

Supplementary Table S4 | Genetically modified mouse strains with aberrant grooming behaviors*

Gene	Protein product	Model	Additional details
<i>Reduced grooming</i>			
Adcyap1	Adenylate cyclase activating polypeptide 1	KO	
App	Amyloid precursor protein SNP (V717F)	TG	
Arid5b	AT rich interactive domain 5B	KO	Sparse ungroomed coat
Bdnf	Brain derived neurotrophic factor	KO	In HZ mice
Cckbr	Cholecystokinin B receptor	KO	↓ Frequency
Chrna4	Cholinergic receptor, nicotinic, alpha polypeptide 4	KO	
Cplx1	Complexin 1	KO	↓ Syntactic chains, face/body washing
Cplx2	Complexin 2	KO	↓ Complete chains
Crhr2	Corticotropin releasing hormone receptor 2	KO	↓ Bouts
Dbh	Dopamine beta hydroxylase	KO	↓ Bouts
Ddo	D-aspartate oxidase	KO	↓ Duration
Dkk3	Dickkopf homolog 3 (<i>Xenopus laevis</i>)	KO	
Drd5	Dopamine receptor D5		
Dst	Dystonin		
En2	Engrailed 2		
Espn	Espin		
Gabra1	Gamma-aminobutyric acid (GABA) A receptor, alpha 1		Poor coat
Gja1	Gap junction protein, alpha 1		Poor coat
Grm2	Glutamate receptor, metabotropic 2		
Gria2	Glutamate receptor, ionotropic, AMPA2 (alpha 2)		
Gulo	Gulonolactone (L-) oxidase		
Hmox1	heme oxygenase (decycling) 1		Poor coat
Itga7	Integrin alpha 7		
Lass1	LAG1 homolog, ceramide synthase 1		Due to poor balance
Lmx1a	LIM homeobox transcription factor 1 alpha		Due to aberrant posture
Lrp6	Low density lipoprotein receptor-related protein 6		Poor coat
Mtap6	Microtubule-associated protein 6		
Ndufs4	NADH dehydrogenase (ubiquinone) Fe-S protein 4		
Nfkb1	Nuclear factor of kappa light polypeptide gene enhancer in B-cells 1		
Nmur2	Neuromedin U receptor 2		
Otc	Ornithine transcarbamylase		
Oxt	Oxytocin		
Pbx3	Pre B cell leukemia homeobox 3		Poor grooming, ↑ latency
Pitx3	Paired-like homeodomain transcription factor 3	KO**	↑ Latency
Plcb3	Phospholipase C, beta 3	KO	↓ Scratching
Ppp1r1b	Protein phosphatase 1, regulatory subunit 1b	KO	In females only
Ppt1	Palmitoyl-protein thioesterase 1	KO	
Ptprf-Lar	Protein tyrosine phosphatase, receptor F	KO	
Sftpc	Surfactant associated protein C	KO	Poor coat
Slc9a1	Solute carrier family 9 (sodium/hydrogen exchanger) 1	KO	Poor coat
Smn1	Survival motor neuron 1	KO	In HZ, but not in -/- mice
Tgfb1	Transforming growth factor, beta 1	OE	↓ in adults
Vegfa	Vascular endothelial growth factor A	KO	Poor coat
<i>Increased grooming</i>			

SUPPLEMENTARY INFORMATION

In format provided by Kalueff *et al.* (JANUARY 2016)

Arx	Aristaless related homeobox	KO	Vigorous grooming during seizure bouts
Atp2b4	ATPase, Ca ⁺⁺ transporting, plasma membrane 4	KO	↑ Scratching, skin lesion
Bdnf	Brain derived neurotrophic factor	OE	
Chst8	carbohydrate (N-acetylgalactosamine 4-0) sulfotransferase 8	KO	
Cntnap2	Contactin associated protein-like 2	KO	↑ Duration
Ctsl	Cathepsin L	KO	↑ Scratching
Cyp19a1	Cytochrome P450, family 19, subfamily a, polypeptide 1	KO	↑ Bouts
Dat	Dopamine transporter	KD	More rigid sequences
Drd1a	Dopamine receptor D1A	KO	
Ehmt1	Euchromatin histone methyltransferase 1		
Fmr1	Fragile X mental retardation syndrome 1		In social situations
Gad2	Glutamic acid decarboxylase 2		
Grhl1	Grainyhead-like 1 (<i>Drosophila</i>)		
Grpr	Gastrin releasing peptide receptor		↑ Scratching
Gsk3a	Glycogen synthase kinase 3 alpha		
Gstm1	Glutathione S-transferase, mu 1		
Hcrt	Hypocretin		
Hoxb8	Homeobox B8	KO	
Hprt	Hypoxanthine guanine phosphoribosyl transferase		
Htr2c	5-hydroxytryptamine (serotonin) receptor 2C		
Htt	Huntingtin		
Itch	Itchy, E3 ubiquitin protein ligase		↑ Scratching
Itgb3	Integrin beta 3	KO	
Krt10	Keratin 10		
Lrrk2	Leucine-rich repeat kinase 2		
Mao-A	Monoamine oxidase A	KO	
Mapt	Microtubule-associated protein tau		↑ Scratching
Mecp2	Methyl CpG binding protein 2		
Ndn	Necdin		↑ Scratching
Neurod2	Neurogenic differentiation 2		
Nfkbiz	Nuclear factor of kappa light polypeptide gene enhancer in B-cells inhibitor, zeta		↑ Scratching
Nk1r	Neurokinin 1 receptor		
Nlgn1	Neuroigin 1		
Nos1	Nitric oxide synthase 1, neuronal		
Nr4a2	Nuclear receptor subfamily 4, group A, member 2	KO**	In response to L-DOPA
Nrxn1	Neurexin 1		
Oxtr	Oxytocin receptor	KO	
Per1	Period homolog (<i>Drosophila</i>) 1	KO	Under acute stress
Plg	Plasminogen	KO	
Prrxl1	Paired related homeobox protein-like 1	KO	
Rad23b	RAD23b homolog (<i>S. cerevisiae</i>)	KO	Washing and scratching
Sapap3	SAP90/PSP-95 associated protein 3	KO	
Sert	Serotonin transporter (SLC6a4)	KO	In HZ mice
Shank3	SH3/ankyrin domain gene 3	KO	
Slc17a6	Solute carrier family 17 (sodium-dependent phosphate cotransporter) 6	KO	↑ Scratching
Slitrk5	SLIT and NTRK-like family, member 5	KO	
Spred2	Sprouty-related protein, EVH1 domain 2	KO	
Tgfb1	Transforming growth factor, beta 1	OE	↑ Postnatally
Tnf	Tumor necrosis factor	KO	↑ Duration
Vdr	Vitamin D receptor	KO	

KO – knockout (-/-), OE – over-expression, KD – knockdown, TG – transgenic, HZ – heterozygous (+/-) mice

* Based on Mouse Genome Informatics Database, www.informatics.jax.org. As of June 2015, over 170 mouse strains from MGI display aberrant grooming-related phenotypes.

** Conditional KO

*** Spontaneous mutagenesis