PNAS Information for Authors

REVISED March 2018

PNAS authors, editors, and reviewers come from around the globe. Submissions are welcomed from all researchers. Authors do not need to have a connection to an NAS member to publish in PNAS. More than 75% of published articles are submitted directly to PNAS, not as Contributed articles by NAS members.

Accepted papers must be of exceptional scientific importance and intelligible to a broad scientific audience. An NAS member makes the final decision for each paper.

To make its coverage more representative of the disciplines that comprise the NAS, PNAS has issued a Call for Papers in the Physical and Social Sciences.

PNAS is committed to transparency in its editorial review process. As a member of the Committee on Publication Ethics (COPE), PNAS supports its core practices and is committed to transparency in scholarly publishing.

PURPOSE AND SCOPE

PNAS publishes research reports, Letters, Front Matter magazine content, Commentaries, Perspectives, and Colloquium Papers. In accordance with the guiding principles established by George Ellery Hale in 1914, PNAS publishes brief first announcements of NAS members' and foreign associates' more important contributions to research and of work that appears to a member to be of particular importance. PNAS is a general science journal and all papers should be intelligible to a broad scientific audience.

Article Types

Research reports describe the results of original research of exceptional importance and are published with a brief, author-written Significance Statement that describes the significance of the work. Unsolicited research reports are welcome.

Letters are brief online comments that allow readers to constructively address a difference of opinion with authors of a recent PNAS article. Readers may comment on exceptional studies or point out potential flaws in studies published in the journal. Letters may not include requests to cite the Letter writer's work, accusations of misconduct, or personal comments to an author. Letters are limited to 500 words and 10 references, and must be submitted within 6 months of the online publication date of the subject article. Unsolicited Letters are welcome.

Front Matter is an expanded front magazine section aimed at a more general level of discussion, tackling the stories of science in interesting ways. Sections include Opinions, News Features, Science and Culture, Inner Workings, and Core Concepts. Front Matter is written only at the invitation of the Editorial Board.

Commentaries call attention to articles of particular note and are written only at the invitation of the Editorial Board.

Perspectives present a viewpoint on an important area of research. Perspectives focus on a specific field or subfield within a larger discipline and discuss current advances and future directions. Perspectives are of broad interest to nonspecialists and may add personal insight to a field, but should be balanced and objective. Perspectives are written only at the invitation of the Editorial Board and evaluated for publication using the same process as Direct Submissions.

Colloquium Papers are reports of scientific colloquia held under NAS auspices and are written only at the invitation of the Editorial Board.

All papers are evaluated solely on their scientific merit by peers, not by professional staff editors. A three-tier review process for research reports includes review by an Editorial Board member from one of the 31 NAS disciplines, an NAS Member Editor, and independent peer reviewers. NAS Member Editors are professional scientists and active researchers. A list of Editorial Board members and their disciplines appears on our masthead.

EDITORIAL AND JOURNAL POLICIES

Direct Submission. The standard mode of transmitting manuscripts is Direct Submission. Direct Submissions account for more than 75% of articles published in PNAS and do not need to be sponsored by an NAS member. The Editorial Board screens all incoming submissions and may reject manuscripts without further review, or review and reject manuscripts that do not meet PNAS standards. More than 50% of Direct Submissions are declined by the Editorial Board without additional review, within 2 weeks on average. For papers that are sent on to an editor and reviewers, the average time to receive a decision is 41 days. If accepted, authors have their articles published online as soon as 4–5 weeks after acceptance.

Authors must recommend three appropriate Editorial Board members, three NAS members who are expert in the paper's scientific area, and five qualified reviewers. The Board may choose someone who is or is not on that list or may reject the paper without further review. Authors are encouraged to indicate in their cover letter why their suggested editors are qualified to handle the paper. See the directory of PNAS Member Editors and their research interests. The editor may obtain reviews of the paper from at least two qualified reviewers, each from a different institution and not from the authors' institutions.

PNAS will invite the reviewers, secure the reviews, forward them to the editor, and secure any revisions and subsequent reviews. The name of the editor must remain anonymous to the author until the paper is accepted. Direct Submissions are published as "Edited by" the responsible editor and have an identifying footnote.

