Borie et al. "*Correction of vasopressin deficit in the lateral septum ameliorates social deficits of mouse autism model*"

Supplementary figures

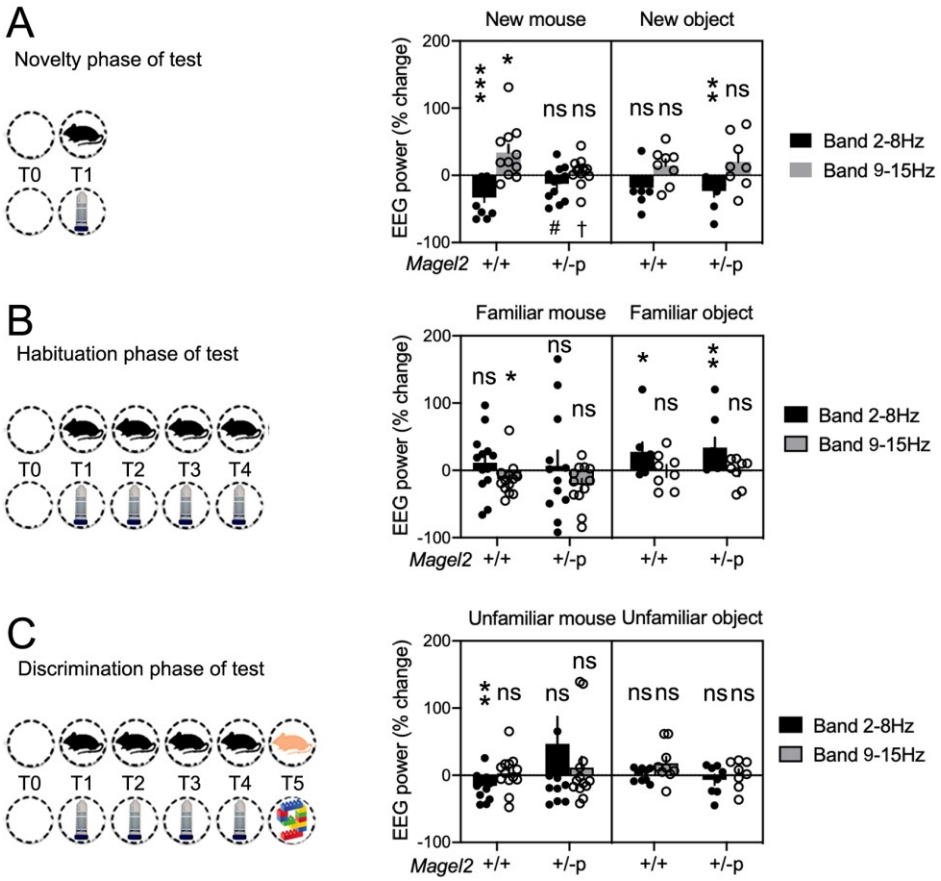

Figure Suppl.1. *Magel2* deficiency impairs the changes of EEG power in the theta band during a new encounter with a mouse but not with an object

(A) Change of EEG power in the theta band at T1 during the exploration of a new mouse or a new object (50-mL falcon tube). Data (means±SEM) expressed as % relative to T0 in n=12 *Magel2* +/+, 13 *Magel2* +/-p. Three-way ANOVA: effect of the theta band $F_{1,72}$=37.7 p<0.0001; effect of genotype $F_{1,72}$=0.06 p=0.7; effect of social versus non-social stimuli $F_{1,72}$=0.006 p=0.7; effect of the theta band X genotype $F_{1,72}$=2.09 p=0.1; effect of social versus non-social stimuli X theta band $F_{1,72}$=0.12 p=0.7; interaction of 3 factors $F_{1,72}$=4.99 p=0.028. Wilcoxon test results as indicated comparing % change from baseline (set as 0) *p<0.05, **p<0.01, ***p<0.001, ns= not significant. Effect of genotype by unpaired t-test in 2-8Hz band $^{\#}p$=0.05 and 9-15Hz band $^{\dagger}p$=0.03.

(B) Change of EEG power in the theta band at T4 during the exploration of the same mouse or same object. Data (means±SEM) expressed as % relative to T1 in n=12 *Magel2* +/+, 13 *Magel2* +/-p. Three-way ANOVA: effect of the theta band $F_{1,74}$=8.4 p=0.0049; effect of genotype $F_{1,74}$=0.03 p=0.8; effect of social versus non-social stimuli $F_{1,74}$=3.5 p=0.06; effect of the theta band X genotype $F_{1,74}$=0.07 p=0.7; effect of social versus non-social stimuli X theta band $F_{1,74}$=0.08 p=0.7; interaction of 3 factors $F_{1,74}$=0.004 p=0.9. Wilcoxon test results as indicated comparing % change from baseline (set as 0) *p<0.05, **p<0.01, ***p<0.001.

(C) Change of EEG power in the theta band at T5 during the exploration of an familiar mouse or unfamiliar object (Lego). Data (means±SEM) expressed as % relative to T4 in n=12 *Magel2* +/+, 13 *Magel2* +/-p. Three-way ANOVA: effect of the theta band $F_{1,78}$=0.02 p=0.8; effect of genotype $F_{1,78}$=0.69 p=0.4; effect of social versus non-social stimuli $F_{1,78}$=0.3 p=0.57; effect of the theta band X genotype $F_{1,78}$=1.23 p=0.26; effect of social versus non-social stimuli X theta band $F_{1,78}$=0.54 p=0.46; interaction of 3 factors $F_{1,78}$=0.65 p=0.4. Wilcoxon test results as indicated comparing % change from baseline (set as 0) *p<0.05, **p<0.01, ***p<0.001.

