

**MANUSCRIPT CHECKLIST**

General formatting guidelines: <https://go.nature.com/2no5C9h>

TITLE	Yes	N/A
No more than 15 words	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Does not contain punctuation (commas and parentheses are ok)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
AUTHORS		
Full postal address for all authors is provided, including post code	<input type="checkbox"/>	<input checked="" type="checkbox"/>
At least 1 email address provided for correspondence	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Full first and last names of all authors are included, where applicable.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ABSTRACT		
No more than 150 words	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Does not contain references	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Results of the current study are written in present tense	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Starts with short description of background (2-3 sentences)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Continues with presentation of the major results ('Here we show' or similar)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Ends with a description of the paper's conclusion and broader implications	<input type="checkbox"/>	<input checked="" type="checkbox"/>
MAIN TEXT		
No more than 5,000 words in total (Introduction, Results, Discussion)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Section order is: Title, Abstract, Introduction, Results, Discussion, Methods, References, End Notes, Figure legends, Tables	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Main text is provided as a Word or Tex document	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Abbreviations are defined at first use	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Genes and genotypes are italicized	<input type="checkbox"/>	<input type="checkbox"/>
Mathematics: Scalar variables and constants should be italic, vectors should be bold without italics, subscripts and superscripts are displayed in non-italic font unless they are variables. Unit dimensions should be expressed using negative integers (e.g. $\text{kg m}^{-1} \text{s}^{-2}$ not $\text{kg/ms}^2$ ) or the word 'per'	<input type="checkbox"/>	<input type="checkbox"/>
Introduction		
Approximately 1,000 words or fewer	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Contains no subheadings	<input type="checkbox"/>	<input checked="" type="checkbox"/>
The last paragraph contains a summary of both the results and conclusions	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Contains no reference to display items (unless overview figures are presented)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Results		
Divided by subheadings less than 60 characters (incl. spaces)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
No 'data not shown' statements	<input type="checkbox"/>	<input checked="" type="checkbox"/>
If personal communication from another laboratory is cited, written permission is provided	<input type="checkbox"/>	<input type="checkbox"/>
Reference to Supplementary items format is (Supplementary Fig. 1), (Supplementary Table 1), etc.	<input type="checkbox"/>	<input checked="" type="checkbox"/>

## MANUSCRIPT CHECKLIST

Discussion	Yes	N/A
Does not contain subheadings		
Minimizes overlap with results section		
METHODS		
Methods are contained within main paper wherever possible		
Divided by subheadings less than 60 characters (incl spaces)		
Contain sufficient detail to repeat experiments (avoid 'as previously described')		
Includes a section on Statistics and Reproducibility		
POLICY COMPLIANCE		
The paper conforms to our requirements on mandatory data deposition <a href="http://www.nature.com/commsbio/journal-policies/editorial-publishing-policies#availability">http://www.nature.com/commsbio/journal-policies/editorial-publishing-policies#availability</a>		
A "Data availability" section is provided containing information on all mandatory and voluntary provision of research data <a href="http://www.springernature.com/gp/authors/research-data-policy/data-availability-statements">http://www.springernature.com/gp/authors/research-data-policy/data-availability-statements</a>		
If applicable, a "Code Availability" section is provided at the end of the Methods/main text <a href="https://www.nature.com/commsbio/journal-policies/editorial-publishing-policies#code">https://www.nature.com/commsbio/journal-policies/editorial-publishing-policies#code</a>		
An updated Life Sciences Reporting checklist is included <a href="https://www.nature.com/authors/policies/ReportingSummary.pdf">https://www.nature.com/authors/policies/ReportingSummary.pdf</a>		
REFERENCES		
Numbered in the order they appear in the text, tables, figures and boxes		
Formatted in <i>Communications Biology</i> style: 'Authors, Title, Journal, Volume, First-last page, (year)'		
References to web-only journals include: 'Authors, Title, Journal, url/doi and year of publication'		
References to websites include: 'Authors (if known), Title of page, url and year of publication'		
References to preprint servers should be formatted as 'Authors. Preprint title. For example: Preprint at <a href="http://arxiv.org/abs/">http://arxiv.org/abs/</a> YYMM.NNNN (Year)'		
Research datasets may be cited if they have been assigned digital object identifiers (DOIs) and should be formatted as 'Authors. Title. Publisher/repository, doi (year)'.		
Contains only published work or work in press (including doi number)		
Does not contain footnotes		
END NOTES		
Acknowledgements do not thank editors or reviewers		
Author contributions statement is provided		
<a href="#">Competing interests statement</a> is provided		

## MANUSCRIPT CHECKLIST

LEGENDS	Yes	N/A
Each contain a brief title		
No more than 350 words each		
Every panel is described		
Length of scale bars is defined		
Definitions for new abbreviations / symbols / colours is provided		
Error bars defined: standard deviation (s.d.) or standard error of the mean (s.e.m.)		
DISPLAY ITEMS		
No more than 10 total figures + tables		
Fit within a column/page (including legend)		
Numbered in the order they appear in the main text		
Figures: <a href="https://go.nature.com/2AWFIZw">https://go.nature.com/2AWFIZw</a>		
Figures do not contain tables		
Each panel is labelled with a single letter		
Panels are not subdivided		
Any bar plots show individual data points		
Scale bars are included (but not labelled within the figure)		
Blots and gels contain molecular weight or size markers		
Axes are labelled, including units		
Stereo figures sufficient width apart (equivalent points separated by 5.5cm)		
Avoid the use of red and green in figures to avoid confusion for colour-blind readers (magenta and turquoise are alternatives)		
Chemical structures are drawn using a Nature Research Chemdraw template <a href="https://www.nature.com/authors/guides/ChemStructureGuide.pdf">https://www.nature.com/authors/guides/ChemStructureGuide.pdf</a>		
Tables: <a href="https://go.nature.com/2M4MxYP">https://go.nature.com/2M4MxYP</a>		
Include a title (no punctuation)		
Tables are editable (not embedded as a picture in the document)		
If table legend is required, it is displayed underneath the table		
NMR standard table for structural refinement statistics has been used ( <a href="https://www.nature.com/authors/policies/tables-nmr.doc">https://www.nature.com/authors/policies/tables-nmr.doc</a> )		
X-ray standard table for structural refinement statistics has been used ( <a href="https://www.nature.com/authors/policies/tables-xray.doc">https://www.nature.com/authors/policies/tables-xray.doc</a> )		
Cryo-EM standard table for refinement and validation statistics has been used ( <a href="https://www.nature.com/authors/policies/tables-cryo-em.doc">https://www.nature.com/authors/policies/tables-cryo-em.doc</a> )		
SUPPLEMENTARY INFORMATION		
Provided as a single PDF file (except for Movies, Audio and Data)		
Supplementary files are less than 30 MB		
Each Supplementary item is cited in the main text in numerical order		
Figure legends are displayed underneath each figure; ideally, each display item and its corresponding legend fit on one page		
Format of the legends is the same as in the main manuscript and any error bars are defined (please see section above)		
Supplementary Data and movie legends are provided in the cover letter		

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SUPPLEMENTARY INFORMATION	Yes	N/A
Supplementary References are numbered sequentially from 1 and are self-contained (they do not refer to the list of References in the main paper; any such papers is duplicated in the list of Supplementary References)		
Where portions of blots and gels have been presented in the main paper, the full blot or gel are included in the Supplementary Information		
Supplementary Information does not contain essential display items (these should be displayed in the main text)		
Supplementary Information does not contain Results		
Supplementary Data files contain titles		