nature neuroscience

Corresponding Author:	H. Troy Ghashghaei	# Main Figures:	3
Manuscript Number:	NN-BC55103	# Supplementary Figures:	10
Manuscript Type:	Brief Communication	# Supplementary Tables:	0
		# Supplementary Videos:	0

Reporting Checklist for Nature Neuroscience

This checklist is used to ensure good reporting standards and to improve the reproducibility of published results. For more information, please read Reporting Life Sciences Research.

Please note that in the event of publication, it is mandatory that authors include all relevant methodological and statistical information in the manuscript.

Statistics reporting, by figure

- Please specify the following information for each panel reporting quantitative data, and where each item is reported (section, e.g. Results, & paragraph number).
- Each figure legend should ideally contain an exact sample size (n) for each experimental group/condition, where n is an exact number and not a range, a clear definition of how n is defined (for example x cells from x slices from x animals from x litters, collected over x days), a description of the statistical test used, the results of the tests, any descriptive statistics and clearly defined error bars if applicable.
- For any experiments using custom statistics, please indicate the test used and stats obtained for each experiment.
- Each figure legend should include a statement of how many times the experiment shown was replicated in the lab; the details of sample collection should be sufficiently clear so that the replicability of the experiment is obvious to the reader.
- For experiments reported in the text but not in the figures, please use the paragraph number instead of the figure number.

Note: Mean and standard deviation are not appropriate on small samples, and plotting independent data points is usually more informative. When technical replicates are reported, error and significance measures reflect the experimental variability and not the variability of the biological process; it is misleading not to state this clearly.

		TEST USED		n			DESCRIPTIVE STATS (AVERAGE, VARIANCE)		P VALUE		DEGREES OF FREEDOM & F/t/z/R/ETC VALUE	
	FIGURE NUMBER	WHICH TEST?	SECTION & PARAGRAPH #	EXACT VALUE	DEFINED?	SECTION & PARAGRAPH #	REPORTED?	SECTION & PARAGRAPH #	EXACT VALUE	SECTION & PARAGRAPH #	VALUE	SECTION & PARAGRAPH #
example	1a	one-way ANOVA	Fig. legend	9, 9, 10, 15	mice from at least 3 litters/group	Methods para 8	error bars are mean +/- SEM	Fig. legend	p = 0.044	Fig. legend	F(3, 36) = 2.97	Fig. legend
example	results, para 6	unpaired t-test	Results para 6	15	slices from 10 mice	Results para 6	error bars are mean +/- SEM	Results para 6	p = 0.0006	Results para 6	t(28) = 2.808	Results para 6

		TEST USED		n			DESCRIPTIVE STATS (AVERAGE, VARIANCE)		P VALUE		DEGREES OF FREEDOM & F/t/z/R/ETC VALUE	
	FIGURE NUMBER	WHICH TEST?	SECTION & PARAGRAPH #	EXACT VALUE	DEFINED?	SECTION & PARAGRAPH #	REPORTED?	SECTION & PARAGRAPH #	EXACT VALUE	SECTION & PARAGRAPH #	VALUE	SECTION & PARAGRAPH #
+ -	1c	unpaired two tailed t-test	Figure 1 legend	3 animals per group	P42-Gi mice from at least 3 litters	Figure 1 legend and online methods	Dot plot of mean from each animal, lines are mean ±s.e.m. of percentages from the three replicates, vehicle: 42.2±5.5%, CNO: 20.1±2.1%	Figure 1 legend	p=0.02	Figure 1 legend	t(4)=3.72	Figure 1 legend
+ -	2b	Fisher's Exact Test (all trials)	Figure 2 legend	10 animals per group	P42-Gi mice from at least 3 litters	Figure 2 legend and online methods	Percent and exact number of successful trials/all trials. Treat A: Vehicle: 60% (42/70); CNO: 13%(9/70). Treat B: Vehicle: 67% (47/70); CNO: 13% (9/70) .	Figure 2 legend	Treat A: P=7.6x10-9 Treat B: P=4.4x10-11	Figure 2 legend	NA	NA
+ -	2c	Fisher's Exact Test (daily comparisons)	Analysis not presented in manuscript	10 animals per group	P42-Gi mice from at least 3 litters	Figure 2 legend and online methods	All values plotted in charts. Exact number of successful trials/all trials per day. Treat A: Day 1: vehicle=2/10, CNO=0/10; day 2: vehicle=6/10, CNO=1/10; day 3: vehicle=6/10, CNO=2/10; day 4: vehicle=5/10, CNO=1/10; day 5: vehicle=8/10, CNO=2/10; day 6: vehicle=8/10, CNO=2/10; day 7: vehicle=8/10, CNO=1/10. Treat B: Day 1: vehicle=4/10, CNO=2/10; day 2: vehicle=4/10, CNO=2/10; day 3: vehicle=6/10, CNO=0/10; day 4: vehicle=6/10, CNO=1/10; day 5: vehicle=9/10, CNO=1/10; day 6: vehicle=9/10, CNO=2/10; day 7: vehicle=9/10, CNO=1/10.	Figure 2 legend	Treat A: day 1: p=0.47, day 2: p=0.14, day 3: p=0.17, day 4: p=0.35, day 5: p=0.023, day 6: p=0.023, day 7: p=0.005. Treat B: day 1: p=0.63, day 2: p=0.63, day 3: p=0.011, day 4: p=0.057, day 5: p=0.001, day 6: p=0.006, day 7: p=0.001	Figure 2 legend	NA	NA

