

**S1 Table.** 382 candidate genes for brain development and their betweenness and permutation FDRs.

<b>Ensembl ID of genes</b>	<b>Gene name</b>	<b>Betweenness</b>	<b>Permutation FDR</b>
ENSP00000241651	MYOG	88	0
ENSP00000245960	CDC25B	38	0
ENSP00000247182	SIX1	88	0
ENSP00000248150	GNG13	84	0
ENSP00000253408	GFAP	88	0
ENSP00000261937	FLT4	88	0
ENSP00000261951	CNOT6	88	0
ENSP00000263094	ABCA7	88	0
ENSP00000267859	BNIP2	133	0
ENSP00000269280	NLRP1	88	0
ENSP00000282588	ITGA1	88	0
ENSP00000284440	UCHL1	88	0
ENSP00000287934	FZD1	88	0
ENSP00000290663	MED8	88	0
ENSP00000300619	ZNF91	88	0
ENSP00000301464	IGFBP6	88	0
ENSP00000318195	NCL	174	0
ENSP00000344666	NF2	88	0
ENSP00000347198	SRGAP1	339	0

ENSP00000351832	RAB3GAP2	88	0
ENSP00000357393	EFNA3	88	0
ENSP00000359151	DBT	88	0
ENSP00000362592	RBBP4	179	0
ENSP00000363826	FZD8	88	0
ENSP00000366413	POU4F1	88	0
ENSP00000370445	HTN3	88	0
ENSP00000175506	ASNS	88	0.002
ENSP00000224237	VIM	88	0.002
ENSP00000229195	CNOT2	88	0.002
ENSP00000311360	RAD9A	88	0.002
ENSP00000329623	BCL2	570	0.002
ENSP00000349959	RICTOR	88	0.002
ENSP00000354478	DLX1	88	0.002
ENSP00000354720	SMC3	88	0.002
ENSP00000373715	DCP2	97	0.002
ENSP00000410076	CASP1	88	0.002
ENSP00000260810	TOPBP1	88	0.004
ENSP00000296930	NPM1	174	0.004
ENSP00000307235	EIF2AK3	88	0.004
ENSP00000320949	CNOT1	88	0.004
ENSP00000330633	CNTN2	88	0.004

ENSP00000340820	MAPT	94	0.004
ENSP00000341551	SMAD4	415	0.004
ENSP00000354511	COMT	88	0.004
ENSP00000354673	CNOT4	88	0.004
ENSP00000370421	PDX1	88	0.004
ENSP00000381717	UBE2D2	88	0.004
ENSP00000403721	CYP21A2	88	0.004
ENSP00000255764	MED10	88	0.006
ENSP00000262030	ATP5B	168	0.006
ENSP00000263923	KDR	98	0.006
ENSP00000280193	VEGFC	62	0.006
ENSP00000312122	SEC13	88	0.006
ENSP00000355370	CNTF	88	0.006
ENSP00000280665	DCP1B	42	0.008
ENSP00000301587	ATP5H	6	0.008
ENSP00000320147	EZH2	88	0.008
ENSP00000321999	PTH1R	15	0.008
ENSP00000219548	STUB1	3	0.01
ENSP00000265371	NRP1	88	0.01
ENSP00000315774	NDUFS8	1	0.01
ENSP00000317159	CYC1	252	0.01
ENSP00000352608	RYR1	175	0.01

ENSP00000354554	MT-CYB	88	0.01
ENSP00000354876	MT-CO2	88	0.01
ENSP00000307786	CYCS	250	0.012
ENSP00000230538	LAMA4	64	0.014
ENSP00000336790	ATF4	168	0.014
ENSP00000396219	MEF2C	88	0.014
ENSP00000281821	EPHA4	88	0.016
ENSP00000305769	SMAD1	252	0.016
ENSP00000354859	DRD2	6	0.016
ENSP00000371138	FKBP1A	186	0.016
ENSP00000264606	HDAC4	9	0.018
ENSP00000353059	APAF1	250	0.018
ENSP00000237527	GHRH	4	0.02
ENSP00000263253	EP300	740	0.02
ENSP00000297904	FIGF	3	0.02
ENSP00000309103	BAD	160	0.02
ENSP00000320171	PKM	69	0.02
ENSP00000354607	FZD5	87	0.02
ENSP00000367207	MYC	289	0.022
ENSP00000370938	CDK8	88	0.022
ENSP00000262160	SMAD2	358	0.024
ENSP00000261349	LRP6	174	0.026

