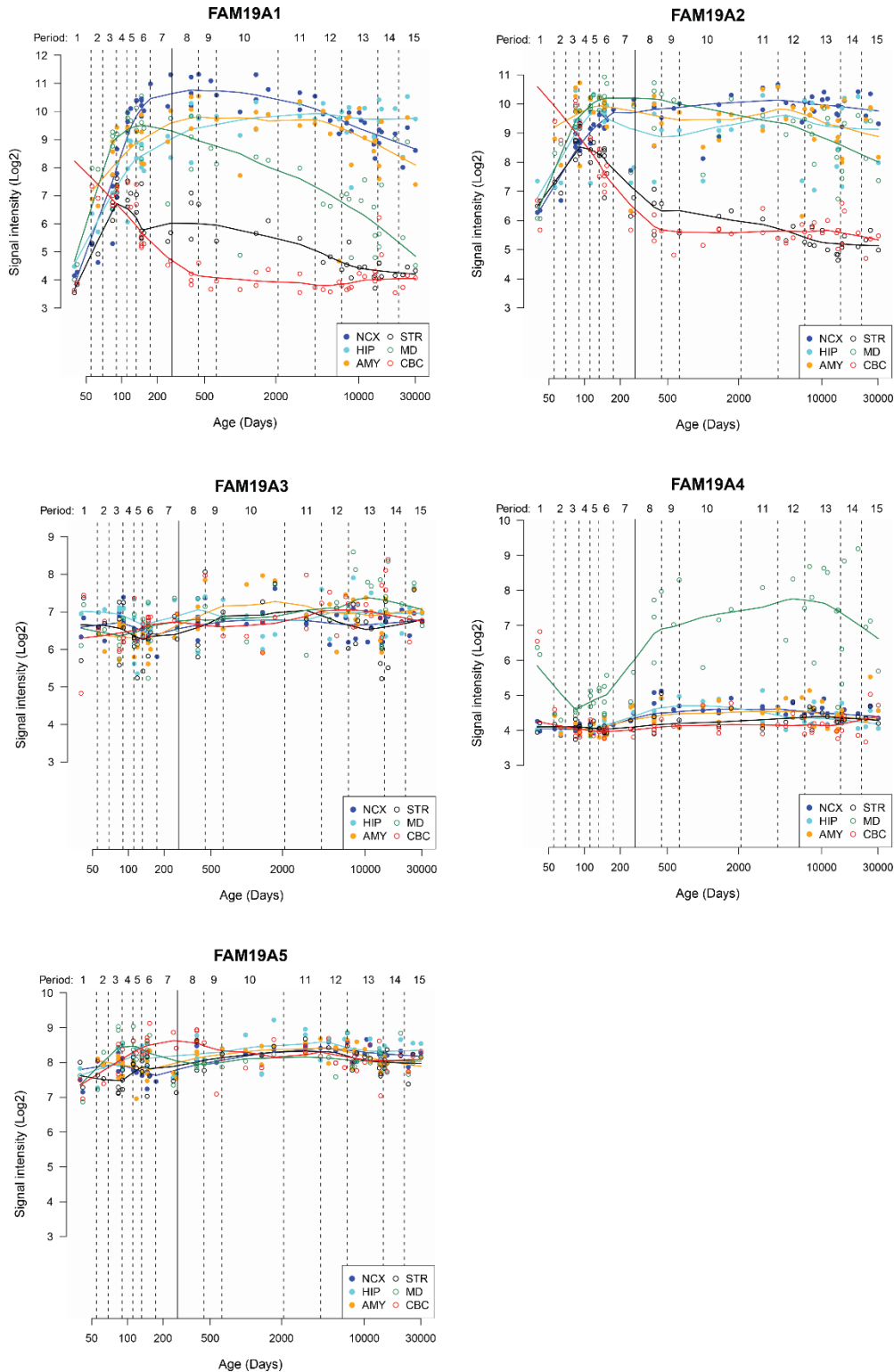


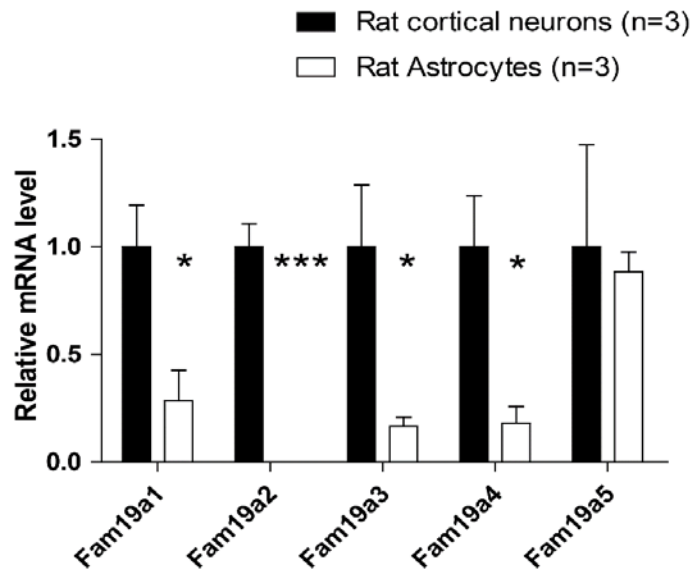
Supplemental Table S1. Primers used in real-time PCR analysis

Gene	Forward primer (5' to 3')	Reverse primer (5' to 3')
<i>Human FAM19A1</i>	CCTGGGTCCTGTATTTGTGGA	GCTGCTATCACTTCACACGTC
<i>Human FAM19A2</i>	TGTTAAAACGGGAACCTTGTGAGG	AAGCATCCACACATGATGGAG
<i>Human FAM19A3</i>	TGGTGGTGTTCAGATGGAGC	GAGCACCTTACACTCCTCCC
<i>Human FAM19A4</i>	AGCCTACGTGTTAATGGTGTG	GTCCCTTGCTTGATTTGGTGG
<i>Human FAM19A5</i>	CCCGCTGTGCGTGTAGAAA	GGTCTTGATGATTCTTGCGTCC
<i>Human GAPDH</i>	GTCTCCTCTGACTTCAACAGCG	ACCACCCTGTTGCTGTAGCAA
<i>Mouse Fam19a1</i>	GTGTTCCCTGTTTACCTGGGAAA	GCTCCATCTCACACCACCATT
<i>Mouse/rat Fam19a2</i>	TAGTGACCTTGTGGGGGAAAG	TTTGGGACCGTTCTTCTATCTTG
<i>Mouse/rat Fam19a3</i>	CAACATCCGCAGTCCTAGTGA	GAGCACCTTACACTCCTCTCC
<i>Mouse Fam19a4</i>	CCTATGTGTTAATGGTCTGCTGT	CCACCACTTCTCAATCACAATGG