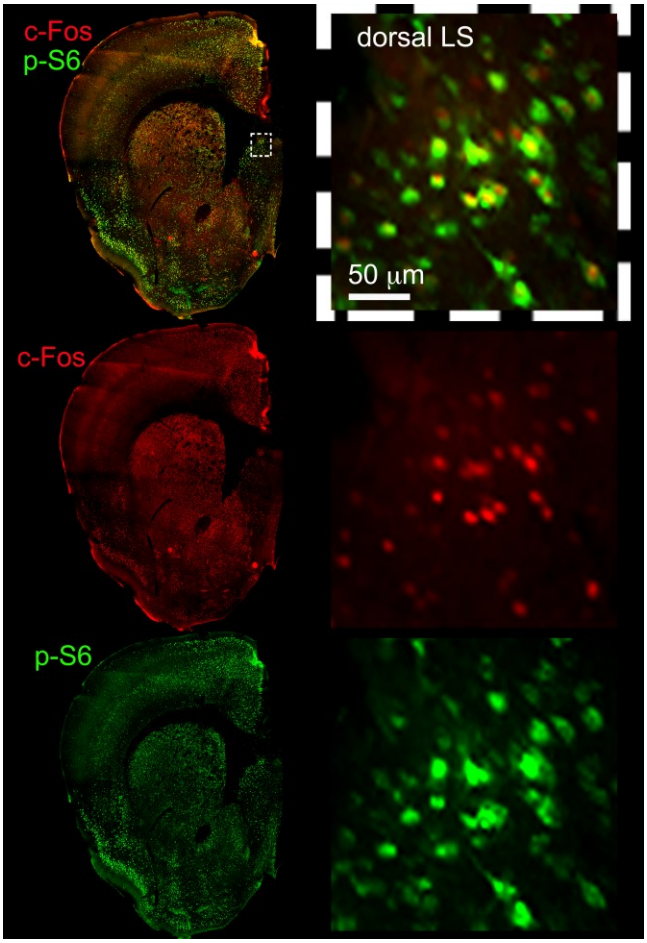

Figure Suppl.2. Co-expression of c-Fos and phospho-S6 ribosomal protein in the mouse brain after the encounter with a new mouse.
Immunolabeling of cells with c-Fos and p-S6 antibodies in dorsal lateral septum 15 min after the end of the social novelty trial.