ENSP00000264951	XRN1	195	0.028
ENSP00000320180	GHRHR	2	0.03
ENSP00000356016	CR1	88	0.03
ENSP00000415941	C4B	88	0.03
ENSP00000234590	ENO1	68	0.032
ENSP00000342307	FOXM1	64	0.032
ENSP00000348877	GPI	88	0.032
ENSP00000363193	MED12	1	0.032
ENSP00000316032	NUP98	88	0.034
ENSP00000379213	PTHLH	5	0.034
ENSP00000229264	GNB3	84	0.038
ENSP00000297338	RAD21	5	0.038
ENSP00000223023	WASL	120	0.04
ENSP00000245323	EFNB2	88	0.04
ENSP00000264039	GPC1	1	0.04
ENSP00000309871	RACGAP1	21	0.044
ENSP00000313950	AURKB	88	0.044
ENSP00000323421	SMC1A	83	0.044
ENSP00000353622	SIN3A	88	0.046
ENSP00000176195	SCT	147	0.048
ENSP00000395498	PAX8	86	0.048
ENSP00000400365	LAMA2	24	0.048

ENSP00000400591	SNRPE	207	0.048
ENSP00000264634	WNT5A	87	0.05
ENSP00000295731	IHH	5	0.05
ENSP00000352264	CD2AP	2	0.05
ENSP00000297261	SHH	91	0.054
ENSP00000361125	VEGFA	122	0.054
ENSP00000318351	BCKDHB	88	0.056
ENSP00000227378	HSPA8	95	0.058
ENSP00000270349	SLC6A3	6	0.058
ENSP00000228872	CDKN1B	134	0.06
ENSP00000262187	RHEB	3	0.06
ENSP00000271555	MEF2D	10	0.06
ENSP00000236850	APOA1	88	0.064
ENSP00000250448	FOXA1	1	0.064
ENSP00000256383	EIF2S1	88	0.064
ENSP00000357625	BNIP3	88	0.064
ENSP00000364133	TGFBR1	88	0.064
ENSP00000378338	GIT1	19	0.064
ENSP00000263360	EED	4	0.066
ENSP00000261023	ITGAV	54	0.068
ENSP00000007722	ITGA3	6	0.07
ENSP00000227667	APOC3	54	0.07

ENSP00000245907	C3	88	0.07
ENSP00000252102	NDUFA2	174	0.07
ENSP00000268182	IQGAP1	154	0.07
ENSP00000222330	GSK3A	6	0.074
ENSP00000244007	PLCG1	113	0.074
ENSP00000332353	PTCH1	5	0.074
ENSP00000344352	ATF3	167	0.074
ENSP00000380280	FGFR1	152	0.076
ENSP00000247170	DAAM1	1	0.08
ENSP00000319664	NUDC	141	0.082
ENSP00000392423	RELN	8	0.082
ENSP00000302665	IGF1	88	0.084
ENSP00000356024	CR2	88	0.084
ENSP00000278616	ATM	83	0.086
ENSP00000338072	AVPR2	85	0.086
ENSP00000355537	ACTN2	89	0.086
ENSP00000243050	NR4A1	135	0.088
ENSP00000351407	ARNT	69	0.09
ENSP00000278568	PAK1	50	0.094
ENSP00000388107	UBA52	88	0.094
ENSP00000302269	VAV1	132	0.096
ENSP00000364893	ARHGEF7	56	0.096

