

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 (<i>n</i>) 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 <i>Only common tests should be described solely by name; describe more complex techniques in the Methods section.</i>
☒	☐ 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. <i>F</i> , <i>t</i> , <i>r</i>) with confidence intervals, effect sizes, degrees of freedom and <i>P</i> value noted <i>Give P values as exact values whenever suitable.</i>
☒	☐ 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 <i>d</i> , Pearson's <i>r</i>), 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	No special code needed
Data analysis	Data visualization and analysis by Prism, OriginPro, MS Excel, Imaris, Inspect3D

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](#)

Data is available upon request to the authors. All raw data will be uploaded to a repository.

Research involving human participants, their data, or biological material

Policy information about studies with [human participants or human data](#). See also policy information about [sex, gender \(identity/presentation\), and sexual orientation](#) and [race, ethnicity and racism](#).

Reporting on sex and gender Not applicable

Reporting on race, ethnicity, or other socially relevant groupings Not applicable

Population characteristics Not applicable

Recruitment Not applicable

Ethics oversight Not applicable

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

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	HSV experiment: Not applicable ; Stress granule experiment: Not applicable ; Animal study: Based on previous data, we need at least 6 mice per group to achieve 80% statistical power.
Data exclusions	HSV experiment: No data were excluded ; Stress granules experiment: No data were excluded ; Animal study: No data were excluded from the analyses.
Replication	HSV experiment: Glutamine dose response : 1 session in triplicate as the dose response protocol optimized in the lab demonstrated high reproducibility for the other compounds tested across different sessions. Viral production : 2 sessions, each one in triplicate. Multiple test comparisons using Dunnett and assuming a normal distribution and an equal standard deviation. Statistic test performed with GraphPad Prism 10.3.1 ; Stress granule experiment: More than 100 cells were analyzed in one single session ; Animal study: All attempts at replication were successful.
Randomization	HSV experiment: No relevant for these tests for a in vitro study to analyse the effect of one parameter ; Stress granule experiment: not applicable ; Animal study: The mice were randomly allocated into two groups.
Blinding	HSV experiment: No relevant for these tests for an in vitro study to analyse the effect of one parameter ; Stress granule experiment: not applicable ; Animal study: The in vivo experiments were conducted and data were analysed by two operators in a single blinded fashion.

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
☒	☐ Clinical data
☒	☐ Dual use research of concern
☒	☐ Plants

Methods

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

Eukaryotic cell lines

Policy information about [cell lines and Sex and Gender in Research](#)

Cell line source(s)	Vero cells, atcc ccl-81 HeLa cells (CCL-2 TM), ATCC.
Authentication	None of the cell lines were authenticated.
Mycoplasma contamination	Vero cells were tested negative for mycoplasma contamination (by PCR). For HeLa cells, we do a regular mycoplasma test in our cell lab and it is a negative result.
Commonly misidentified lines (See ICLAC register)	<i>Name any commonly misidentified cell lines used in the study and provide a rationale for their use.</i>

Animals and other research organisms

Policy information about [studies involving animals](#); [ARRIVE guidelines](#) recommended for reporting animal research, and [Sex and Gender in Research](#)

Laboratory animals	C57BL/6 mice aged from 7 to 8 weeks were used in the study.
Wild animals	The study did not involve wild animals.
Reporting on sex	Male mice were used.
Field-collected samples	The study did not involve samples collected from the field.
Ethics oversight	All animal procedures were performed in compliance with protocols approved by the Animal Care and Use Committee of the Southern University of Science and Technology (Resolution number: SUSTech-JY202407031).

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

Plants

Seed stocks	Not applicable
Novel plant genotypes	Not applicable
Authentication	Not applicable