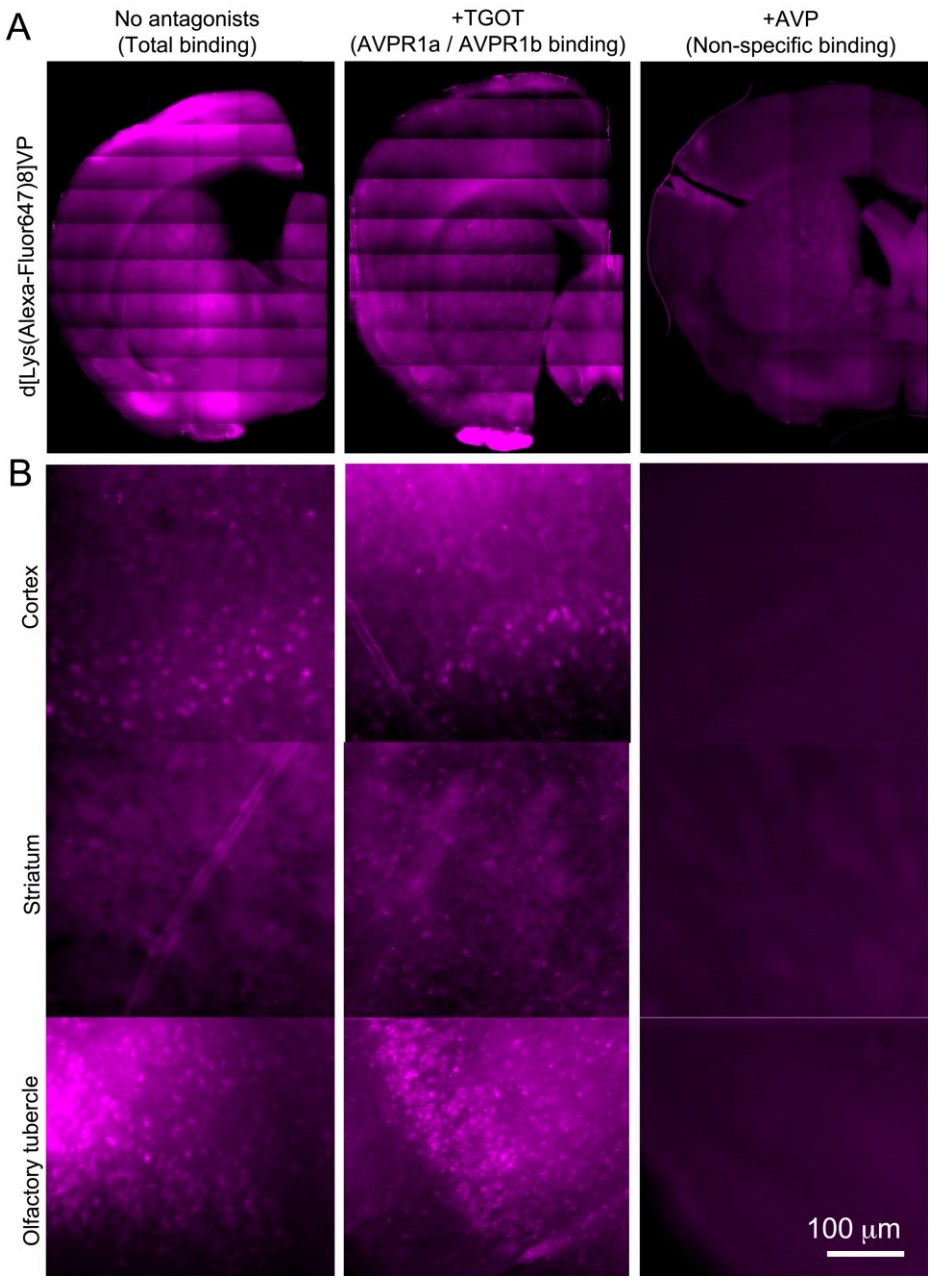

Figure Suppl.3. Displacement of d[Lys(Alexa-Fluor647)8]VP binding ex vivo by TGOT and AVP.

(A) Acute live brain slices incubated with 150 nM d[Lys(Alexa-Fluor647)8]VP (total binding) for 1hr at 12ºC labeled cells in regions where AVPR1a, AVPR1b and OXTR are expressed (1). Slices were pre-incubated with 5μM TGOT (AVPR1a/ AVPR1b binding) or with 1μM AVP (non specific binding) for 1hr and further incubated with d[Lys(Alexa-Fluor647)8]VP for 1hr. Experiments are representative of 6-8 slices from 4 adult male mice. Cytological binding of

d[Lys(Alexa-Fluor647)8]VP +TGOT most likely results from AVPR1a binding sites at least in the lateral septum based on the affinity of d[Lys(Alexa-Fluor647)8]VP shown in the Table S1 and the enrichment of AVPR1a in the septum compared to the others receptors.
(B) Zoom in specific brain areas. Most labeling is in the cortex, olfactory tubercles, septum, hippocampus, hypothalamus and thalamus. The striatum is poorly labeled except for blood vessels. This pattern is similar to that observed with the autoradiographic labeling of V1a (see figure 3A).

REFERENCE

1. Dumais KM & Veenema AH (2016) Vasopressin and oxytocin receptor systems in the brain: Sex differences and sex-specific regulation of social behavior. *Frontiers in Neuroendocrinology* 40:1-23.

Supplementary Table

d[Lys(Alexa647)8]VP Ki (nM)				dLysVP Ki (nM)			TGOT (nM)	
Murine receptors	Mean	±SEM	N	Mean	±SEM	N	Mean	Ref.
AVPR1a	765	182	7	5.9	1.46	7	>1000	(2)
AVPR1b	200	36	4	0.8	0.18	4	>10000	(2)
AVPR2	10429	745	4	4.8	0.9	4	n.d.	n.d.

Table S1. Affinity of d[Lys(Alexa647)8]VP compared to dLysVP for murine AVP receptors

Affinity of d[Lys(Alexa-Fluor-647)^{8}]VP *in vitro* for the indicated mouse receptors: AVPR1b transfected in HEK293 cells, AVPR1a and AVPR2 are the endogenous from liver and kidney, respectively. K_i values for d[Lys(Alexa-647)^{8}]VP were calculated from dose response curves against 1 nM [^{3}H]AVP. One-way ANOVA $F(2,9)=168.2$ $p<0.0001$ post-hoc Tukey test comparing AVPR2 with AVPR1a $p<0.0001$ and AVPR2 with AVPR1b $p<0.0001$. In contrast, dLysVP without the conjugation of Alexa-Fluor647 showed little selectivity among the murine AVPRs. One-way ANOVA $F(2,12)=4.06$ $p=0.045$ post-hoc Tukey test comparing AVPR1a with AVPR1b $p=0.038$. Therefore, d[Lys(Alexa-647)^{8}]VP has selective profile for the subtypes 1a and 1b amongst the murine AVPRs. The affinity of TGOT on the murine AVPR1a and AVPR1b are based on the supplemental reference 2.

REFERENCE

2. Busnelli M, Bulgheroni E, Manning M, Kleinau G, & Chini B (2013) Selective and potent agonists and antagonists for investigating the role of mouse oxytocin receptors. *J Pharmacol Exp Ther* 346(2):318-327.

Table S2: List of reagents

Antibodies				
Immunogen	**Details**	**Source**	**Use**	**Manufacturer**
Neurotensin (NT	Cat# 418 005, RRID:AB_2782980	Guinea pig polyclonal	1:100	Synaptic systems
Neurogranin (NG)	Cat# ab5620, RRID:AB_2171427	Mouse monoclonal	1:1000	Merck
NeuN	Cat# MAB377, RRID:AB_2298767	Mouse monoclonal	1:500	Merck
GAD67	Cat# MAB5406, RRID:AB_2278725	Mouse monoclonal	1:500	Merck
Calretinin (CalR)	Cat# 6B3, RRID:AB_10000320	Mouse monoclonal	1:1000	Swant
Calbindin D28k (CalB)	Cat# CB38, RRID:AB_2721225	Mouse monoclonal	1:5000	Swant
Somatostatin (SST)	Cat# ab30788, RRID:AB_778010	Rat polyclonal	1:50	Abcam
GFP	Cat# ab13970, RRID:AB_300798	Chicken polyclonal	1:3000	Abcam
c-Fos (9F6)	Cat# 2250, RRID:AB_2247211	Rabbit polyclonal	1:1000	Cell Signaling Technology
c-Fos (E8)	Cat# sc-166940, RRID:AB_10609634	Mouse monoclonal	1:100	Santa Cruz Laboratories
Neurophysin I (NPI)	Cat# PS-38, RRID:AB_2315026	Mouse monoclonal	1:1000	H. Gainer at NIH, USA
Neurophysin II (NPII)	Cat# PS41, RRID:AB_2313960	Mouse monoclonal	1:500	H. Gainer at NIH, USA
Fab anti mouse IgG	Cat# BI 1013C		1:500	Abliance
Goat anti-guinea pig Alexa-Fluor488	Cat#A-11073, RRID: AB_2534117		1:2000	Thermo Fisher Scientific
Goat anti-rabbit Alexa-Fluor488/594/64	Cat#A-11034/11037/21244; RRID: AB_2576217, RRID: AB_2534095, RRID: AB_2535812		1:2000	Thermo Fisher Scientific
Goat anti-mouse Alexa-Fluor488/594/64	Cat#A-11029/11032/21236; RRID: AB_2534088; RRID: AB_2534091; RRID: AB_141725		1:2000	Thermo Fisher Scientific