ENSP00000282397	FLT1	3	0.098
ENSP00000298552	TSC1	51	0.098
ENSP00000338799	IL6ST	89	0.098
ENSP00000254976	SNAP25	88	0.104
ENSP00000344822	S100A13	4	0.104
ENSP00000364094	ITGB1	109	0.106
ENSP00000303634	LRP8	4	0.108
ENSP00000351665	CLIP1	14	0.108
ENSP00000365891	WAS	22	0.11
ENSP00000256442	CCNB1	52	0.112
ENSP00000280357	IL18	88	0.112
ENSP00000379933	TPI1	87	0.112
ENSP00000309597	MAP3K11	5	0.114
ENSP00000354687	MT-ND1	2	0.114
ENSP00000363708	BMPR2	2	0.116
ENSP00000261205	SYT1	4	0.12
ENSP00000414006	LSM2	19	0.12
ENSP00000241014	MAPK8IP1	5	0.122
ENSP00000260402	PLCB2	4	0.122
ENSP00000264708	POMC	160	0.122
ENSP00000299293	FRS2	78	0.122
ENSP00000345571	E2F1	96	0.122



ENSP00000358622	IKBKG	88	0.124
ENSP00000287820	PPARG	86	0.126
ENSP00000310491	ARHGAP1	16	0.126
ENSP00000338018	HIF1A	261	0.126
ENSP00000379204	BMP7	62	0.128
ENSP00000360141	GNAS	84	0.13
ENSP00000256897	CCNH	23	0.134
ENSP00000301633	BIRC5	72	0.138
ENSP00000348708	UPF2	49	0.138
ENSP00000360286	RAE1	36	0.138
ENSP00000300651	MED1	64	0.14
ENSP00000215832	MAPK1	199	0.142
ENSP00000312987	HNF4A	6	0.142
ENSP00000298171	TSHR	1	0.144
ENSP00000362413	PGK1	87	0.144
ENSP00000358918	SUFU	1	0.148
ENSP00000229022	VDR	63	0.15
ENSP00000229239	GAPDH	87	0.15
ENSP00000264867	PPARGC1A	66	0.152
ENSP00000363019	UBE2D1	14	0.154
ENSP00000264246	CD80	4	0.158
ENSP00000297518	CDK5	10	0.16

ENSP00000354923	DMD	2	0.16
ENSP00000302160	LSM3	7	0.162
ENSP00000313419	CD19	88	0.166
ENSP00000363804	KLF4	6	0.166
ENSP00000310596	LSM1	41	0.168
ENSP00000216911	AURKA	29	0.174
ENSP00000258682	CAMK2B	124	0.174
ENSP00000333001	RBM8A	8	0.174
ENSP00000399968	NCOA2	80	0.176
ENSP00000267163	RB1	120	0.178
ENSP00000263754	KAT2B	30	0.18
ENSP00000282091	PTH	81	0.182
ENSP00000317714	STX4	3	0.184
ENSP00000332049	CD86	12	0.19
ENSP00000363827	HSPG2	1	0.19
ENSP00000261396	NUP133	52	0.192
ENSP00000276201	UPF3B	8	0.192
ENSP00000368169	DVL1	86	0.194
ENSP00000278916	CHEK1	100	0.198
ENSP00000300161	YWHAB	1	0.198
ENSP00000354621	SMURF1	7	0.206
ENSP00000262077	NUP153	52	0.208

ENSP00000262320	AXIN1	69	0.208
ENSP00000324890	CD28	16	0.208
ENSP00000338345	SNCA	201	0.208
ENSP00000354586	GLI2	6	0.208
ENSP00000233242	APOB	15	0.212
ENSP00000257408	KLB	1	0.214
ENSP00000290158	KPNB1	27	0.218
ENSP00000369050	CYP1A1	84	0.222
ENSP00000338934	EZR	4	0.224
ENSP00000279593	GRIN2B	95	0.244
ENSP00000237837	FGF23	1	0.246
ENSP00000331746	CALCA	61	0.246
ENSP00000302564	BCL2L1	8	0.25
ENSP00000320935	SLC2A4	3	0.25
ENSP00000304895	IRS1	136	0.258
ENSP00000321797	FGF8	70	0.258
ENSP00000354558	MTOR	123	0.258
ENSP00000292408	FGFR4	2	0.266
ENSP00000229135	IFNG	73	0.272
ENSP00000333982	NDEL1	10	0.272
ENSP00000363868	ABCA1	13	0.278
ENSP00000352561	CALCR	61	0.28