Contributed Submission. Since January 2017, all Contributed papers are submitted directly to PNAS, which handles the administrative aspects of the review process. Less than 25% of published research articles are contributed by NAS members. An NAS member may submit up to four of his or her own manuscripts for publication per year. The deadline is the last day of the year. To contribute a paper, the member must affirm that he or she had a direct role in the design and execution of all or a significant fraction of the work, and the subject matter must be within the member's area of expertise. Contributed articles must report the results of original research. A footnote will be included on Contributed articles for which the member or coauthors disclose a significant financial or competing interest. Members who have selected at least two reviewers should submit information about their manuscript to PNAS,

including a PDF file for review, and documentation that the reviewers have agreed to review the paper. Each reviewer should be from a different institution and not from the authors' institutions. Reviewers are asked to evaluate revised manuscripts to ensure that their concerns have been adequately addressed.

Members must select reviewers who have not collaborated with the authors in the past 48 months. See section *iv* and the Conflict of Interest Policy. Members must verify that reviewers are free of conflicts of interest, or must disclose any conflicts and explain their choice of reviewers. The names and institutional affiliations of all reviewers of Contributed articles are published in a footnote. The NAS member must be one of the corresponding authors on the paper. These papers are published as "Contributed by" the responsible editor.

Direct Submission Plus or Contributed Plus. Authors may submit a Plus version of either a Direct or Contributed submission, in which research reports appear online only in an expanded format up to 10 pages in length. A collection of Plus Significance Statements is published in each issue.

Review. All manuscripts are evaluated by the Editorial Board. The identity of the assigned Board member is confidential and not shared with authors or third parties. The names of reviewers are confidential and not shared, unless express permission is granted by the reviewers. The Board may reject manuscripts without further review, or review and reject manuscripts that do not meet PNAS standards. Replication studies are held to the same standards as other submissions. Manuscripts rejected by one member cannot be resubmitted through another member or as a Direct Submission. Please note a single negative review, with which the editor agrees, is sufficient to recommend rejection. Information pertaining to a submitted manuscript is treated as confidential and not shared outside of the journal.

Appeals of decisions on rejected papers will be considered; however, appeals on the basis of novelty or general interest are unlikely to be granted. Due to the high volume of submissions that PNAS receives we cannot guarantee a quick decision on appeals. Appeals must be made in writing and should be sent to pnas@nas.edu. If an appeal is rejected, further appeals of the decision will not be considered and the paper may not be resubmitted. Repeated appeals or resubmissions of a rejected manuscript without invitation by the Editorial Board will not be considered and may result in the authors being banned from submitting to PNAS.

Submission Guidelines

(*i*) Papers are considered provided they have not been **Published Previously** or concurrently submitted for publication elsewhere. What constitutes prior publication must take into account many criteria, including the extent of review, and will be determined on a case-by-case basis. Related manuscripts that are in press or submitted elsewhere must be included with a PNAS submission.

Figures, tables, or videos that have been published elsewhere must be identified, and permission of the copyright holder for both the online and print editions of the journal must be provided.

(*ii*) Posting on **Preprint Servers**, such as arXiv or bioRxiv, is permitted. See the PNAS statements on prior publication, and preprints for details, and see section *vii* for media embargo policies.

(*iii*) **Authorship** must be limited to those who have contributed substantially to the work. The corresponding author must have obtained permission from all authors for the submission of each version of the paper and for any change in authorship.

All collaborators share some degree of responsibility for any paper they coauthor. Some coauthors have responsibility for the entire paper as an accurate, verifiable report of the research. These include coauthors who are accountable for the integrity of the data reported in the paper, carry out the analysis, write the manuscript, present major findings at conferences, or provide scientific leadership to junior colleagues.

Coauthors who make specific, limited contributions to a paper are responsible for their contributions but may have only limited responsibility for other results. While not all coauthors may be familiar with all aspects of the research presented in their paper, all collaborators should have in place an appropriate process for reviewing the accuracy of the reported results.

Authors must indicate their specific contributions to the published work. This information will be published as a footnote to the paper. Published contributions are taken from the submission system, not from the manuscript file. Examples of designations include:

- Designed research
- Performed research
- Contributed new reagents or analytic tools
- Analyzed data
- Wrote the paper

An author may list more than one contribution, and more than one author may have contributed to the same aspect of the work.

(*iv*) Failure to disclose a **Conflict of Interest** at submission may result in author sanctions. Authors must disclose, at submission, any association that poses or could be perceived as a conflict of interest in connection with the manuscript, and acknowledge all funding sources supporting the work. When asked to evaluate a manuscript, members, reviewers, and editors must disclose any association that poses a conflict of interest in connection with the manuscript.