Drugs				
Compound	**Effect**	**Working**	**comments**	**Manufacture**

name		concentration		r
Arg-vasopressin	Avpr agonist CAS#113-79-1	*Ex vivo :* 10^{-6} M *In vitro :* 10^{-6} M *In vivo :* 3x10-[illegible] M	Used in Whole cell recordings Used as competitor in binding tests Used in intraseptal injections	Merck
TGOT	Specific oxtr agonist CAS# 60786-59-6	*Ex vivo :* 10^{-7}M *In vivo :* 3x10-[illegible] M	Used in Whole cell recordings Used in intraseptal injections	Merck
Atosiban	Oxtr antagonist CAS#90779-69-4	*In vivo :* 10^{-8} M *Ex vivo :* 10^{-6} M	Used in behaving mice Used in Whole cell recordings	Merck
Manning Compound (MC)	AVPR antagonist CAS#73168-24-8	*In vivo :* 10^{-8} M *Ex vivo :* 10^{-6} M *Ex vivo :* 5x10-[illegible] ^{6} M	Used in intraseptal injections Used in Whole cell recordings Used in combination with d[L(Alexa-647)8]VP for selectivity	Bachem
SR95531 (GABAzine)	GABA-A antagonist CAS# 104104-50-9	*Ex vivo :* 6x10-[illegible] ^{6} M	Used in Whole cell recordings	Merck
Tetrodotoxin (TTX)	CAS# 4368-28-9 T8024	*Ex vivo :* 3x10-[illegible] ^{7} M	Used in Whole cell recordings	Merck
6-Cyano-7-nitroquinoxaline-2,3-dione (CNQX)	CAS# 115066-14-3 FG-9065	*Ex vivo :* 10^{-6} M	Used in Whole cell recordings	Merck

Other compounds

Alexa-594-cadaverine	Cell tracer Cat# A30678	*Ex vivo :* 5x10^{-5} M *In vivo :* 5x10^{-5} M	Used to label patched cells Used in vivo to visualize the diffusion area in the septum	Life Technology
d[L(Alexa-Fluor-647)8]VP	Fluorescent peptide	*In vivo :* 5x10^{-5} M *In vitro :* 3x10^{-8} M *Ex vivo :* 15x10^{-8} M	Used in combination with oxtr or avpr competitors for specificity	Homemade
[^{3}H]-AVP	AVPR agonis CAT#NET80	*In vitro :* 3x10^{-9} M	Radioligand binding assays	Perkin-Elmer

	0			
[^{125}I]-LVA	AVPR ligand CAT#NEX310010	*In vitro :* 1x10^{-9} M	Radioligand binding assays	Perkin-Elmer
Desamino-Cys^{1}, Lys^{8}]Vasopressin	CAS#16679-58-6	*In vitro :* 1x10^{-6} M	Synthesis of d[L(Alexa-647)8]VP	Bachem
Paraformaldehyde	Cat#P6148	*4 %*	Tissue fixation	Merck
Alexa647 carboxylic acid succinimidyl ester	Fluorescent tracer CAT#A37573	*In vitro :* 1.25x10^{-6} M	Synthesis of d[L(Alexa-647)8]VP	ThermoFisher Scientific
pentobarbital	Anesthetic VetCode QN51AA01	*In vivo :* 50 mg/kg	Intraperitoneal injection	Ceva Santé Animale
xylazine	anesthetic VetCode QN05CM92	*In vivo :* 1.3 g/kg	Use in combination with ketamine. Intraperitonea injection	Ceva Santé Animale
Ketamine	anesthetic VetCode QN01AX03	*In vivo :* 6.6 g/kg	Use in combination with xylazine. Intraperitoneal injection	Ceva Santé Animale

Virus

Virus name	**Concentration**	**Volume injected**	**Manufacturer**
EF1a::DIO-ChR2-eYFP;WPRE::hGH	2x1011 viruses/mL	500 nL/hemisphere	U Penn Lot #CS0384

Reagents

Name	**Comment**	**Manufacturer**
Lipofectamine CAT# 11668019	Transfection of cells	Life Technology
Fluoromount CAT# 00-4958-02	Preservation of fluorescence mounting medium	ThermoFisher Scientific
HEK293T cells (CRL-3216)	Do not express endogenous OXTR and AVPR	ATCC repository, USA
DMEM CAT# 11960044	Cell culture	Life Technology
Fetal bovine serum CAT#A31605	Cell culture	Life Technology
OPTIMEM CAT#31985062	Transfection of cells	Life Technology
Dental cement CAT#203097	surgery	Paladur, Henry Schein
Mandrin double pas de projection CAT#C235DCS-5/3/0	cannula	Phymed
Small dust cap CAT# 303DC/1	cannula	Phymed
Canule interne double projection 1mm CAT# C235IS-5/3/1		
Guide canule double 26G CAT# C235GS-5-0,8/3 0.8mm 3mm	cannula	Phymed