+ -	2c	Hypothesis test of Linear Regression	Figure 2 legend	10 animals per group	P42-Gi mice from at least 3 litters	Figure 2 legend and online methods	Data are presented as slope ± s.e.with 95% CI (LL,UL) slope(vehicle): Treat A = -8.9 ± 2.77%/day (-14.45, -3.4); Treat B = -10.0 ± 1.56%/day (-15.15, -4.85); slope(CNO): Treat A= -1.79 ± 2.02%/day (-5.82, 2.25), Treat B= 0.71 ± 1.5%/day (-3.34, 4.76)	Figure 2 legend	Treat A: P=0.039 Treat B: P=0.0014	Figure 2 legend	Treat A: F(1,136)=4.35 Treat B: F(1,136)=10.68	Figure 2 legend
+ -	2d	Fisher's Exact Test (all trials)	Figure 2 legend	9 animals per group	P42-Gi mice from at least 3 litters	Figure 2 legend and online methods	Percent and exact values of trials with freezing behavior/all trials. Vehicle:89% (56/63); CNO: 87% (55/63)	Figure 2 legend	P=0.999	Figure 2 legend	NA	NA
+ -	2e	Fisher's Exact Test (daily comparisons)	Figure 2 legend	9 animals per group	P42-Gi mice from at least 3 litters	Figure 2 legend and online methods	All values plotted in chart. Exact values of trials with freezing behavior/all trials per day between groups. Day 1: vehicle=9/9 CNO=9/9; day 2: vehicle=9/9, CNO=9/9; day 3: vehicle=9/9, CNO=8/9; day 4: vehicle=9/9, CNO=9/9; day 5: vehicle=8/9, CNO=7/9; day 6: vehicle=7/9, CNO=7/9; day 7: vehicle=6/9, CNO=7/9.	Figure 2 legend	day 1: P=1.0, day 2: P=1.0, day 3: P=1.0, day 4: P=1.0, day 5: P=1.0, day 6: P=1.0, day 7: P=1.0.	Figure 2 legend	NA	NA
+ -	2e	Hypothesis test of Linear Regression	Figure 2 legend	9 animals per group	P42-Gi mice from at least 3 litters	Figure 2 legend and online methods	Data are presented as slope ± s.e.with 95% CI (LL,UL) slope(vehicle)=6.75±1.82%/day (3.11, 10.38); slope(CNO)= 5.56 ±2.1%/day (1.54, 9.57)	Figure 2 legend	P=0.66	Figure 2 legend	F(1,122)=0.19	Figure 2 legend

