

Supplementary Table 12. Animal models of schizophrenia.

		Disc1 KO mice	DN-Disc1 mice	CNB-cKO mice	Dysbindin KO mice	NMDA-R KD mice	AKT1 KO mice	nNOS KO mice	COMT KO mice	Shn-2 KO mice
Behavior	Locomotor activity	→	↑	↑	↓	↑	→	↑	→	↑
	Working memory	→	↓	↓	↓	↓	→	→	↑	↓
	Social behavior	↑	↓	↓	↓	↓	ND	↓	↓	↓
	Prepulse inhibition of startle response	↓	↓	↓	normal	↓	↓	→	→	↓
Phenotypes in the brain	Physiology	ND	ND	ND	ND	→	ND		ND	↓
	Thickness of cortex	ND	ND	ND	ND	↑	ND		ND	↓
	Parvalbumin	ND	↓	(normal) *	↓	ND	→		ND	↓
	GAD67	ND	ND	(↓) *	ND	ND	ND		ND	↓
	Myelination	ND	ND	ND	ND	ND	ND		ND	↓

References

Disc1 KO mice

Kuroda K, Yamada S, Tanaka M, Iizuka M, Yano H, Mori D, et al. Behavioral alterations associated with targeted disruption of exons 2 and 3 of the Disc1 gene in the mouse. *Hum. Mol. Genet.* 2011; 20: 4666–4683.

Hikida T, Jaaro-Peled H, Seshadri S, Oishi K, Hookway C, Kong S, et al. Dominant-negative DISC1 transgenic mice display schizophrenia-associated phenotypes detected by measures translatable to humans. *PNAS.* 2007; 104: 14501–14506.

DN-Disc1 mice

Li W, Zhou Y, Jentsch JD, Brown RAM, Tian X, Ehninger D, et al. Specific developmental disruption of disrupted-in-schizophrenia-1 function results in schizophrenia-related phenotypes in mice. *Proc. Natl. Acad. Sci. U.S.A.* 2007; 104: 18280–18285.

Pletnikov MV, Ayhan Y, Nikolskaia O, Xu Y, Ovanesov MV, Huang H, et al. Inducible expression of mutant human DISC1 in mice is associated with brain and behavioral abnormalities reminiscent of schizophrenia. *Molecular Psychiatry.* 2008; 13: 173–186.

Ibi D, Nagai T, Koike H, Kitahara Y, Mizoguchi H, Niwa M, et al. Combined effect of neonatal immune activation and mutant DISC1 on phenotypic changes in adulthood. *Behav Brain Res.* 2010; 206: 32–37.

CNB-cKO mice

Zeng H, Chattarji S, Barbarosie M, Rondi-Reig L, Philpot BD, Miyakawa T, et al. Forebrain-specific calcineurin knockout selectively impairs bidirectional synaptic plasticity and working/episodic-like memory. *Cell.* 2001; 107: 617–629.

Miyakawa T, Leiter LM, Gerber DJ, Gainetdinov RR, Sotnikova TD, Zeng H, et al. Conditional calcineurin knockout mice exhibit multiple abnormal behaviors related to schizophrenia. *Proc Natl Acad Sci U S A.* 2003; 100: 8987–8992.

* Data not shown.

Dysbindin KO mice

Hattori S, Murotani T, Matsuzaki S, Ishizuka T, Kumamoto N, Takeda M, et al. Behavioral abnormalities and dopamine reductions in *sdv* mutant mice with a deletion in *Dtnbp1*, a susceptibility gene for schizophrenia. *Biochemical and Biophysical Research Communications.* 2008; 373: 298–302.

Takao K, Toyama K, Nakanishi K, Hattori S, Takamura H, Takeda M, et al. Impaired long-term memory retention and working memory in *sdv* mutant mice with a deletion in *Dtnbp1*, a susceptibility gene for schizophrenia. *Mol Brain.* 2008; 1: 11.

Li W, Zhang Q, Oiso N, Novak EK, Gautam R, O'Brien EP, et al. Hermansky-Pudlak syndrome type 7 (HPS-7) results from mutant dysbindin, a member of the biogenesis of lysosome-related organelles complex 1 (BLOC-1). *Nat Genet.* 2003; 35: 84–89.

Jentsch JD, Trantham-Davidson H, Jairl C, Tinsley M, Cannon TD, Lavin A. Dysbindin Modulates Prefrontal Cortical Glutamatergic Circuits and Working Memory Function in Mice. *Neuropsychopharmacology.* 2009; 34: 2601–2608.

