

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

Data analysis

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](#)

Macromolecular structure data will be available via the protein data bank (PDB) and Electron Microscopy Data Bank (EMDB). Generated and analyzed data sets that support the findings of this study are available as source data.

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 N/A.

Reporting on race, ethnicity, or other socially relevant groupings N/A.

Population characteristics N/A.

Recruitment N/A.

Ethics oversight N/A.

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 To process the diffraction data, number of crystals and frames are shown in the statistic Supplementary Table 3. No sample sizes were predetermined for cryo-EM, and the movies stacks collection was stopped when the cryo-EM maps' resolution did not improved. Shown in Supplementary Table 4. Number of technical replicates and biological replicates are reported in the figure legends. Sample size was determined based on variability of the response deviating from the mean as indicated by the standard error of the mean (SEM), which is also represented in the figures. Typically, at least three biological replicates were performed so that the SEM was within at least 20% of the mean, but exact number of replicates are indicated per result in figure legends.

Data exclusions No data were excluded for this study.

Replication Data were replicated using technical and independent replicates. See figure legends for specific details.

Randomization For cellular assays, treatment groups were always randomized across the plate and analyzed blinded. For animal studies, animal treatments were randomized.

Blinding All cellular assays and animal work was analyzed by an experimenter blinded to the treatment condition.

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-Baculovirus gp64 (clone AcV1, PE-conjugated); Thermo Fisher Scientific (eBioscience); Catalog #12-6991-82
Validation	According to the manufacturer's datasheet, this antibody (clone AcV1) has been validated by the supplier for flow cytometric detection of baculovirus gp64 protein expressed in Sf9 insect cells.

Eukaryotic cell lines

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

Cell line source(s)	Source for HEK293T cell line is ATCC CRL-11268. FLP-In cell line was from invitrogen R78007. Spodoptera frugiperda (Sf9) cells were from Expression Systems.
Authentication	All cells used in this study are commercial and were obtained from vendors as indicated in the manuscript.
Mycoplasma contamination	Cell lines were certified as mycoplasma-free as they were obtained from the source companies and labs.
Commonly misidentified lines (See ICLAC register)	No commonly misidentified cell lines were used.

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	The species, strain, sex, and age of animals are reported in the methods where appropriate and included C57BL/6J mice and cynomolgus monkeys. The species, strain, sex, and age of animals are reported in the methods where appropriate and included C57BL/6J mice and cynomolgus monkeys.
Wild animals	We did not use wild animals.
Reporting on sex	Mice used for all tests were male; monkeys used for tests were mixed-sex populations or single sex as mentioned in the manuscript.
Field-collected samples	We did not use field-collected samples.
Ethics oversight	Mice experiments were performed in accordance with the guidelines approved by IACUC of the Center for Excellence in Molecular Cell Science (CEMCS), Chinese Academy of Sciences. The study protocol for the experiments of cynomolgus monkey was reviewed and approved by the Institutional Animal Care and Use Committee (IACUC) of Prisms Biotechnologies Co., Ltd (Shanghai, China), in accordance with the Association for Reassessment and Accreditation of Laboratory Animal Care (AAALAC) guideline.

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

Plants

Seed stocks	N/A.
Novel plant genotypes	N/A.
Authentication	N/A.