+ -	2f	Two-tailed Mann-Whitney U test	Figure 2 legend	9 animals per group	P42-Gi mice from at least 3 litters	Figure 2 legend and online methods	All values plotted in chart. Data below are in the following order: mean± s.e.m of percentages; Q1, median, Q3.By animal: vehicle: 193.3±42.1s; 83.1, 146.9, 281.9; CNO: 203.3±41.7s; 83, 216.1, 295.9; N(vehicle)=N(CNO)=9. By day: vehicle: 193.3 ±5.3s, 183, 186.6, 205.8; CNO: 203.3 ±7.2s; 190.0, 210.7, 213.7; N(vehicle)=N(CNO)=7	Figure 2 legend	By day: P=0.26 By animal: P=0.96	Figure 2 legend	By day: U=15.00 By animal: U=39.50	Figure 2 legend
+ -	2f	Hypothesis test of Linear Regression	Figure 2 legend	9 animals per group	P42-Gi mice from at least 3 litters	Figure 2 legend and online methods	Data are presented as slope ± s.e.with 95% CI (LL,UL) slope(vehicle)=-1.36±8.55s/day (-18.44, 15.73); slope(CNO)=-8.1 ±8.00s/day (-24.12, 7.88)	Figure 2 legend	P=0.56	Figure 2 legend	F(1,122)=0.33	Figure 2 legend
+ -	3b	None	NA	3 animals per group	P0-Gi and P42-Gi forebrains, 3 animals/group, 18 sections per animal, respectively	Figure 3 legend and online methods	dot plot of mean per animal, lines are mean±s.e.m.	Figure 3 legend	NA	NA	NA	NA
+ -	3c	None	NA	3 animals per group	P0-Gi and P42-Gi forebrains, 3 animals/group, 18 sections per animal, respectively	Figure 3 legend and online methods	dot plot of mean per animal, lines are mean±s.e.m.	Figure 3 legend	NA	NA	NA	NA
+ -	3e	Fisher's Exact Test (all trials)	Figure 3 legend	9 animals per group	P0-Gi mice from at least 3 litters	Figure 3 legend and online methods	Exact proportion freezing trials/all trials Vehicle: 94% (59/63); CNO: 27% (17/63)	Figure 3 legend	P=2.99x10-15	Figure 3 legend	NA	NA
+ -	3f	Fisher's Exact Test (daily comparisons)	Figure 3 legend	9 animals per group	P0-Gi mice from at least 3 litters	Figure 3 legend and online methods	All values plotted in chart. Exact values of trials with freezing behavior/all trials per day between groups. Day 1: vehicle=9/9, CNO=2/9; day 2: vehicle=9/9, CNO=2/9; day 3: vehicle=9/9, CNO=2/9; day 4: vehicle=9/9, CNO=4/9; day 5: vehicle=9/9, CNO=3/9; day 6: vehicle=8/9, CNO=2/9; day 7: vehicle=6/9, CNO=2/9.	Figure 3 legend	day 1: P=0.005, day 2: P=0.005, day 3: P=0.005, day 4: P=0.06 day 5: P=0.02, day 6: P=0.02, day 7: P=0.17	Figure 3 legend	NA	NA