ENSP00000361275	PLK3	36	0.28
ENSP00000252444	LDLR	15	0.282
ENSP00000312435	DAG1	24	0.284
ENSP00000354791	DCTN1	14	0.284
ENSP00000262613	SLC9A3R1	175	0.288
ENSP00000312995	CLSPN	19	0.288
ENSP00000177694	TBX21	9	0.298
ENSP00000332973	SMAD3	47	0.304
ENSP00000312652	LEP	177	0.306
ENSP00000294172	NXF1	41	0.308
ENSP00000267996	TPM1	19	0.31
ENSP00000270202	AKT1	437	0.316
ENSP00000325690	CARM1	7	0.326
ENSP00000212015	SIRT1	66	0.328
ENSP00000352400	NUP214	38	0.328
ENSP00000250003	MYOD1	82	0.33
ENSP00000368880	FOXO1	3	0.33
ENSP00000387662	GCG	151	0.332
ENSP00000419692	RXRA	21	0.344
ENSP00000348986	INS-IGF2	122	0.346
ENSP00000242057	AHR	15	0.36
ENSP00000269305	TP53	1340	0.362

ENSP00000219476	TSC2	25	0.366
ENSP00000330237	CASP9	1	0.368
ENSP00000256443	CDK7	14	0.37
ENSP00000339527	FOXO3	14	0.37
ENSP00000302486	MAP2K1	14	0.376
ENSP00000356713	IFNGR1	8	0.376
ENSP00000313829	KHDRBS1	1	0.382
ENSP00000344115	CDH5	6	0.384
ENSP00000283635	CD8A	88	0.386
ENSP00000380921	SH3KBP1	30	0.39
ENSP00000303830	INSR	24	0.392
ENSP00000365016	IRS2	3	0.392
ENSP00000226218	SEBOX	1	0.398
ENSP00000261799	PDGFRB	130	0.4
ENSP00000362649	HDAC1	156	0.4
ENSP00000321656	CDC25C	145	0.402
ENSP00000346300	CRKL	8	0.402
ENSP00000338548	FGF1	4	0.404
ENSP00000380227	ITGA4	90	0.414
ENSP00000387699	CREB1	118	0.414
ENSP00000398597	EXOSC6	4	0.414
ENSP00000274255	SKP2	11	0.418

ENSP00000300093	PLK1	143	0.426
ENSP00000361626	YBX1	113	0.43
ENSP00000254227	NR0B2	8	0.434
ENSP00000358997	IRAK1	12	0.442
ENSP00000264033	CBL	150	0.444
ENSP00000302967	HDAC3	2	0.444
ENSP00000357656	FYN	100	0.444
ENSP00000211998	VCL	16	0.45
ENSP00000316460	FYB	2	0.452
ENSP00000306512	IL8	3	0.458
ENSP00000353483	MAPK8	134	0.458
ENSP00000340691	EIF4EBP1	2	0.46
ENSP00000359424	CHUK	14	0.46
ENSP00000268035	IGF1R	29	0.462
ENSP00000343204	JAK1	8	0.464
ENSP00000299421	ILK	14	0.466
ENSP00000216160	TAB1	1	0.47
ENSP00000347858	XIAP	1	0.47
ENSP00000252486	APOE	69	0.472
ENSP00000274376	RASA1	4	0.472
ENSP00000329357	SP1	106	0.474
ENSP00000274026	CCNA2	48	0.478