Branching Fiberoptic Patchcord CAT# BFP(2)_200/220/900-0.53_1m_FCM-GS0	patchcord	Doric lenses
Dual fiber optic cannula with Guiding Socket CAT# DFC_200/245-0.53_3.5mm_GS0.8_FLT	0.53 NA	Doric lenses
Standard 6-pin headmount 8231-SM	EEG electrodes	Pinnacle Technology
PREAMPLIFIERS FOR MICE - 3-CHANNEL SYSTEM 8202-DSE3	Preamplifier for EEG recordings	Pinnacle Technology
6-pin Mouse Commutator/Swivel 8204	Commutator for EEG recordings	Pinnacle Technology
3-Channel Analog Adapter 8242-K	ANALOG ADAPTERS for EEG recordings	Pinnacle Technology
Data acquisition system sampling 200-2000Hz	1Hz, gain 5000-10000V/V	Pinnacle Technology
SYNCHRONIZED VIDEO SYSTEM	30 frames per second	Pinnacle Technology
Cage for mice 8228	25.4 x 20.3 cm	Pinnacle Technology

Mice

Name	background	Details	Source
Avptm1.1(cre)Hze/.	Avp-CRE	C57BL6J	Cat#023530; RRID: IMSR_JAX:023530	Jackson laboratories
Magel2tm1.1Mus/J	Magel2KO	C57BL6J	MGI:4849506	F. Muscatelli, INMED, Fr
C57BL6J		C57BL6J	Cat#000664; RRID: IMSR_JAX:000664	Charles River

Genotyping Primers

Gene	Sequence
Cre-recombinase allele	5’-TCTGTCCGTTTGCCGGTCGT-3’ and 5’-AGACCGCGCGCCTGAAGATA-3’
AVP-cre WT allel	5’-GAGTCCGTGGATTCTGCCAA-3’ and 5’-CTATGCACGACTTCGGGTGT-3’
Magel2- (KO) allele	5’-TGCTTCCTGCCCTTCAGTTAC-3’ and 5’-GCTTATCGATACCGTCGACCTC-3’
Magel2+ (WT) allele	5’-GTCACACACCCATTCGACCT-3’ and 5’-TACCCTCGGGAGCAGTAGAC-3’

Softwares and Agorithms

Name	Source
Graphpad prism 8.0 SCR_002798	http://graphpad.com
Adobe Creative Suite 6 (Photoshop, Illustrator)	https://www.adobe.com/de/products/cs6.html

Fiji Image J SCR_003070	http://imagej.net/Fiji
Sirenia acquisition and seizure	https://www.pinnaclet.com/software.html
NeuroScore™ CNS Software	https://www.datasci.com/products/software/neuroscor
pClamp software	https://www.moleculardevices.com/products/axon-patch-clamp-system/acquisition-and-analysis-software

Table S3: Statistical analyses

Fig.	Sample size	Effect size (Cohen's d)	Type of test	Statistical data
1B	Mice: 12 +/+, 13 +/-p	$d_{NOVELTY}$ =0.88 $d_{HABITUATION}$ =0.49 $d_{DISCRIMINATION}$ =1.96	1-way ANOVA	F_{TRIALS} (5,125)=16.47, p<0.0001*
1C	Mice: 14 +/+, 16 +/-p	$d_{GENOTYPE}$ =0.47 d_{TRIALS} =0.55 $d_{GENOTYPE\ X\ TRIALS}$ =0.46	2-way ANOVA RM	$F_{GENOTYPE}$ (1,28)=2.55, p=0.001* $F_{SOCIAL\ TRIALS}$ (2,56)=6.82, p=0.002* $F_{GENOTYPE\ X\ SOCIAL\ TRIALS}$ (2,56)=4.69, p=0.01*
1D	Mice: 8 +/+, 8 +/-p	$d_{NOVELTY}$ =0.013 $d_{HABITUATION}$ =0.17 $d_{DISCRIMINATION}$ =1.15	1-way ANOVA	F_{TRIALS} (5,125)=5.69, p<0.0001*
1E	Mice: 9 +/+, 9 +/-p	$d_{GENOTYPE}$ =0.17 d_{TRIALS} =1.47 $d_{GENOTYPE\ X\ TRIALS}$ =0.087	2-way ANOVA RM	$F_{GENOTYPE}$ (1,16)=0.4, p=0.5 $F_{OBJECT\ TRIALS}$ (2,32)=28.33, p<0.000 $F_{GENOTYPE\ X\ OBJECT\ TRIALS}$ (2,32)=0.09, p=0.9
2C	+/+ mice: 5 T0, 5 T1, 4 T4, 4 T5	$d_{NOVELTY\ MS}$ =2.4 $d_{NOVELTY\ LSD}$ =4.3 $d_{NOVELTY\ LSI}$=2.88 $d_{NOVELTY\ LSV}$ =3.6 $d_{HABITUATION\ MS}$ =5.4 $d_{HABITUATION\ LSD}$ =2.17 $d_{HABITUATION\ LSI}$ =2.8 $d_{HABITUATION\ LSV}$ =2.84 $d_{DISCRIMINATION\ MS}$ =3.73 $d_{DISCRIMINATION\ LSD}$ =2.0 $d_{DISCRIMINATION\ LSI}$ =2.19 $d_{DISCRIMINATION\ LSV}$ =3.66	2-way ANOVA RM	$F_{SOCIAL\ TRIALS\ in\ +/+}$ (3,56)=31.7, p<0.0001* $F_{SEPTAL\ REGIONS\ in\ +/+}$ (3,56)=2.95, p=0.
	+/-p mice: 7 T0, 5 T1, 4 T4, 9 T5	$d_{NOVELTY\ MS}$ =1.38 $d_{NOVELTY\ LSD}$ =0.4 $d_{NOVELTY\ LSI}$=0.2 $d_{NOVELTY\ LSV}$ =0.83	2-way ANOVA RM	$F_{SOCIAL\ TRIALS\ in\ +/-p}$ (3,88)=6.87, p=0.0003* $F_{SEPTAL\ REGIONS\ in\ +/-p}$ (3,56)=2.39, p=0