+ -	3f	Hypothesis test of Linear Regression	Figure 3 legend	9 animals per group	P0-Gi mice from at least 3 litters	Figure 3 legend and online methods	Data are presented as slope ± s.e.with 95% CI (LL,UL) slope(vehicle)=3.18±1.30%/day (0.57, 5.78); slope(CNO)=-0.40 ±2.84%/day (-6.08, 5.29)	Figure 3 legend	P=0.26	Figure 3 legend	F(1,122)=1.31	Figure 3 legend
+ -	3g	Two-tailed Mann-Whitney U test	Figure 3 legend	9 animals per group	P0-Gi mice from at least 3 litters	Figure 3 legend and online methods	All values plotted in chart. Data below are in the following order: mean± s.e.m of percentages; Q1, median, Q3. By day: vehicle: 252.6 ±9.5s; 237.3, 245.3, 276.1; CNO: 144.4±5.8s; 133.2, 148.4,157.0; N(vehicle)=N(CNO)=7. By animal: vehicle: 252.6 ±27s; 207.6, 242.1, 283.4; CNO:144.4 ±25.77s; 93.21, 112.1, 168.6; N(vehicle)=N(CNO)=9.	Figure 3 legend	By day: P=0.0006, By animal: P=0.0078	Figure 3 legend	By day: U=0; By animal: U=11	Figure 3 legend
+ -	3g	Hypothesis test of Linear Regression	Figure 3 legend	9 animals per group	P0-Gi mice from at least 3 litters	Figure 3 legend and online methods	Data are presented as slope ± s.e.with 95% CI (LL,UL) slope(vehicle):-10.64±5.78s/day (-22.2, 0.92), slope(CNO):3.66 ±5.4s/day (-7.08, 14.39)	Figure 3 legend	P=0.072	Figure 3 legend	F(1,122)=3.28	Figure 3 legend
+ -	3h	Fisher's Exact Test (all trials)	Figure 3 legend	6 animals per group	P0-Gi mice from at least 3 litters	Figure 3 legend and online methods	Exact proportion successful trials/all trials Vehicle: 74% (31/42); CNO: 71% (30/42)	Figure 3 legend	P=0.99	Figure 3 legend	NA	NA
+ -	3i	Fisher's Exact Test (daily comparisons)	Figure 3 legend	6 animals per group	P0-Gi mice from at least 3 litters	Figure 3 legend and online methods	All values plotted in chart. Exact proportion successful trials/all trials between groups per day. Day 1: vehicle=0/6, CNO=2/6; day 2: vehicle=4/6, CNO=3/6; day 3: vehicle=6/6, CNO=5/6; day 4: vehicle=5/6, CNO=6/6; day 5: vehicle=5/6, CNO=4/6; day 6: vehicle=5/6, CNO=6/6; day 7: vehicle=6/6, CNO=4/6.	Figure 3 legend	day 1: P=0.45, day 2: P=0.999, day 3: P=0.999, day 4: P=0.999 day 5: P=0.999, day 6: P=0.999, day 7: P=0.45	Figure 3 legend	NA	NA

+ -	3i	Hypothesis test of Linear Regression	Figure 3 legend	6 animals per group	P0-Gi mice from at least 3 litters	Figure 3 legend and online methods	Data are presented as slope ± s.e.with 95% CI (LL,UL) Slope (vehicle): -11.31 ± 2.98%/day (-17.33, -5.29); slope (CNO): -6.55 ± 3.42%/day (-13.46, 0.36)	Figure 3 legend	P=0.30	Figure 3 legend	F(1,80)=1.10	Figure 3 legend
+ -	S1c	None	NA	3 animals per group	P42 Gi mice from at least 3 litters, 100 EGFP+ cells per animal	Supplementary Figure 1 legend and online methods	dot plots are average per animal and lines are mean±s.e.m.	Supplementary Figure 1 legend	NA	NA	NA	NA
+ -	S2b	Two-tailed Mann-Whitney U test	Supplementary Figure 2 legend	6 animals per group	P42 Gi mice from at least 3 litters	Supplementary Figure 2 legend and online methods	Data presented as dot plot for individual animals with lines indicating mean± s.e.m. Data below are in the following order: mean± s.e.m, Q1, median, Q3. Mobile- vehicle: 86.83±2.56%; 81.71, 87.33, 92.71; CNO: 82.56 ±3.74%; 75.51, 83.17, 90.89. Rearing- vehicle: 13.35±2.5%; 9.60, 11.44, 17.59; CNO: 30.8±9.35%; 10.74, 27.83, 48.94 Grooming- vehicle: 9.83 ±2.00%; 5.84, 8.24,15.06; CNO: 9.03±2.25%; 4.27, 7.30, 15.08 Digging- vehicle: 20.54±2.85%, 15.48, 20.07, 26.74; CNO: 21.36 ±5.13%, 10.16, 18, 33.58	Supplementary Figure 2 legend	Mobile: P=0.39; Rearing: P=0.23; Grooming: P=0.63; Digging: P=1	Supplementary Figure 2 legend	Mobile: U=12.00; Rearing: U=10.00; Grooming: U=14.50; Digging: U=18.00;	Supplementary Figure 2 legend
+ -	S3b	Fisher's Exact Test (all trials)	Supplementary Figure 3 legend	6 animals per group	10 week old Nestin-cre mice without AAV2-Gi injections	Supplementary Figure 3 legend and online methods	Percent and exact number of successful trials/all trials. Vehicle: 83% (35/42), CNO: 88% (37/42)	Supplementary Figure 3 legend	P=0.76	Supplementary Figure 3 legend	NA	NA