<i>Mouse/rat Fam19a5</i>	GGTGATTCACGCGCAGTTC	GGTCACAATCTCACAGGTTCC
<i>Mouse Gapdh</i>	CATCACTGCCACCCAGAAGACTG	ATGCCAGTGAGCTTCCCGTTCAG
<i>Mouse β-actin</i>	AGTGTGACGTTGACATCCGTA	GCCAGAGCAGTAATCTCCTTCT
<i>Rat Fam19a1</i>	CTTGCAAGGAATTTACCCATCC	GGGCCGTCCGGTCAATG
<i>Rat Fam19a4</i>	GTACTAAGAGGGCGATGGGC	GGGCTTGGAAGACCTGTAGT
<i>Rat β-actin</i>	CGCGAGTACAACCTTCTTGC	CGTCATCCATGGCGAACTGG

Supplemental Figure S1. Temporal expression of human *FAM19A1-5* from embryonic, early fetal, late fetal, neonatal, early childhood, adolescence, to adulthood. These data were derived from the Human Brain Transcriptome database (Kang et al. Spatio-temporal transcriptome of the human brain. *Nature* 2011; 478, 483-489). NCX, Neocortex; HIP, Hippocampal anlage; AMY, amygdala; STR, striatum; MD, Mediodorsal nucleus of the thalamus; CBC, Cerebellar cortex.