		$d_{HABITUATION\ MS}$ =1.56 $d_{HABITUATION\ LSD}$ =0.3 $d_{HABITUATION\ LSI}$ =0.16 $d_{HABITUATION\ LSV}$ =0.59 $d_{DISCRIMINATION\ MS}$ =1.55 $d_{DISCRIMINATION\ LSD}$ =0.52 $d_{DISCRIMINATION\ LSI}$ =0.5 $d_{DISCRIMINATION\ LSV}$ =1.19		
2D	+/+ mice: 7 T0, 6 T1, 7 T4, 7 T5, 5 T1+2hrs +/-p mice: 7 T0, 5 T1, 6 T4, 6 T5, 5 T1+2hrs	d_{TRIALS} =1.11 $d_{GENORYPE}$ =0.97 $d_{SEPTAL\ REGIONS\ X\ TRIALS}$ =0.262	2-way ANOVA	$F_{GENOTYPE}$ (1,52)=14.05, p=0.0004* F_{TRIALS} (4,52)=18.36, p<0.0001* $F_{GENOTYPE\ X\ TRIALS}$ (4,52)=1.0, p=0.4
2E	Mice: 5 NaCl, 5 AVP, 4 TGOT	$d_{INJECTIONS}$ =2.89	Kruskal Wallis	p=0.0012*
3A	Mice: 8 +/+, 7 +/-p	$d_{GENOTYPE}$ =0.8 $d_{SEPTAL\ REGIONS}$ =0.2 $d_{GENOTYPE\ X\ SEPTAL\ REGIONS}$ =0.26	2-way ANOVA	$F_{GENOTYPE}$ (1,26)=2.08, p=0.16 $F_{SEPTAL\ REGIONS}$ (1,26)=0.13, p=0.71 $F_{SEPTAL\ REGIONS\ X\ GENOTYPE}$ (1,26)=0.2 p=0.64
3D	Mice: 5 +/+, 5 +/-p	$d_{CELL\ MARKER}$ =1.6 $d_{dLVP647}$ =1.85 $d_{GENORYPE}$ =0.356 $d_{CELL\ MARKER\ X\ dLVP647}$ =1.93 $d_{CELL\ MARKER\ X\ GENOTYPE}$ =0.6 $d_{dLVP647\ X\ GENOTYPE}$ =0.41 $d_{GENOTYPE\ X\ CELL\ MARKER\ X\ dLVP647}$ =0.68	3-way ANOVA	$F_{CELL\ MARKER}$ (2,59)=37.27, p<0.0001 $F_{dLVP647}$ (1,59)=49.85, p<0.0001* $F_{GENOTYPE}$ (1,59)=1.83, p<0.18 $F_{CELL\ MARKER\ X\ dLVP647}$ (2,59)=54.01, p<0.0001* $F_{CELL\ MARKER\ X\ GENOTYPE}$ (2,59)=5.26, p=0.0079* $F_{GENOTYPE\ X\ dLVP647}$ (2,59)=2.5, p=0.11 $F_{GENOTYPE\ X\ dLVP647\ X\ CELL\ MARKER}$ (2,59)=5.35, p=0.0073*
4B	Cells +/+: 27 excited, 33 insensitive Cells +/-p: 14 exited, 14 insensitive	d_{TIME} =0.71 d_{AVP} =0.95 $d_{GENORYPE}$ =0.256 $d_{TIME\ X\ AVP}$ =0.682 $d_{TIME\ X\ GENOTYPE}$	3-way ANOVA RM	F_{TIME} (30,2259)= 9.5, p<0.0001* F_{AVP} (1,76)=16.89, p<0.0001* $F_{GENOTYPE}$ (1,76)=1.22, p=0.27 $F_{TIME\ X\ AVP}$ (30,2259)=8.67, p<0.0001 $F_{TIME\ X\ GENOTYPE}$ (30,2259)=1.39, p=0