+ -	S3c	Fisher's Exact Test (daily comparisons)	Supplementary Figure 3 legend	6 animals per group	10 week old Nestin-cre mice without AAV2-Gi injections	Supplementary Figure 3 legend and online methods	All values plotted in chart. Percent and exact number of successful trials/all trials. Day 1: vehicle=4/6,CNO=3/6; day 2: vehicle=3/6, CNO=5/6; day 3: vehicle=6/6, CNO=6/6; day 4: vehicle=4/6, CNO=5/6; day 5: vehicle=6/6, CNO=6/6; day 6: vehicle=6/6, CNO=6/6; day 7: vehicle=6/6, CNO=6/6.	Supplementary Figure 3 legend	day 1: P=0.999, day 2: P=0.55, day 3: P=1, day 4: P=0.999, day 5=day 6=day 7: P=1	Supplementary Figure 3 legend	NA	NA
+ -	S3c	Hypothesis test of Linear Regression	Supplementary Figure 3 legend	6 animals per group	10 week old Nestin-cre mice without AAV2-Gi injections	Supplementary Figure 3 legend and online methods	Data are presented as slope ± s.e.with 95% CI (LL,UL) Slope (vehicle): -7.14 ± 2.72%/day (-12.64, 1.64), slope (CNO): -6.55 ± 2.34%/day (-11.28, -1.82)	Supplementary Figure 3 legend	P=0.87	Supplementary Figure 3 legend	F(1,80)=0.027	Supplementary Figure 3 legend
+ -	S3e	None-all trials successful	NA	6 animals per group	P42 Gi mice from at least 3 litters	Supplementary Figure 3 legend and online methods	bar charts of succesful/failed trials	Supplementary Figure 3 legend and online methods	NA	NA	NA	NA
+ -	S4b	Fisher's Exact Test (all trials)	Supplementary Figure 4 legend	6 animals per group	10 week old Nestin-cre mice without AAV2-Gi injections	Supplementary Figure 4 legend and online methods	Exact proportion freezing trials/all trials Vehicle: 83% (35/42), CNO: 86% (36/42)	Supplementary Figure 4 legend	P=0.999	Supplementary Figure 4 legend	NA	NA
+ -	S4c	Fisher's Exact Test (daily comparisons)	Supplementary Figure 4 legend	6 animals per group	10 week old Nestin-cre mice without AAV2-Gi injections	Supplementary Figure 4 legend and online methods	All values plotted in chart. Exact values of trials with freezing behavior/all trials per day between groups. Day 1: vehicle=6/6, CNO=6/6; day 2:vehicle=6/6, CNO=6/6; day 3: vehicle=6/6, CNO=6/6; day 4: vehicle=6/6, CNO=6/6; day 5: vehicle=4/6, CNO=5/6; day 6: vehicle=4/6, CNO=3/6; day 7: vehicle=3/6, CNO=4/6.	Supplementary Figure 4 legend	day 1: P=1.0, day 2: P=1.0, day 3: P=1.0, day 4: P=1.0, day 5: P=1.0, day 6: P=1.0, day 7: P=1.0.	Supplementary Figure 4 legend	NA	NA

