

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	Agilent 1290 Infinity II LC-System equipped with a 50 mm PLRP-S column from Agilent with 1000 Å pore size. The LC system is attached to an Agilent 719 6545XT quadrupole-time of flight (Q-TOF) (Agilent, Santa Clara, CA). Biacore X100 Control Software for SPR data, ASTRA (version 8.1.2.1) and HPLC Manager (version 1.4.1.1) (Wyatt Corporation) for SEC-MALS, Unicorn 7.1 (AKTA) for SEC, ChemoDoc Imaging System (Bio-Rad).
Data analysis	Agilent MassHunter BioConfirm Software 10.0, Phenix 1.20.1-4487, Coot v 0.9.8.7, Cytoscape 3.9.1, Pymol v 2.5.2, UFSF-Chimera v 1.16, Microsoft Excel, Origin, RAW 2.1.1, cryoparc v3.2.0, Biacore X100 evaluation software, ASTRA (version 8.1.2.1) (Wyatt Corporation), REDATE version 1.01, SEDFIT version 16.36 (https://spsrch.cit.nih.gov/).

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 atomic coordinates and structure factors have been deposited with the Protein Data Bank, accession codes 8U9F (BT1285 wt+Nal) [<http://doi.org/10.2210/pdb8U9F/pdb>], 8U46 (BT1285 D161A-E163A) [<http://doi.org/10.2210/pdb8U46/pdb>], 8U47 (BT1285 wt) [<http://doi.org/10.2210/pdb8U47/pdb>], 8U48 (BT1285 + Man9GlcNAc2) [<http://doi.org/10.2210/pdb8U48/pdb>], 8W01 (B. faecium GH18-like C2) [<http://doi.org/10.2210/pdb8W01/pdb>] and 8W04 (B. faecium GH18-like P21) [<http://doi.org/10.2210/pdb8W04/pdb>]. Previously reported PDB structures used in this study are available under the accession codes: 8UWV [<http://doi.org/10.2210/pdb8UWV/pdb>], 6TCV [<http://doi.org/10.2210/pdb6TCV/pdb>], 2WVX [<http://doi.org/10.2210/pdb2WVX/pdb>], 4MRU [<http://doi.org/10.2210/pdb4MRU/pdb>], 5JII [<http://doi.org/10.2210/pdb5JII/pdb>], 7NWF [<http://doi.org/10.2210/pdb7NWF/pdb>], 1C8Y [<http://doi.org/10.2210/pdb1C8Y/pdb>], 6Q64 [<http://doi.org/10.2210/pdb6Q64/pdb>], and 3POH [<http://doi.org/10.2210/pdb3POH/pdb>]. Other data are available in the Supplementary information and Supplementary Data. Source data are provided with this paper.

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	This is not relevant for this study
Reporting on race, ethnicity, or other socially relevant groupings	This is not relevant for this study
Population characteristics	This is not relevant for this study
Recruitment	This is not relevant for this study
Ethics oversight	This is 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	We performed the experiments in duplicates or triplicates. We have included this information in the relevant figure legends.
Data exclusions	No data excluded.
Replication	We performed the experiments in duplicates or triplicates. All the assays were reproducible.
Randomization	This is not relevant for this study because we did not need to prevent bias in our activity and binding experiments.
Blinding	This is not relevant for this study because we did not need to prevent bias in our activity and binding experiments.

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	Rituximab (RITUXAN, Genentech) was kindly provided courtesy of the University of Maryland Greenebaum Comprehensive Cancer Center). No catalogue number. It was used as a substrate for activity measurements at 2 micromolar concentration or as a ligand for SPR analysis.
Validation	We did not need to validate the antibody because our experiment are focus on the Fc region of IgG1.

Eukaryotic cell lines

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

Cell line source(s)	HEK293T (ATCC, cat.No.: CRL-3216) and Expi293 (ThermoFisher Scientific, cat. No.:A14527) cells. No commonly misidentified cell lines were used in this study.
Authentication	None of the cell used were authenticated
Mycoplasma contamination	No
Commonly misidentified lines (See ICLAC register)	N/A

Plants

Seed stocks	<i>Report on the source of all seed stocks or other plant material used. If applicable, state the seed stock centre and catalogue number. If plant specimens were collected from the field, describe the collection location, date and sampling procedures.</i>
Novel plant genotypes	<i>Describe the methods by which all novel plant genotypes were produced. This includes those generated by transgenic approaches, gene editing, chemical/radiation-based mutagenesis and hybridization. For transgenic lines, describe the transformation method, the number of independent lines analyzed and the generation upon which experiments were performed. For gene-edited lines, describe the editor used, the endogenous sequence targeted for editing, the targeting guide RNA sequence (if applicable) and how the editor was applied.</i>
Authentication	<i>Describe any authentication procedures for each seed stock used or novel genotype generated. Describe any experiments used to assess the effect of a mutation and, where applicable, how potential secondary effects (e.g. second site T-DNA insertions, mosaicism, off-target gene editing) were examined.</i>