ENSP00000280892	EIF4E	7	0.478
ENSP00000341189	PTK2	78	0.48
ENSP00000264972	ZAP70	3	0.484
ENSP00000348551	NCOR2	1	0.488
ENSP00000354394	STAT1	64	0.488
ENSP00000348461	RAC1	248	0.492
ENSP00000266970	CDK2	39	0.498
ENSP00000252622	LSM7	9	0.5
ENSP00000228307	PXN	102	0.502
ENSP00000355865	PARK2	100	0.502
ENSP00000274335	PIK3R1	9	0.504
ENSP00000351273	CASP8	4	0.504
ENSP00000283195	RANBP2	27	0.506
ENSP00000251849	RAF1	53	0.522
ENSP00000221494	SF3A2	223	0.54
ENSP00000215829	SNRPD3	16	0.544
ENSP00000348827	THRB	1	0.544
ENSP00000262158	SMAD7	2	0.546
ENSP00000309503	YWHAZ	36	0.576
ENSP00000264657	STAT3	333	0.58
ENSP00000226730	IL2	101	0.582
ENSP00000216797	NFKBIA	39	0.586

ENSP00000326804	CUL1	7	0.586
ENSP00000263341	IL1B	15	0.588
ENSP00000356346	PTPRC	18	0.59
ENSP00000263967	PIK3CA	4	0.594
ENSP00000257904	CDK4	2	0.596
ENSP00000003084	CFTR	85	0.6
ENSP00000330393	LEPR	6	0.6
ENSP00000361021	PTEN	55	0.608
ENSP00000221930	TGFB1	29	0.61
ENSP00000304903	CD2BP2	110	0.612
ENSP00000269321	ARHGDI1	77	0.614
ENSP00000222812	STX1A	81	0.618
ENSP00000339007	GRB2	394	0.634
ENSP00000358490	CD2	110	0.64
ENSP00000348577	RANGAP1	29	0.644
ENSP00000346839	FN1	27	0.648
ENSP00000288986	NCK1	5	0.668
ENSP00000162330	BCAR1	14	0.67
ENSP00000396127	RAN	29	0.678
ENSP00000360683	PTPN1	10	0.68
ENSP00000360266	JUN	46	0.688
ENSP00000300574	CRK	11	0.69



ENSP00000249636	PIAS1	4	0.692
ENSP00000255465	CCNA1	10	0.7
ENSP00000046794	LCP2	92	0.71
ENSP00000259808	RIPK1	4	0.718
ENSP00000335153	HSP90AA1	26	0.72
ENSP00000339151	IKBKB	2	0.734
ENSP00000337825	LCK	132	0.74
ENSP00000324897	UBE2I	50	0.748
ENSP00000206249	ESR1	133	0.762
ENSP00000376076	SUMO1	6	0.778
ENSP00000011653	CD4	10	0.786
ENSP00000309845	HRAS	14	0.788
ENSP00000284981	APP	61	0.792
ENSP00000372023	CHEK2	23	0.804
ENSP00000384273	RELA	47	0.808
ENSP00000363822	AR	10	0.81
ENSP00000384675	SOS1	8	0.814
ENSP00000326366	PSEN1	60	0.826
ENSP00000401303	SHC1	25	0.828
ENSP00000350283	BRCA1	23	0.842
ENSP00000350941	SRC	129	0.842
ENSP00000227507	CCND1	58	0.864

ENSP00000371067	JAK2	21	0.884
ENSP00000320940	NCOA1	1	0.888
ENSP00000359206	BTRC	15	0.89
ENSP00000231509	NR3C1	1	0.894
ENSP00000262367	CREBBP	9	0.898
ENSP00000244741	CDKN1A	8	0.904
ENSP00000344456	CTNNB1	245	0.928
ENSP00000417281	MDM2	97	0.932
ENSP00000269571	ERBB2	64	0.956
ENSP00000344818	UBC	240	0.984
ENSP00000275493	EGFR	162	0.998