+ -	S4c	Hypothesis test of Linear Regression	Supplementary Figure 4 legend	6 animals per group	10 week old Nestin-cre mice without AAV2-Gi injections	Supplementary Figure 4 legend and online methods	Data are presented as slope ± s.e.with 95% CI (LL,UL) Slope (vehicle): 8.93 ± 2.59%/day (3.7, 14.15); slope (CNO): 7.74 ± 2.48%/day (2.72, 12.75)	Supplementary Figure 4 legend	P=0.74	Supplementary Figure 4 legend	F(1,80)=0.11	Supplementary Figure 4 legend
+ -	S7b	Two-tailed Mann-Whitney U test	Supplementary Figure 7 legend	6 animals per group	P0-Gi mice from at least 3 litters	Supplementary Figure 7 legend and online methods	Data presented as dot plot for individual animals with lines indicating mean± s.e.m. Data below are in the following order: mean± s.e.m, Q1, median, Q3. Mobile - vehicle: 83.01±3.62%, 74.24, 81.96, 92.86; CNO: 85.39 ±3.43%; 77.47, 87.41, 92.19; Rearing - vehicle: 16.69±1.87%; 13.44,15.65, 20.96; CNO: 16.22 ±1.96%, 11.28,16.37, 21.44. Grooming - vehicle: 13.71 ±2.55%; 8.97,11.94,19.06; CNO: 15.2±1.29%; 13.09,14.41,18.66. Digging - vehicle: 17.1±2.74%; 10.92,15.22, 24.52; CNO: 17.43 ±2.95%, 10.96,17.48, 23.87.	Supplementary Figure 7 legend	Mobile: P=0.82; Rearing: P=0.94 ; Grooming: P=0.30; Digging: P=0.94	Supplementary Figure 7 legend	Mobile: U=16.00; Rearing: U=17.00; Grooming: U=11.00; Digging: U=17.00	Supplementary Figure 7 legend
+ -	S8c	Two-tailed Mann-Whitney U test	Supplementary Figure 8 legend	6 animals per group	P0-Gi mice from at least 3 litters	Supplementary Figure 8 legend and online methods	All values plotted in chart in supplementary figure 8b Data below are in the following order: mean± s.e.m of percentages; Q1, median, Q3. Vehicle: 72.4 ±3.8%; 65.41, 67.23, 83.41; CNO: 70.8±7.4%; 65.41, 67.23, 83.41.	Supplementary Figure 8 legend	P=0.90	Supplementary Figure 8 legend	U=23	Supplementary Figure 8 legend
+ -	S9c	None	NA	3 animals per group	P0-Gi and P42-Gi mice	Supplementary Figure 9 legend and online methods	dot plots are percentage calculated per mouse, lines indicate mean± s.e.m	Supplementary Figure 9 legend	NA	NA	NA	NA
+ -	S10c	None	NA	3 animals per group	P0-Gi and P42-Gi mice; 100 double labeled cells/ animal	Supplementary Figure 10 legend and online methods	dot plots are percentage calculated per mouse, lines indicate mean± s.e.m	Supplementary Figure 10 legend	NA	NA	NA	NA

Representative figures

1. Are any representative images shown (including Western blots and immunohistochemistry/staining) in the paper?

   If so, what figure(s)?

   Main Figure 1b, Supplementary Figures 1b, 1d, 1e, 1f, 5, 9a, 9b, 10b.

2. For each representative image, is there a clear statement of how many times this experiment was successfully repeated and a discussion of any limitations in repeatability?

   If so, where is this reported (section, paragraph #)?

   Number of repeats are indicated in the figure legends and in some instances in the text. No discussion is provided on repeatability of results.

Statistics and general methods

1. Is there a justification of the sample size?

   If so, how was it justified?

   Where (section, paragraph #)?

   Even if no sample size calculation was performed, authors should report why the sample size is adequate to measure their effect size.

   Justification of sample size calculation was not performed.

   For histological analyses a minimum of 3 animals and for behavioral analyses a minimum of 6 animals based on length of time per experiment and availability of mice.

2. Are statistical tests justified as appropriate for every figure?

   Where (section, paragraph #)?

   Yes. Cellular cross sample comparisons used unpaired t test. All behavioral data were compared using nonparametric statistics. These are indicated where reported and described in Online Methods, Data analyses and statistics.

   a. If there is a section summarizing the statistical methods in the methods, is the statistical test for each experiment clearly defined?

      Statistical tests for each experiment are stated where reported. Details are described in Online Methods, Data analyses and statistics.

   b. Do the data meet the assumptions of the specific statistical test you chose (e.g. normality for a parametric test)?

      Where is this described (section, paragraph #)?

      Yes, details are provided in Online Methods, Data analyses and statistics.

   c. Is there any estimate of variance within each group of data?

      Is the variance similar between groups that are being statistically compared?

      Where is this described (section, paragraph #)?

      No

   d. Are tests specified as one- or two-sided?

      Two-sided where appropriate.

   e. Are there adjustments for multiple comparisons?

      Not applicable.

