

Reporting Summary

Nature Research 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 Research 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	Diffraction data were collected at the following synchrotron facilities: UBA6-ATP, P14 at DESY/EMBL in Hamburg; UBA6-FAT10, ID 30A-3 at ESRF-EBS in Grenoble; Uba1-ATP, BL14.1 at BESSY in Berlin.
Data analysis	Anisotropy of the diffraction data was corrected with the Staraniso server (https://staraniso.globalphasing.org/cgi-bin./staraniso.cgi) from Global Phasing Limited. The structure of the UBA6-C625A-ATP and UBA6-FAT10 complexes were solved by molecular replacement (MR) with Phaser. The structures were refined with Phenix and manual rebuilding with Coot. The protein structures were analyzed using The PyMOL Molecular Graphics System, Version 2.0 Schrödinger, LLC. The secondary structure depiction was generated using ESPript 3.0.

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 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

6dc6 [<http://doi.org/10.2210/pdb3CMM/pdb>] 1z2m [<http://doi.org/10.2210/pdb1Z2M/pdb>]
 6gf1 [<http://doi.org/10.2210/pdb6GF1/pdb>] 3cmm [<http://doi.org/10.2210/pdb3CMM/pdb>]
 6gf2 [<http://doi.org/10.2210/pdb6GF2/pdb>]
 6zqh [<http://doi.org/10.2210/pdb6ZQH/pdb>]

The coordinates and structure factor amplitudes have been deposited in the PDB and can accessed as follows: UBA6-ATP: PDB entry 7pvn, Uba1-ATP: PDB entry 7zh9 and UBA6chim-FAT10: PDB entry 7pyf. Source data are provided with this paper.

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	No sample-size was performed.
Data exclusions	No data was excluded.
Replication	Assays are conducted in 3 independent replicates which gave similar results.
Randomization	Randomization is not applicable in our study.
Blinding	Blinding is not relevant to this study

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