25		↓(19)		transmembrane receptor protein tyrosine kinase signaling pathway
894	Csf1r	1419872_at	1.21	1.5E-03						
894	Fam149a	1437950_at	-1.26	3.0E-03	214890_s_at	-1.25		↓(10)		
894	Gfap				203540_at	1.25		↓(10)	↓	
894	Kcnf1	1454768_at	-1.58	6.0E-04	210263_at	-1.25			↓	cellular process
894	Kcnf1	1441300_at	-1.28	5.1E-03						
894	Krt222	1457354_at	-1.22	2.4E-02	244111_at	-1.25		↓(4)		
894	Pvrl3	1423331_a_at	-1.56	6.4E-03	213325_at	-1.25		↑(4)		cell adhesion
894	Pvrl3	1448673_at	-1.48	3.7E-02						
894	Slc30a3	1460654_at	1.29	2.7E-03	207035_at	-1.25				cellular process
986	Ass1	1416239_at	-1.24	1.1E-02	207076_s_at	-1.24		↓(10)	↑	

986	D0H4S114				201310_s_at	-1.24	(41)	↓(4, 37)	↑	
986	H2-T23	1449556_at	-1.30	6.0E-03	200905_x_at	1.24	(43)	↓(10), ↑(11)	↓	immune response
986	Hdac9	1434572_at	-1.40	1.1E-02	1552760_at	-1.24		↓(4)		inflammatory response
986	Lyn				202626_s_at	1.24	(21)	↑(7)		inflammatory response
986	Nrsn1	1418588_at	-1.25	7.7E-06	239293_at	-1.24		↓(4)		
986	Nrxn3				205795_at	-1.24	(21)	↓(4)	↑	neurotransmitter secretion
986	Nrxn3				229649_at	-1.24		↓(4)		
986	Pxn	1456135_s_at	1.33	1.8E-02	201087_at	1.24		↑(10)		cellular response to oxidative stress
986	Pxn	1424027_at	1.27	8.3E-03						
986	Serpinf1	1453724_a_at	1.35	2.0E-02	202283_at	-1.24				regulation of cell development
1101	C3ar1	1419482_at	1.20	4.5E-02	209906_at	1.23				inflammatory response
1101	Cxadr				203917_at	-1.23				regulation of cell proliferation
1101	Epha4	1421928_at	-1.25	1.2E-02	228948_at	-1.23	(44)	↓(4)	↑	transmembrane receptor protein tyrosine kinase signaling pathway
1101	Galnt13	1457045_at	-1.26	1.6E-02	234472_at	-1.23		↓(4)	↓	
1101	Hecw2	1455150_at	-1.31	2.6E-02	232080_at	-1.23	(45)	↓(10)		
1101	Ms4a6b				223922_x_at	1.23				
1101	Spa17	1417635_at	-1.22	4.8E-02	205406_s_at	-1.23		↓(10)		
1218	Cntnap4				232388_at	-1.22				
1218	Epha4				229374_at	-1.22				
1218	Fam19a1	1457092_at	-1.43	1.8E-02	230923_at	-1.22	(21)			
1218	Psrc1	1417323_at	-1.27	2.0E-04	201896_s_at	1.22			↓	
1218	Ptprn2	1457874_at	-1.22	3.2E-02	203030_s_at	-1.22	(21, 46)	↓(4), ↑(10)	↑	
1218	Rhoc	1448605_at	1.24	3.8E-02	200885_at	1.22			↓	
1218	Slc8a1	1440201_at	-1.25	8.3E-03	241752_at	-1.22	(47)	↓(4), ↑(4)		cytosolic calcium ion homeostasis
1356	1810041L15Rik	1429440_at	1.33	6.7E-03	52837_at	-1.21			↑	
1356	1810041L15Rik	1455515_at	1.22	9.0E-03						
1356	6330527O06Rik	1423853_at	-1.40	2.6E-02	219463_at	-1.21			↑	
1356	Aif1	1418204_s_at	1.27	5.1E-03	215051_x_at	1.21		↓(37)		inflammatory response
1356	Etv5				216375_s_at	-1.21		↑(10, 11), ↓(19)		cellular response to oxidative stress
1356	Fam149a				214889_at	-1.21		↓(10)		
1356	Fstl5	1436800_at	1.35	1.9E-02	232010_at	-1.21	(45)		↑	
1356	Hpca	1450930_at	1.26	4.2E-03	205454_at	-1.21				
1356	Hpca	1425833_a_at	1.22	3.9E-02						
1356	Idi1	1423804_a_at	-1.27	4.9E-02	208881_x_at	-1.21		↓(4)		
1356	N28178	1455023_at	-1.21	2.9E-02	213636_at	-1.21		↓(4)		
1356	S1pr3	1438658_a_at	-1.67	4.8E-06	228176_at	1.21			↑	inflammatory response
1356	S1pr3	1437173_at	-1.28	3.8E-03						inflammatory response
1356	Sla	1420819_at	1.30	1.2E-02	203760_s_at	1.21				

1517	Bcl11a			219498_s_at	-1.20		↓(11)	immune system development
1517	Cd53	1448617_at	1.21	3.1E-03	203416_at	1.20	↓(19)	
1517	Rnf149	1440344_at	1.21	3.9E-02	243178_at	1.20	↓(4), ↑(4, 10)	
1517	Sept6	1460286_at	-1.28	5.7E-03	1555526_a_at	-1.20	↓(4, 10)	↑
1517	Slc8a1			238546_at	-1.20	(47)		cytosolic calcium ion homeostasis
1517	Syn2	1460230_at	1.23	3.8E-02	229039_at	-1.20	↓(4, 10), ↑(7)	neurotransmitter secretion
1517	Tns1	1449405_at	1.34	1.6E-02	221748_s_at	1.20	↑(4, 10, 11)	
1517	Tns1	1419283_s_at	1.32	9.5E-03				

PFC, prefrontal cortex; iPS cell, induced pluripotent Stem Cell

up-regulated genes in both Shn-2 KO mice and schizophrenia

down-regulated genes in both Shn-2 KO mice and schizophrenia

*1: Studies of schizophrenia or bipolar disorder

*2: Genes up- (↑) or down-regulated (↓) in the post-mortem brains of SCZ and/or BD patients (identified by curated studies in NextBio (<http://www.nextbio.com>))

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