3. Are criteria for excluding data points reported? Was this criterion established prior to data collection? Where is this described (section, paragraph #)?	No data were excluded. This is indicated in Online Methods, Data analyses and statistics.
4. Define the method of randomization used to assign subjects (or samples) to the experimental groups and to collect and process data. If no randomization was used, state so. Where does this appear (section, paragraph #)?	Randomized cell counting is described in Online Methods, Data analyses and statistics.
5. Is a statement of the extent to which investigator knew the group allocation during the experiment and in assessing outcome included? If no blinding was done, state so. Where (section, paragraph #)?	No blinding was done.
6. For experiments in live vertebrates, is a statement of compliance with ethical guidelines/regulations included? Where (section, paragraph #)?	Yes, Online Methods, Animals.
7. Is the species of the animals used reported? Where (section, paragraph #)?	Yes, Online Methods, Animals.
8. Is the strain of the animals (including background strains of KO/ transgenic animals used) reported? Where (section, paragraph #)?	Yes, Online Methods, Animals.
9. Is the sex of the animals/subjects used reported? Where (section, paragraph #)?	Yes, Online Methods, Animals.
10. Is the age of the animals/subjects reported? Where (section, paragraph #)?	Yes, Online Methods, Animals.
11. For animals housed in a vivarium, is the light/dark cycle reported? Where (section, paragraph #)?	Yes, Online, Methods, Animals.
12. For animals housed in a vivarium, is the housing group (i.e. number of animals per cage) reported? Where (section, paragraph #)?	Not reported.
13. For behavioral experiments, is the time of day reported (e.g. light or dark cycle)? Where (section, paragraph #)?	Not reported.

14. Is the previous history of the animals/subjects (e.g. prior drug administration, surgery, behavioral testing) reported?

    Where (section, paragraph #)?

Animals used in this study were not used in any other prior experimental procedures. This is stated in Online Methods, Animals.

    a. If multiple behavioral tests were conducted in the same group of animals, is this reported?

       Where (section, paragraph #)?

Yes, Online Methods, 'Novel appetitive odor detection task' and 'Novel aversive odor detection task'.

15. If any animals/subjects were excluded from analysis, is this reported?

    Where (section, paragraph #)?

No animals were excluded.

    a. How were the criteria for exclusion defined?

       Where is this described (section, paragraph #)?

Not applicable

    b. Specify reasons for any discrepancy between the number of animals at the beginning and end of the study.

       Where is this described (section, paragraph #)?

Not applicable

Reagents

1. Have antibodies been validated for use in the system under study (assay and species)?

Yes.

    a. Is antibody catalog number given?

       Where does this appear (section, paragraph #)?

Yes, Online Methods, Tissue processing and immunohistochemistry.

    b. Where were the validation data reported (citation, supplementary information, Antibodypedia)?

       Where does this appear (section, paragraph #)?

Cereb Cortex. 2015 Sep;25(9):2970-9. doi: 10.1093/cercor/bhu094. Brain Struct Funct. 2013 Jul;218(4):1033-49. doi: 10.1007/s00429-012-0445-y.

2. Cell line identity

    a. Are any cell lines used in this paper listed in the database of commonly misidentified cell lines maintained by ICLAC and NCBI Biosample?

       Where (section, paragraph #)?

not applicable

    b. If yes, include in the Methods section a scientific justification of their use--indicate here in which section and paragraph the justification can be found.

not applicable

c. For each cell line, include in the Methods section a statement that specifies:
- the source of the cell lines
- have the cell lines been authenticated? If so, by which method?
- have the cell lines been tested for mycoplasma contamination?

Where (section, paragraph #)?

not applicable

Data deposition

Data deposition in a public repository is mandatory for:

a. Protein, DNA and RNA sequences
b. Macromolecular structures
c. Crystallographic data for small molecules
d. Microarray data

Deposition is strongly recommended for many other datasets for which structured public repositories exist; more details on our data policy are available here. We encourage the provision of other source data in supplementary information or in unstructured repositories such as Figshare and Dryad.

We encourage publication of Data Descriptors (see Scientific Data) to maximize data reuse.

1. Are accession codes for deposit dates provided?

   Where (section, paragraph #)?

not applicable

Computer code/software

Any custom algorithm/software that is central to the methods must be supplied by the authors in a usable and readable form for readers at the time of publication. However, referees may ask for this information at any time during the review process.