		=0.27 $d_{GENOTYPE\ X\ AVP}$ =0.188 $d_{GENOTYPE\ X\ AVP\ X\ TIME}$ =0.23		$F_{GENOTYPE\ X\ AVP}$ (1,76)=0.66, p=0.41 $F_{TIME\ X\ AVP\ X\ GENOTYPE}$ (30,2259)=1.04 p=0.4
4C	Cells +/+: 31 inhibited, 33 insensitive Cells +/-p: 4 inhibited, 14 insensitive	d_{TIME} =0.43 d_{AVP} =0.59 $d_{GENORYPE}$ =0.209 $d_{TIME\ X\ AVP}$ =0.47 $d_{TIME\ X\ GENOTYPE}$ =0.21 $d_{GENOTYPE\ X\ AVP}$ =0.093 $d_{GENOTYPE\ X\ AVP\ X\ TIME}$ =0.185	3-way ANOVA RM	F_{TIME} (30,2077)= 2.55, p<0.0001* F_{AVP} (1,71)=4.9, p=0.029* $F_{GENOTYPE}$ (1,71)=0.6, p=0.43 $F_{TIME\ X\ AVP}$ (30,2077)=3.045, p<0.000 $F_{TIME\ X\ GENOTYPE}$ (30,2077)=0.65, p=0 $F_{GENOTYPE\ X\ AVP}$ (1,71)=0.13, p=0.71 $F_{TIME\ X\ AVP\ X\ GENOTYPE}$ (30,2077)=0.47 p=0.99
4D	Loose patch: 32 +/+, 26 +/-p cells Whole cell: 103 +/+, 45 +/-p cells	$d_{LOOSE\ PATCH}$ =0.99 $d_{WHOLE\ CELL}$ =0.62	Chi-square	X^2 (2)=11.47, p=0.003* X^2 (2)=13.22, p=0.0013*
5B	Mice: 13 NaCl, 10 AVP	$d_{FREQUENCY}$ =0.38 $d_{AVP\ 10\ MIN}$ =1.255 $d_{AVP\ 10\ MIN\ X\ FREQUENCY}$ =0.449 $d_{FREQUENCY}$ =0.27 $d_{AVP\ 60\ MIN}$ =1.73 $d_{AVP\ 60\ MIN\ X\ FREQUENCY}$ =0.57	2-way ANOVA RM	$F_{FREQUENCY}$ (25,546)= 0.77, p=0.78 $F_{AVP\ 10\ MIN}$ (1,546)=8.13, p=0.0045* $F_{FREQUENCY\ X\ AVP\ 10\ MIN}$ (25,546)=1.04 p=0.41 $F_{FREQUENCY}$ (25,650)= 0.38, p=0.99 $F_{AVP\ 60\ MIN}$ (1,650)=15.59, p<0.0001* $F_{FREQUENCY\ X\ AVP\ 60\ MIN}$ (25,650)=1.73 p=0.017*
5C	+/-p mice: 14 NaCl, 16 AVP	d_{TRIALS} =1.6 d_{AVP} =0.021 $d_{AVP\ X\ TRIALS}$ =0.573	2-way ANOVA RM	F_{TRIALS} (2,42)=17.99, p<0.0001* F_{AVP} (1,21)=0.003, p=0.8 $F_{AVP\ X\ TRIALS}$ (2,42)=2.29, p=0.11
5D	+/-p mice: 14 NaCl, 9 AVP	$d_{FREQUENCY\ T1}$ =0.75 d_{AVP} =0.485 $d_{AVP\ X\ FREQUENCY\ T1}$ =0.505 $d_{FREQUENCY\ T5}$ =0.39 d_{AVP} =0.589 $d_{AVP\ X\ FREQUENCY\ T5}$ =0.59	2-way ANOVA RM	$F_{FREQUENCY\ T1}$ (23,504)=2.84, p<0.00(F_{AVP} (1,504)=1.176, p=0.27 $F_{AVP\ X\ FREQUENCY\ T1}$ (23,480)=1.275, p=0.17 $F_{FREQUENCY\ T5}$ (23,480)=0.76, p=0.77 F_{AVP} (1,480)=1.738, p=0.18 $F_{AVP\ X\ FREQUENCY\ T5}$ (23,480)=1.74, p=0.016*
5E	+/+ mice: 15 NaCl, 11 MC	d_{TRIALS} =1.37 d_{MC} =0.648	2-way ANOVA	F_{TRIALS} (2,48)=11.12, p=0.0001* F_{MC} (1,24)=2.46, p=0.12

		$d_{MC\ X\ TRIALS}$ =0.56	RM	$F_{MC\ X\ TRIALS}$ (2,48)=1.83, p=0.17
5F	+/+ mice: 17 NaCl, 11 MC	$d_{FREQUENCY\ T1}$ =0.676 d_{MC} =0.644 $d_{MC\ X\ FREQUENCY\ T1}$ =0.298 $d_{FREQUENCY\ T5}$ =0.32 d_{MC} =2.24 $d_{MC\ X\ FREQUENCY\ T5}$ =0.565	2-way ANOVA RM	$F_{FREQUENCY\ T1}$ (25,650)=2.833, p<0.0001* F_{MC} (1,650)=2.56, p=0.1 $F_{MC\ X\ FREQUENCY\ T1}$ (25,650)=0.55, p=0.96 $F_{FREQUENCY\ T5}$ (25,676)=0.63, p=0.9 F_{MC} (1,676)=31.38, p<0.0001* $F_{MC\ X\ FREQUENCY\ T5}$ (25,676)=1.98, p=0.003*
6B	Mice: 5 +/+, 5 +/-p		Kolmogorov-Smirnov	p<0.0001*
6D	+/+ mice: 8 T0, 8 T1, 12 T4, 7 T5	$d_{NOVELTY\ PVN}$ =2.41 $d_{NOVELTY\ LH}$ =NA $d_{NOVELTY\ SON}$=1.37 $d_{NOVELTY\ BNST}$ =NA $d_{HABITUATION\ PVN}$ =1.17 $d_{HABITUATION\ LH}$ =0.33 $d_{HABITUATION\ SON}$ =0.83 $d_{HABITUATION\ BNST}$ =0.44 $d_{DISCRIMINATION\ PVN}$ =5.3 $d_{DISCRIMINATION\ LH}$ =NA $d_{DISCRIMINATION\ SON}$ =NA $d_{DISCRIMINATION\ BNST}$ =0.9	2-way ANOVA	$F_{SOCIAL\ TRIALS}$ (3,96)=4.34, p=0.006* $F_{SEPTAL\ REGIONS\ in\ +/+}$ (3,96)=23.76, p<0.0001* $F_{SEPTAL\ REGIONS\ in\ +/+\ X\ SOCIAL\ TRIALS}$ (3,96)=4.36, p<0.0001*
	+/-p mice: 9 T0, 8 T1, 5 T4, 5 T5	$d_{NOVELTY\ PVN}$ =0.6 $d_{NOVELTY\ LH}$ =0.07 $d_{NOVELTY\ SON}$=0.24 $d_{NOVELTY\ BNST}$ =0.86 $d_{HABITUATION\ PVN}$ =0.35 $d_{HABITUATION\ LH}$ =0.5 $d_{HABITUATION\ SON}$ =0.6 $d_{HABITUATION\ BNST}$ =0.7	2-way ANOVA	$F_{SOCIAL\ TRIALS}$ (3,75)=2.53, p=0.06 $F_{SEPTAL\ REGIONS\ in\ +/-p}$ (3,75)=1.76, p=($F_{SEPTAL\ REGIONS\ in\ +/-p\ X\ SOCIAL\ TRIALS}$ (3,75)=1.173, p=0.32