Recent collaborators, defined as people who have coauthored a paper or were a principal investigator on a grant with any of the authors within the past 48 months, must be excluded as editors and reviewers. Other examples of possible conflicts include past or present association as thesis advisor or thesis student, or a family relationship, such as a spouse, domestic partner, or parent–child relationship. Please see the Conflict of Interest Policy for details.

(*v*) Regarding **Research Misconduct**, all work should be free of fabrication, falsification, and plagiarism as defined by the US Office of Research Integrity. PNAS will evaluate issues with data or figures that are brought to our direct attention. We do not monitor the Internet or social media for these issues. If we determine that there is cause for investigation, we may discuss the concerns with a member of the Editorial Board, the editor, or the authors. We may request from the authors source data, descriptions of how experiments were performed, or explanations of how figures were prepared. Responses are assessed by subject experts.

In submitting to PNAS, all authors must agree to abide by relevant PNAS policies. Manuscripts are reviewed with the explicit understanding that all authors have seen and approved of the submitted version. In cases of suspected or alleged misconduct, PNAS follows the recommended procedures from the Committee on Publication Ethics (COPE) for handling allegations of misconduct.

(*vi*) Completion of the online submission form electronically gives a **License to Publish** the work to the NAS. If a paper is declined for publication, the license to publish is terminated.

(*vii*) PNAS may distribute **Embargoed** copies of an accepted article to the press prior to publication. Embargoes expire at 3:00 PM Eastern time, Monday of the publication week. Authors may talk freely with the press about their work but

should coordinate with the PNAS News Office so that reporters are aware of PNAS policy.

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(*viii*) Research involving **Human and Animal Participants and Clinical Trials** must have been approved by the author's institutional review board. Authors must include in the methods section a brief statement identifying the institutional and/or licensing committee approving the experiments. For all experiments involving human participants, authors must also include a statement confirming that informed consent was obtained from all participants, or provide a statement why this was not necessary.

All experiments must have been conducted according to the principles expressed in the Declaration of Helsinki. Authors must follow the International Committee of Medical Journal Editors' policy and deposit trial information and design into an accepted clinical trial registry before the onset of patient enrollment. For animal studies, authors must report the species, strain, sex, and age of the animals.

(*ix*) **Dual Use Research of Concern**. Authors and reviewers must notify PNAS if a manuscript reports potential dual use research of concern. PNAS will evaluate such papers and, if necessary, will consult additional reviewers.

(*x*) For research using **Recombinant DNA**, physical and biological containment must conform to National Institutes of Health guidelines or those of a corresponding agency.

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Authors are encouraged to use supporting information (SI) to show all necessary data or to deposit as much of their data as possible in community-endorsed publicly accessible databases, and when possible follow the guidelines of the Joint Declaration of Data Citation Principles. Research datasets should be cited in the references if they have a DOI. (See *References* for citation information.) Such deposition may facilitate access to data during the review process and postpublication. In rare cases where subject-specific repositories are not available, authors may use figshare or Dryad. Fossils or other rare specimens must be deposited in a museum or repository and be made available to qualified researchers for examination.

For further information about accessibility of data and materials, see the following: *Sharing Publication-Related Data and Materials: Responsibilities of Authorship in the Life Sciences* (2003); and *Ensuring the Integrity, Accessibility, and Stewardship of Research Data in a Digital Age* (2009).

Authors must make **Unique Materials** (e.g., cloned DNAs; antibodies; bacterial, animal, or plant cells; viruses; and algorithms and computer codes) promptly available on request by qualified researchers for their own use. Failure to comply will preclude future publication in the journal. It is reasonable for authors to charge a modest amount to cover the cost of preparing and shipping the requested material. Contact pnas@nas.edu if you have difficulty obtaining materials.

Plasmids: Authors are encouraged to deposit plasmid constructs in a public repository such as Addgene.

Databases: Before publication, authors must deposit large datasets (including microarray data, protein or nucleic acid sequences, and atomic coordinates for macromolecular structures) in an approved database and provide an accession number for inclusion in the published article. When no public repository exists, authors must provide the data as SI or, if this is not possible, on the author's institutional website. Authors should contact PNAS regarding special circumstances or privacy concerns.