Carlson GC, Talbot K, Halene TB, Gandal MJ, Kazi HA, Schlosser L, et al. Dysbindin-1 mutant mice implicate reduced fast-phasic inhibition as a final common disease mechanism in schizophrenia. *Proc. Natl. Acad. Sci. U.S.A.* 2011; 108: E962–970.

Karlsgodt KH, Robledo K, Trantham-Davidson H, Jairl C, Cannon TD, Lavin A, et al. Reduced Dysbindin Expression Mediates N-Methyl-D-Aspartate Receptor Hypofunction and Impaired Working Memory Performance. *Biological Psychiatry.* 2011; 69: 28–34.

NMDA-R KD mice

Mohn AR, Gainetdinov RR, Caron MG, Koller BH. Mice with Reduced NMDA Receptor Expression Display Behaviors Related to Schizophrenia. *Cell.* 1999; 98: 427–436.

Duncan GE, Moy SS, Perez A, Eddy DM, Zinzow WM, Lieberman JA, et al. Deficits in sensorimotor gating and tests of social behavior in a genetic model of reduced NMDA receptor function. *Behavioural Brain Research.* 2004; 153: 507–519.

Duncan G, Moy S, Lieberman J, Koller B. Effects of haloperidol, clozapine, and quetiapine on sensorimotor gating in a genetic model of reduced NMDA receptor function. *Psychopharmacology.* 2006; 184: 190–200.

Duncan GE, Moy SS, Lieberman JA, Koller BH. Typical and atypical antipsychotic drug effects on locomotor hyperactivity and deficits in sensorimotor gating in a genetic model of NMDA receptor hypofunction. *Pharmacol Biochem Behav.* 2006; 85: 481–491.

Bickel S, Lipp H-P, Umbricht D. Early Auditory Sensory Processing Deficits in Mouse Mutants with Reduced NMDA Receptor Function. *Neuropsychopharmacology.* 2008; 33: 1680–1689.

Dzirasa K, Ramsey AJ, Takahashi DY, Stapleton J, Potes JM, Williams JK, et al. Hyperdopaminergia and NMDA Receptor Hypofunction Disrupt Neural Phase Signaling. *J. Neurosci.* 2009; 29: 8215–8224.

- COMT KO mice
- Halene TB, Ehrlichman RS, Liang Y, Christian EP, Jonak GJ, Gur TL, et al. Assessment of NMDA Receptor NR1 Subunit Hypofunction in Mice as a Model for Schizophrenia. *Genes Brain Behav.* 2009; 8: 661–675.
- Gogos JA, Morgan M, Luine V, Santha M, Ogawa S, Pfaff D, et al. Catechol-O-methyltransferase-deficient mice exhibit sexually dimorphic changes in catecholamine levels and behavior. *PNAS.* 1998; 95: 9991–9996.
- Haasio K, Huotari M, Nissinen E, Männistö PT. Tissue histopathology, clinical chemistry and behaviour of adult comt-gene-disrupted mice. *Journal of Applied Toxicology.* 2003; 23: 213–219.
- Babovic D, O' Tuathaigh CM, O' Sullivan GJ, Clifford JJ, Tighe O, Croke DT, et al. Exploratory and habituation phenotype of heterozygous and homozygous COMT knockout mice. *Behavioural Brain Research.* 2007; 183: 236–239.
- Papaleo F, Crawley JN, Song J, Lipska BK, Pickel J, Weinberger DR, et al. Genetic Dissection of the Role of Catechol-O-Methyltransferase in Cognition and Stress Reactivity in Mice. *J. Neurosci.* 2008; 28: 8709–8723.
- Tammimäki A, Käenmäki M, Kambur O, Kuleskaya N, Keisala T, Karvonen E, et al. Effect of S-COMT deficiency on behavior and extracellular brain dopamine concentrations in mice. *Psychopharmacology.* 2010; 211: 389–401.
- AKT1 KO mice
- Lai W-S, Xu B, Westphal KGC, Paterlini M, Olivier B, Pavlidis P, et al. Akt1 deficiency affects neuronal morphology and predisposes to abnormalities in prefrontal cortex functioning. *PNAS.* 2006; 103: 16906–16911.
- Emamian ES, Hall D, Birnbaum MJ, Karayiorgou M, Gogos JA. Convergent evidence for impaired AKT1-GSK3 β signaling in schizophrenia. *Nature Genetics.* 2004; 36: 131–137.
- Chen YW, Lai WS. Behavioral phenotyping of v-akt murine thymoma viral oncogene homolog 1-deficient mice reveals a sex-specific prepulse inhibition deficit in females that can be partially alleviated by glycogen synthase kinase-3 inhibitors but not by antipsychotics. *Neuroscience.* 2011; 174: 178–189.