1. Identify all custom software or scripts that were required to conduct the study and where in the procedures each was used.

not applicable

2. If computer code was used to generate results that are central to the paper's conclusions, include a statement in the Methods section under "**Code availability**" to indicate whether and how the code can be accessed. Include version information as necessary and any restrictions on availability.

not applicable

Human subjects

1. Which IRB approved the protocol?

   Where is this stated (section, paragraph #)?

not applicable

2. Is demographic information on all subjects provided?

   Where (section, paragraph #)?

not applicable

3. Is the number of human subjects, their age and sex clearly defined?

   Where (section, paragraph #)?

   not applicable

4. Are the inclusion and exclusion criteria (if any) clearly specified?

   Where (section, paragraph #)?

   not applicable

5. How well were the groups matched?

   Where is this information described (section, paragraph #)?

   not applicable

6. Is a statement included confirming that informed consent was obtained from all subjects?

   Where (section, paragraph #)?

   not applicable

7. For publication of patient photos, is a statement included confirming that consent to publish was obtained?

   Where (section, paragraph #)?

   not applicable

fMRI studies

For papers reporting functional imaging (fMRI) results please ensure that these minimal reporting guidelines are met and that all this information is clearly provided in the methods:

1. Were any subjects scanned but then rejected for the analysis after the data was collected?

   not applicable

   a. If yes, is the number rejected and reasons for rejection described?

      Where (section, paragraph #)?

      not applicable

2. Is the number of blocks, trials or experimental units per session and/or subjects specified?

   Where (section, paragraph #)?

   not applicable

3. Is the length of each trial and interval between trials specified?

   not applicable

4. Is a blocked, event-related, or mixed design being used? If applicable, please specify the block length or how the event-related or mixed design was optimized.

   not applicable

5. Is the task design clearly described?

   Where (section, paragraph #)?

   not applicable

6. How was behavioral performance measured?

   not applicable

7. Is an ANOVA or factorial design being used?

   not applicable

8. For data acquisition, is a whole brain scan used? If not, state area of acquisition.	not applicable
a. How was this region determined?	not applicable
9. Is the field strength (in Tesla) of the MRI system stated?	not applicable
a. Is the pulse sequence type (gradient/spin echo, EPI/spiral) stated?	not applicable
b. Are the field-of-view, matrix size, slice thickness, and TE/TR/flip angle clearly stated?	not applicable
10. Are the software and specific parameters (model/functions, smoothing kernel size if applicable, etc.) used for data processing and pre-processing clearly stated?	not applicable
11. Is the coordinate space for the anatomical/functional imaging data clearly defined as subject/native space or standardized stereotaxic space, e.g., original Talairach, MNI305, ICBM152, etc? Where (section, paragraph #)?	not applicable
12. If there was data normalization/standardization to a specific space template, are the type of transformation (linear vs. nonlinear) used and image types being transformed clearly described? Where (section, paragraph #)?	not applicable
13. How were anatomical locations determined, e.g., via an automated labeling algorithm (AAL), standardized coordinate database (Talairach daemon), probabilistic atlases, etc.?	not applicable
14. Were any additional regressors (behavioral covariates, motion etc) used?	not applicable
15. Is the contrast construction clearly defined?	not applicable
16. Is a mixed/random effects or fixed inference used?	not applicable
a. If fixed effects inference used, is this justified?	not applicable
17. Were repeated measures used (multiple measurements per subject)?	not applicable
a. If so, are the method to account for within subject correlation and the assumptions made about variance clearly stated?	not applicable
18. If the threshold used for inference and visualization in figures varies, is this clearly stated?	not applicable
19. Are statistical inferences corrected for multiple comparisons?	not applicable

a. If not, is this labeled as uncorrected?	not applicable
20. Are the results based on an ROI (region of interest) analysis?	not applicable
a. If so, is the rationale clearly described?	not applicable
b. How were the ROI's defined (functional vs anatomical localization)?	not applicable
21. Is there correction for multiple comparisons within each voxel?	not applicable
22. For cluster-wise significance, is the cluster-defining threshold and the corrected significance level defined?	not applicable

Additional comments

Additional Comments	