Characterization of Chemical Compounds: Authors must provide sufficient information to establish the identity of a new compound and its purity. Sufficient experimental details must be included to allow other researchers to reproduce the synthesis. Characterization data and experimental details must be included either in the text or in the SI.

Protein and Nucleic Acid Sequences: Authors must deposit data in a publicly available database such as GenBank, EMBL, DNA Data Bank of Japan, UniProtKB/Swiss-Prot, or PRIDE and provide a link to the data and associated accession numbers prior to publication.

Structural Studies: For papers describing structures of biological macromolecules and small molecules, the atomic coordinates and the related experimental data (structure factor amplitudes/intensities and/or NMR restraints) must be deposited at a member site of the Worldwide Protein Data Bank: RCSB PDB, PDBe, PDBj, or BMRB prior to publication. The PDB ID should be included in the manuscript. For nuclear magnetic resonance structures, data deposited should include resonance assignments and all restraints used in structure determination and the derived atomic coordinates for both an individual structure and a family of acceptable structures.

Papers must include literature references for all coordinate datasets as well as dataset identification. Authors must agree to release the atomic coordinates and experimental data when the associated article is published. Authors may be asked to provide the atomic coordinates and experimental data during the review process and are encouraged to provide PDB validation reports at submission. Questions relating to depositions should be sent to deposit@wwpdb.org.

For papers describing structures of biological macromolecules from electron microscopy experiments that involve any averaging method (including subtomogram averaging), the 3D map should be deposited at either the EMBL-EBI (UK) or RCSB (USA) EMDB deposition site. Any atomic structure models fitted to EM maps must be deposited in the PDB. For electron tomographic studies with no averaging, deposition of one or more representative tomograms in EMDB is strongly recommended. PDB and/or EMDB accession codes must be included in the manuscript, together with a brief descriptive title for each accession. In cases where PDB models have been fitted into EMDB maps, the correspondences between them should be clearly stated.

For papers describing small-angle scattering experiments, authors are encouraged to follow the guidelines presented by the International Union of Crystallography (IUCr). Prior to submission, authors are encouraged to use the IUCr checkCIF service to validate their crystallographic information files (CIFs) and structure factors. Validation reports may be submitted as SI for editors and reviewers.

Functional Magnetic Resonance Imaging (fMRI) Studies: Authors should deposit data with XNAT Central, or other suitable

public repositories.

Genomic and Proteomic Studies: Authors of papers that include genomic, proteomic, or other high-throughput data are required to submit their data to the NCBI gene expression and hybridization array data repository (GEO) or equivalent publicly accessible database and must provide the accession number. Deposition in dbGaP is encouraged. Access to the deposited data must be available at the time of publication. Submitted data should follow the MIAME checklist.

Enzymology Data: Authors are encouraged to follow the Standards for Reporting Enzymology Data (STRENDA) commission guidelines when reporting kinetic and equilibrium binding data. See the Beilstein Institut/STRENDA commission website for details.

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Design and Analysis Transparency: Authors should follow field standards for disclosing key aspects of research design and data analysis, and should report the standards used in their study. See the Equator Network for information about standards across disciplines. PNAS encourages authors to preregister their studies and analysis plans and to provide links to the preregistration in their submission.

Statistical Analysis: Authors should include the source and version of any software used, full information on the statistical methods and measures used for each table and figure, such as a statistical test, estimates of parameters, exact sample sizes, and measures of evidence strength (frequentist or Bayesian). Statistical analyses should be done on all available data and not just on data from a "representative experiment." Statistics and error bars should only be shown for independent experiments and not for replicates within a single experiment (see Figure Legends for error bar details). Editors may send manuscripts for statistical review.

(*xii*) **Figure Preparation.** No specific feature within an image may be enhanced, obscured, moved, removed, or introduced. The grouping or consolidation of images from multiple sources must be made explicit by the arrangement of the figure and in the figure legend. Adjustments of brightness, contrast, or color balance are acceptable if they are applied to the whole image and if they do not obscure, eliminate, or misrepresent any information present in the original, including backgrounds.

Questions about images raised during image screening will be referred to the editors, who may request the original data from the authors for comparison with the prepared figures. If the original data cannot be produced, the manuscript may be rejected. Cases of deliberate misrepresentation of data will result in rejection of the paper and will be reported to the corresponding author's home institution or funding agency. Authors must obtain consent for publication of figures with recognizable human faces.