		$d_{DISCRIMINATION\ PVN}$ =0.1 $d_{DISCRIMINATION\ LH}$ =0.5 $d_{DISCRIMINATION\ SON}$ =0.44 $d_{DISCRIMINATION\ BNST}$ =0.7		
7C	BNST: 6 no light, 6 light stimulation PVN: 9 no light, 11 light stimulation	d_{TRIALS} =2.61 $d_{CHR2\ in\ BNST}$ =0.268 $d_{CHR2\ in\ BNST\ X\ TRIALS}$ =1.2 d_{TRIALS} =1.4 $d_{CHR2\ in\ PVN}$ =0.79 $d_{CHR2\ in\ PVN\ X\ TRIALS}$ =0.8	2-way ANOVA RM	F_{TRIALS} (2,10)=17.11, p=0.0006* $F_{CHR2\ in\ BNST}$ (1,5)=0.18, p=0.6 $F_{TRIALS\ X\ CHR2\ in\ BNST}$ (2,10)=3.61, p=0 F_{TRIALS} (2,26)=8.84, p=0.0012* $F_{CHR2\ in\ PVN}$ (1,13)=2.8, p=0.11 $F_{TRIALS\ X\ CHR2\ in\ PVN}$ (2,8)=2.9, p=0.11
7D	BNST: 11 no light, 6 light stimulation	$d_{FREQUENCY\ T1}$ =0.275 d_{CHR2} =2.3 $d_{CHR2\ X\ FREQUENCY\ T1}$ =0.4 $d_{FREQUENCY\ T5}$ =0.45 d_{CHR2} =0.054 $d_{CHR2\ X\ FREQUENCY\ T5}$ =0.711	2-way ANOVA RM	$F_{FREQUENCY\ T1}$ (25,390)=0.26, p=0.99 F_{CHR2} (1,390)=18.27, p<0.0001* $F_{CHR2\ X\ FREQUENCY\ T1}$ (25,390)=0.6, p= $F_{FREQUENCY\ T5}$ (25,400)=0.7, p=0.84 F_{CHR2} (1,16)=0.01, p=0.8 $F_{CHR2\ X\ FREQUENCY\ T5}$ (25,400)=1.73, p=0.016*
7E	BNST: 6 no light, 6 light stimulation PVN: 6 no light. 6 light stimulation	d_{BNST} =1.44	Kruskal Wallis	p=0.0117*
Table 1	EPSC: 40 excited cells	d_{AVP} =0.26 d_{TTX} =0.76 $d_{AVP\ X\ TTX}$ =1.69 d_{CNQX} =2.27 $d_{AVP\ X\ CNQX}$ =4.3	1-way ANOVA	$F_{EPSC\ EXCITED\ CELLS}$ (5,74)=10.52, p<0.0001*
	EPSC: 21 inhibited cells	d_{AVP} =0.7 d_{TTX} =0.03 $d_{AVP\ X\ TTX}$ =1.04 d_{CNQX} =3.1 $d_{AVP\ X\ CNQX}$ =1.03	1-way ANOVA	$F_{EPSC\ INHIBITED\ CELLS}$ (5,36)=5.1, p=0.0012*
	IPSC: 26 excited cells	d_{AVP} =1.19 d_{TTX} =0.6 $d_{AVP\ X\ TTX}$ =3.7	1-way ANOVA	$F_{IPSC\ EXCITED\ CELLS}$ (3,49)=8.97,

			$p<0.0001$*
IPSC: 13 inhibited cells	$d_{AVP}=1.23$ $d_{TTX}=0.6$ $d_{AVP\ X\ TTX}=6.9$	1-way ANOVA	$F_{IPSC\ INHIBITED\ CELLS}(3,22)=5.1$, $p=0.0077$*
EPSC+IPSC: 52 excited cells	$d_{AVP}=0.85$ $d_{TTX}=0.49$ $d_{GABAZINE}=0.45$ $d_{AVP+GABAZINE}=2.0$	1-way ANOVA	$F_{IPSC\ EXCITED\ CELLS}(4,99)=6.45$, $p<0.0001$*
EPSC+IPSC: 30 inhibited cells	$d_{AVP}=1.43$ $d_{TTX}=0.6$ $d_{GABAZINE}=0.56$ $d_{AVP+GABAZINE}=1.46$	1-way ANOVA	$F_{IPSC\ INHIBITED\ CELLS}(4,55)=8.33$, $p<0.0001$*