Title	eIF2α controls memory consolidation via excitatory and somatostatin neurons
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Publication date	2020-10-07
Original Citation	Sharma, V., Sood, R., Khlaifia, A., et al (2020) 'eIF2α controls memory consolidation via excitatory and somatostatin neurons', Nature 586, pp. 412-416. doi: 10.1038/s41586-020-2805-8
Type of publication	Article (peer-reviewed)
Link to publisher's version	10.1038/s41586-020-2805-8
Rights	© 2020, The Authors, under exclusive licence to Springer Nature Limited. This is a post-peer-review, pre-copyedit version of a paper published as: Sharma, V., Sood, R., Khlaifia, A., et al (2020) 'eIF2α controls memory consolidation via excitatory and somatostatin neurons', Nature 586, pp. 412-416, doi: 10.1038/s41586-020-2805-8. The final authenticated version is available online at: https://doi.org/10.1038/s41586-020-2805-8
Download date	2025-07-01 21:19:30
Item downloaded from	https://hdl.handle.net/10468/14510

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Last updated by author(s): Jun 24, 2020

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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
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☒	☐	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	Clampex 10.7 (Electrophysiology), EthoVision XT 11.5 (Behavior), Zen 2.6 Blue (Immunoflourescence)
Data analysis	ImageJ version 1.8.0_112 (Immunostaining), Zen version 3.1, Prism 7 (Statistics), Clampfit version 10.7 (Electrophysiology), GFY-Core platform version 3.8, SEQUEST (GFY-Core platform module), Cutadapt version 1.18, Gencode version 14, Bowtie version 1.0.1, DESeq2 version 1.26.0, Enricher tool (EnrichR).

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/reviewers. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Research 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 list of figures that have associated raw data
- A description of any restrictions on data availability

The associated raw data are provided for Fig.1 and 2; ED Fig. 1-10. Full Ribotag gene-expression dataset is available at the National Centre for Biotechnology Information Gene Expression Omnibus (GEO accession number GSE152825). The additional relevant data that support the findings of this study are available from the corresponding author upon reasonable request.

Field-specific reporting

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

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Life sciences study design

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

Sample size	No statistical methods were used to predetermine sample size. The sample sizes are selected based on published studies in the field (Ehnninger et al. Nat Med, 2008; Auerbach et al., Nature, 2011; Jakkamsetti et al., Neuron, 2013; Hao et al., Nature 2015; Santini et al., Nature 2013; Gkogkas et al. Nature 2013; Mathur et al., Nat Neurosci, 2013; Labouebe et al., Nat Neurosci, 2013; Atwood et al., Nature Neurosci, 2014; Knafo et al., Nat Neurosci, 2016; Uematsu et al., Nat Neurosci, 2017); Baek et al., Nature, 2019; Campos et al., Nature, 2018.
Data exclusions	No animals or data points were excluded from the analyses.
Replication	All conclusions described in the paper were confirmed by analysis of individual biological replicates, and all attempts at replication were successful. To ensure reproducibility, independent cohorts of animals were repeatedly generated and tested for the presence of described phenotypes.
Randomization	For molecular, behavioral and electrophysiological studies, mice were randomly assigned to control and experimental groups.
Blinding	These experiments were performed and analyzed blind to treatment conditions and/or genotype, information which was unveiled post-analysis.

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
☐	☒ Animals and other organisms
☒	☐ Human research participants
☒	☐ Clinical data

Methods

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

Antibodies

Antibodies used	eIF2α (D7D3) XP (#5324S, Lot 5) was purchased from cell Signaling technology (Danvers, MA). p-eIF2α (S51)(#Ab32157, Lot GR319440-11 and GR319440-13) from Abcam. CaMKIIα (Cba-2) (#13-730, Lot RA230420) is from Invitrogen. PAB CamKIIα (#AB87597, GR69112-22) is from Abcam. GAD67 (#MAB5406, Lot 2844575) and Somatostatin (#MAB354, Lot 3018725) are from Millipore. Parvalbumin (#P3088, Lot 016M4847V) is from Sigma. Parvalbumin (#195004, Lot 2-23) is from Synaptic system. Puromycin (#EQ0001, Lot 041416) is from Kerafest. Anti-HA-Epitope Tag is from Biolegend (#901513, Lot B-274467). Alexa-488 (Mouse, #A11001, Lot 1170048), Alexa-488 (Rabbit, #A11034, Lot 1971418), Alexa-546 (Mouse, #A11030, Lot 1904466), Alexa-546 (Rabbit, #A11035, Lot 1904467), Alexa-647 (Rat, 3A21247, Lot 2043368), and Alexa-647 (Guinea Pig, #A21450, Lot 1979376) are from Invitrogen. Alexa Fluor 555 Alkyne is from Invitrogen (#A20013, Lot 2126710).
Validation	All antibodies used in this study are commercially available and validated antibodies. Each lot of Biolegend antibody is quality control tested by immunofluorescent staining with flow cytometric analysis.

Animals and other organisms

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

Laboratory animals	All animals used in this study were of the species Mus musculus and the strain C57BL/6. Animals used for behavioral experiments were males 2-3 months old (see methods).
Wild animals	The study did not involve wild animals.
Field-collected samples	The study did not involve samples collected from the field.
Ethics oversight	Mice were maintained under standard conditions at the Goodman Cancer Research Centre (GCRC) animal facility, and all experiments were carried out under the Canadian Council on Animal Care (CCAC) guidelines and were approved by both McGill University and the University of Montréal (see methods).

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