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☐ Initial submission ☐ Revised version ☒ Final submission

Life Sciences Reporting Summary

Nature Research wishes to improve the reproducibility of the work that we publish. This form is intended for publication with all accepted life science papers and provides structure for consistency and transparency in reporting. Every life science submission will use this form; some list items might not apply to an individual manuscript, but all fields must be completed for clarity.

For further information on the points included in this form, see Reporting Life Sciences Research. For further information on Nature Research policies, including our data availability policy, see Authors & Referees and the Editorial Policy Checklist.

Experimental design

1. Sample size

Describe how sample size was determined.

No statistical methods were used to predetermine the sample size, however, our sample sizes are similar (or even higher) to those generally employed in the field.

2. Data exclusions

Describe any data exclusions.

Cells in which serial resistance changed more than 20 % or was higher than 40 MΩ were discarded from the whole-cell patch clamp analysis. Miss-implated animals were excluded from the electrophysiological analysis. In the L-maze and beaconing assays, test trials with a vector length shorter than 20 cm and/or a mean swimming speed lower than 5 cm/s were excluded from the analysis. These exclusion criteria were pre-established and are reported in the Methods section.

3. Replication

Describe whether the experimental findings were reliably reproduced.

the experiements were conducted with different litters of mice and were always reliably reproduced.

4. Randomization

Describe how samples/organisms/participants were allocated into experimental groups.

Experimental groups were defined at posteriori upon analysis of the brain injections.

5. Blinding

Describe whether the investigators were blinded to group allocation during data collection and/or analysis.

The experimenter was blind to the genotype of the mice since experimental groups were defined at posteriori upon analysis of the brain injections.

Note: all studies involving animals and/or human research participants must disclose whether blinding and randomization were used.

6. Statistical parameters

For all figures and tables that use statistical methods, confirm that the following items are present in relevant figure legends (or in the Methods section if additional space is needed).

n/a	Confirmed
☐	☒ The exact sample size (*n*) for each experimental group/condition, given as a discrete number and unit of measurement (animals, litters, cultures, etc.)
☐	☒ A description of how samples were collected, noting whether measurements were taken from distinct samples or whether the same sample was measured repeatedly
☐	☒ A statement indicating how many times each experiment was replicated
☐	☒ The statistical test(s) used and whether they are one- or two-sided (note: only common tests should be described solely by name; more complex techniques should be described in the Methods section)
☐	☒ A description of any assumptions or corrections, such as an adjustment for multiple comparisons
☐	☒ The test results (e.g. *P* values) given as exact values whenever possible and with confidence intervals noted
☐	☒ A clear description of statistics including central tendency (e.g. median, mean) and variation (e.g. standard deviation, interquartile range)
☐	☒ Clearly defined error bars

See the web collection on statistics for biologists for further resources and guidance.

Software

Policy information about availability of computer code

7. Software

Describe the software used to analyze the data in this study.	Electrophysiological raw data was processed using custom written C++ programs, shell scripts and R scripts. Behavioral data raw data was processed using using Ethovision XT9 (Noldus). Statistical analysis was performed using Prism 6 (GraphPad Software) and Oriana 4.02 (Kovach Computing). Quantification of brain area/volume infected by the virus and estimation of tetrode location were analyzed using the software Zen 2lite (Zeiss microscopy).

For manuscripts utilizing custom algorithms or software that are central to the paper but not yet described in the published literature, software must be made available to editors and reviewers upon request. We strongly encourage code deposition in a community repository (e.g. GitHub). *Nature Methods* guidance for providing algorithms and software for publication provides further information on this topic.

Materials and reagents

Policy information about availability of materials

8. Materials availability

Indicate whether there are restrictions on availability of unique materials or if these materials are only available for distribution by a for-profit company.	All unique materials are readily available from the authors.

9. Antibodies

Describe the antibodies used and how they were validated for use in the system under study (i.e. assay and species).	No antibodies were used in this study.

10. Eukaryotic cell lines

a. State the source of each eukaryotic cell line used.	No eukaryotic cell lines were used in this study.
b. Describe the method of cell line authentication used.	NA
c. Report whether the cell lines were tested for mycoplasma contamination.	NA
d. If any of the cell lines used are listed in the database of commonly misidentified cell lines maintained by ICLAC, provide a scientific rationale for their use.	NA

Animals and human research participants

Policy information about studies involving animals; when reporting animal research, follow the ARRIVE guidelines

11. Description of research animals

Provide details on animals and/or animal-derived materials used in the study.	Experiments were performed using four day old (P4) NR1flox mice and wild-type littermates with a C57BL/6 background (64 males and 36 females).

Policy information about studies involving human research participants

12. Description of human research participants

Describe the covariate-relevant population characteristics of the human research participants.	The study did not include human research participants.