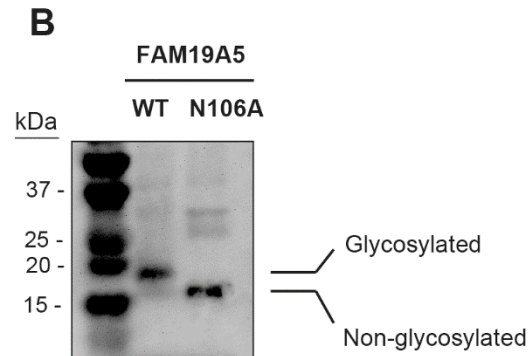
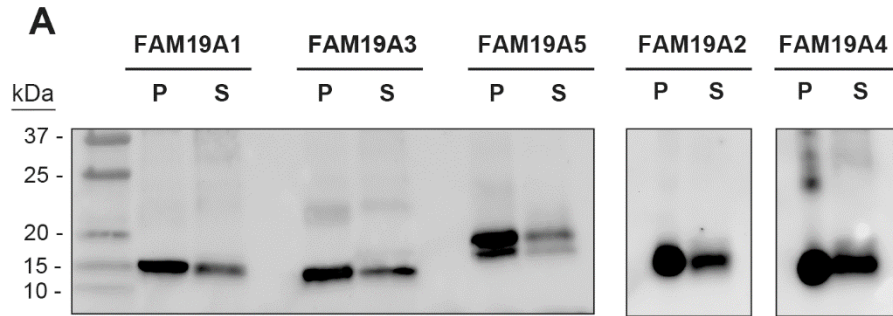


Supplemental Figure S2. Expression of rat *Fam19a1-a5* in primary rat cortical neurons and astrocytes. Data are expressed as mean \pm SEM. Two-tailed Student's t-tests are used for comparing gene expression levels in cortical neurons vs. astrocytes. * $P < 0.05$; *** $P < 0.001$

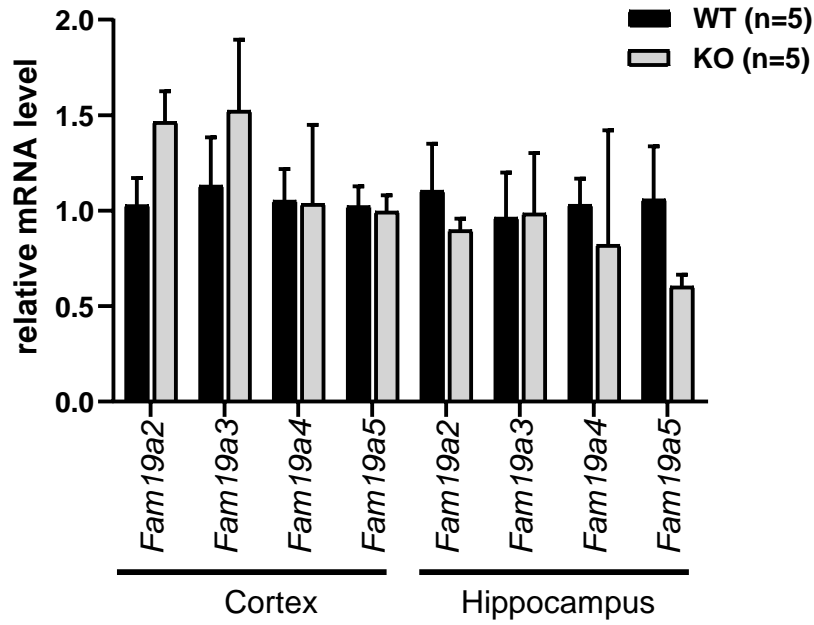


Supplemental Figure S3. FAM19A1-A5 are secreted proteins with or without N-linked glycosylation.

A, Western blot analysis of cell lysate/pellet (P) and supernatant (S) from HEK 293 cells transfected with C-terminal FLAG-tagged mouse Fam19a1-5 expression plasmids using anti-FLAG antibody; B, Western blot analysis of cell lysates of transfected HEK293 cells expressing either the C-terminal FLAG-tagged wild-type (WT) Fam19a5 or the N106A mutant.



Supplemental Figure S4. Expression of *Fam19a2-a5* in the cortex and hippocampus of WT (n=5) and *Fam19a1* KO (n=5) female mice was measured by quantitative real-time PCR analysis. Expression levels were normalized to β -actin. Data are expressed as mean \pm SEM.



Supplemental Figure S5. Histamine-induced itch response in WT (n=6) and *Fam19a1* KO (n=6) female mice. For method details, please see Materials and Method section of the main text. Data are expressed as mean \pm SEM.

