nature portfolio

Corresponding author(s): Erin S. Calipari, PHD

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Reporting Summary

Nature Portfolio wishes to improve the reproducibility of the work that we publish. This form provides structure for consistency and transparency in reporting. For further information on Nature Portfolio policies, see our Editorial Policies and the Editorial Policy Checklist.

Statistics

For all statistical analyses, confirm that the following items are present in the figure legend, table legend, main text, or Methods section.

n/a	Confirmed
☐	☒ The exact sample size (*n*) for each experimental group/condition, given as a discrete number and unit of measurement
☐	☒ A statement on whether measurements were taken from distinct samples or whether the same sample was measured repeatedly
☐	☒ The statistical test(s) used AND whether they are one- or two-sided *Only common tests should be described solely by name; describe more complex techniques in the Methods section.*
☒	☐ A description of all covariates tested
☐	☒ A description of any assumptions or corrections, such as tests of normality and adjustment for multiple comparisons
☐	☒ A full description of the statistical parameters including central tendency (e.g. means) or other basic estimates (e.g. regression coefficient) AND variation (e.g. standard deviation) or associated estimates of uncertainty (e.g. confidence intervals)
☐	☒ For null hypothesis testing, the test statistic (e.g. *F*, *t*, *r*) with confidence intervals, effect sizes, degrees of freedom and *P* value noted *Give P values as exact values whenever suitable.*
☒	☐ For Bayesian analysis, information on the choice of priors and Markov chain Monte Carlo settings
☒	☐ For hierarchical and complex designs, identification of the appropriate level for tests and full reporting of outcomes
☒	☐ Estimates of effect sizes (e.g. Cohen's *d*, Pearson's *r*), indicating how they were calculated

Our web collection on statistics for biologists contains articles on many of the points above.

Software and code

Policy information about availability of computer code

Data collection	Synapse (version 96; TDT), MED-PC (version 5.1; MED Associates, Inc.), Custom MatLab analysis codes (DOI: 10.5281/zenodo.6635659)
Data analysis	Prism (Version 9.3.0; GraphPad), MatLab (version R2019b, Mathworks), Illustrator (version 24.0; Adobe)

For manuscripts utilizing custom algorithms or software that are central to the research but not yet described in published literature, software must be made available to editors and reviewers. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Portfolio guidelines for submitting code & software for further information.

Data

Policy information about availability of data

All manuscripts must include a data availability statement. This statement should provide the following information, where applicable:

- Accession codes, unique identifiers, or web links for publicly available datasets
- A description of any restrictions on data availability
- For clinical datasets or third party data, please ensure that the statement adheres to our policy

All data in the manuscript or the supplementary material are available from the corresponding author upon reasonable request. Correspondence and requests for materials should be addressed to Erin Calipari.

Field-specific reporting

Please select the one below that is the best fit for your research. If you are not sure, read the appropriate sections before making your selection.

☒ Life sciences ☐ Behavioural & social sciences ☐ Ecological, evolutionary & environmental sciences

For a reference copy of the document with all sections, see nature.com/documents/nr-reporting-summary-flat.pdf

Life sciences study design

All studies must disclose on these points even when the disclosure is negative.

Sample size	The sample sizes for fiber photometry experiments were determined based on the number of events (trials, outcome and cue received) yielded per each session (min. 10 events).
Data exclusions	Only data from animals who failed to show the required viral expression for the optogenetics experiments were excluded.
Replication	For each experiment, there are built in replications as the experiments are iterative. We collected multiple events and trials for each subject as well as had replications of previous experiments in each subsequent experiment. We replicated the main findings within our study using different optical approaches and reported within the manuscript: 1) NAc dopamine response is decreased after pre-exposure (Figure 2 and Figure 6) 2) Stimulation of NAc dopamine abolishes latent inhibition (Figure 4 and Figure 6)
Randomization	A majority of the study was designed as a within subject study, therefore randomized sampling was not necessary. All dopamine fiber photometry experiments were designed as within subject design to eliminate variance in imaging quality. Optogenetics studies were designed as between-subject. We randomly assigned subjects into groups for those experiments.
Blinding	All experimenters were blinded to the phases of the experiments for all experiments required manual scoring or viral expression.

Reporting for specific materials, systems and methods

We require information from authors about some types of materials, experimental systems and methods used in many studies. Here, indicate whether each material, system or method listed is relevant to your study. If you are not sure if a list item applies to your research, read the appropriate section before selecting a response.

Materials & experimental systems

n/a	Involved in the study
☐	☒ Antibodies
☒	☐ Eukaryotic cell lines
☒	☐ Palaeontology and archaeology
☐	☒ Animals and other organisms
☒	☐ Human research participants
☒	☐ Clinical data
☒	☐ Dual use research of concern

Methods

n/a	Involved in the study
☒	☐ ChIP-seq
☒	☐ Flow cytometry
☒	☐ MRI-based neuroimaging

Antibodies

Antibodies used	mouse anti-TH, Millipore #MAB318 (clone LNC1); goat anti-chicken AlexaFluor 488 (Life Technologies #A-11039); donkey anti-mouse AlexaFluor 594 (Life Technologies # A-21203); chicken anti-GFP (Abcam #AB13970)
Validation	mouse anti-TH, Millipore #MAB318 (clone LNC1): company website with validation info: https://www.emdmillipore.com/US/en/product/Anti-Tyrosine-Hydroxylase-Antibody-clone-LNC1,MM_NF-MAB318?bd=1#anchor_COA References: Sharaf, A., Rahhal, B., Spittau, B., & Roussa, E. (2015). Localization of reelin signaling pathway components in murine midbrain and striatum. Cell and tissue research, 359(2), 393-407. Chand, A. N., Galliano, E., Chesters, R. A., & Grubb, M. S. (2015). A distinct subtype of dopaminergic interneuron displays inverted structural plasticity at the axon initial segment. Journal of Neuroscience, 35(4), 1573-1590. chicken anti-GFP (Abcam #AB13970): company website with validation info: https://www.abcam.com/gfp-antibody-ab13970.html References: Horita, N., Keeley, T. M., Hibdon, E. S., Delgado, E., Lafkas, D., Siebel, C. W., & Samuelson, L. C. (2022). Delta-like 1–Expressing Cells at the Gland Base Promote Proliferation of Gastric Antral Stem Cells in Mouse. Cellular and Molecular Gastroenterology and

Hepatology, 13(1), 275-287.

Animals and other organisms

Policy information about studies involving animals; ARRIVE guidelines recommended for reporting animal research

Laboratory animals	C57Bl6/J mice. Male (N=35) and female (N=48) 6- to 8-week-old C57BL/6J mice obtained from Jackson Laboratories (Bar Harbor, ME; SN: 000664) were kept 5 per cage and maintained on a 12-hour reverse light/dark cycle, with all behavioral testing took place during the light cycle.
Wild animals	No wild animals were used in the study
Field-collected samples	No field collected samples were used in the study
Ethics oversight	The Institutional Animal Care and Use Committee (IACUC) at Vanderbilt University School of Medicine The NIDA-IRP Institutional Animal Care and Use Committee of the US National Institutes of Health (NIH)

Note that full information on the approval of the study protocol must also be provided in the manuscript.