

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
<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. F , t , r) with confidence intervals, effect sizes, degrees of freedom and P 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 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	N/A
Data analysis	MestreNova 10.0.2 software (Mestrelab Research), ChemDraw Professional 20.0 (Revvity), MassLynx software version 4.1 (Waters), Thermo Xcalibur 2.2 (Thermo Scientific), GraphPad Prism 8.1.1 (Graphpad), Microsoft Excel 2019 MSO (Microsoft), BIOVIA Discovery Studio v20.1.0 (Dassault Systèmes)

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](#)

The data supporting this article have been included in the Supplementary information, Supplementary Data 1-5 and it is available the corresponding author on reasonable request.

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	In the present manuscript, no studies are performed with human participants or human data. HEK293 cells are originated from female human fetus
Reporting on race, ethnicity, or other socially relevant groupings	In the present manuscript, no studies are performed with human participants or human data.
Population characteristics	In the present manuscript, no studies are performed with human participants or human data.
Recruitment	In the present manuscript, no studies are performed with human participants or human data.
Ethics oversight	not relevant for this study

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](https://www.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	A minimum of two experiments were performed in duplicate per condition. For key experiments a minimum of three independent experiments were performed.
Data exclusions	Data was excluded when the control experiment failed
Replication	Most experiments were replicated three times, showing reproducibility.
Randomization	Different samples were allocated in different positions in 96 well plates depending on the replicate
Blinding	Blinding was not possible due to a limitation of personnel.

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

Antibodies

Antibodies used	Anti-cAMP-Cryptate (62AM4PEC, Revvity); rat anti-HA (11867423001, Sigma); rat anti-D1 (D2944, Sigma); donkey anti-rat Alexa 488 (712-545-150, Jackson ImmunoResearch)
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Validation

in accordance to the manufacturer

Eukaryotic cell lines

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

Cell line source(s)

HEK293 cells (ATCC, Cat# CRL-1573) are originated from female female human fetus

Authentication

non of the cell lines were authenticated

Mycoplasma contamination

all cells tested negative for Mycoplasma contamination

Commonly misidentified lines
(See [ICLAC](#) register)

not relevant for this study

Plants

Seed stocks

no plants used in this study

Novel plant genotypes

no plants used in this study

Authentication

no plants used in this study