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SI may take the form of supplemental figures, tables, datasets, derivations, and audio and videos files.

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SUBMISSION PROCEDURES

Initial Submission

All authors must submit their articles at PNAS. Only a single PDF file containing all text, figures, tables, and supplemental information (SI) is required for initial submissions; high-resolution files are not required. The corresponding author must include the following information for each coauthor: author order, first name, last name, email, and institution. A cover letter (optional), movie files, and datasets may be uploaded separately.

A length estimate is not required for initial submissions, but 6-page articles should be under 49,000 characters (including spaces, figures, and tables) and 10-page articles under 82,000. Direct Submission Plus and Contributed Plus submissions undergo the same review process as Direct Submissions and Contributed submissions, respectively. Authors writing their papers in LaTeX should use our LaTeX template. Authors will need to complete the License to Publish form online and provide permissions for any previously published material.

Manuscript Length. PNAS generally uses a two-column format averaging 67 characters, including spaces, per line. The maximum length of a regular research article is 6 pages (or 10 pages for Direct Submission Plus and Contributed Plus articles), including all text, spaces, and the number of characters displaced by figures, tables, and equations.

An online submission tool estimates whether the manuscript

fits within PNAS length requirements (see Length Estimate Guidelines and FAQ). When submitting tables, figures, and/or equations in addition to text, keep the text for your manuscript under 39,000 characters (including spaces) for 6-page articles and 65,000 for 10-page articles.

Digital Figures. High-resolution figure files are not required for initial submissions. Resolution of at least 300 dpi for all figures is required. EPS, Adobe Illustrator, high-resolution PDF, and PowerPoint are preferred formats for figures that will be used in the main text. Authors may submit PRC or U3D files for 3D images; these must be accompanied by 2D representations in TIFF, EPS, or high-resolution PDF format. (See *SI* below for supplementary material.) Color images must be in RGB (red, green, blue) mode. Include the font files for any text.

Images must be final size, preferably one column width (8.7 cm). Figures wider than one column should be sized to 11.4 cm or 17.8 cm wide. Numbers, letters, and symbols should be no smaller than 6 points (2 mm) and no larger than 12 points (6 mm) after reduction and must be consistent. Composite figures must be preassembled. Figures must be submitted as separate files, not embedded in manuscript text. See the PNAS Digital Art Guidelines. Figures and tables may be enlarged to improve legibility of text.

Tables. Each table should have a brief title above the table. Table footnotes should be below the table. Tables must be submitted as separate files, not embedded in the manuscript text. Publication-ready formats include Word and LaTeX.

SI. The main text of the paper must stand on its own without the SI. Refer to the SI Appendix in the manuscript at an appropriate point in the text. Number supporting figures and tables starting with S1, S2, etc.

Authors who place detailed materials and methods in an SI Appendix must provide sufficient detail in the main text methods to enable a reader to follow the logic of the procedures and results and also must reference the SI methods. If a paper is fundamentally a study of a new method or technique, then the methods must be described completely in the main text.

- *SI Appendix:* Effective with submissions beginning April 2018, PNAS will publish SI as an uncomposed PDF file, as the authors have provided it. Authors should submit SI as a single separate PDF file, combining all text, figures, tables, movie legends, and SI references. We recommend using or following the PNAS SI template, which can be downloaded in Word or LaTeX. Additional guidelines about how to prepare your SI Appendix are included in the SI templates.
- *Datasets*: Supply Excel (.xls), RTF, PDF, CSV, or TXT files. Datasets will be published in raw format and will not be edited or composed.
- *Movies*: Supply Audio Video Interleave (avi), Quicktime (mov), Windows Media (wmv), animated GIF (gif), or MPEG files, and submit a brief legend for each movie in the SI Appendix. All movies should be submitted at the desired reproduction size and length. Movies should be no more than 10 MB in size.

Revised and Contributed Submission

Authors of Contributed papers and authors of revisions or resubmissions must provide publication-ready source files; guidelines for submitting source files appear below. Publication-ready file formats include Word and LaTeX. Only one paper text file should be submitted. Figure and table files should not be included in the main text file. The SI Appendix file should be uploaded separately, and should include all SI text, figures, tables, movie legends, and SI references. At the completion of the review process for Contributed papers, the NAS member may designate a corresponding author to upload submission files.

Revised papers must be received within 2 months or they will be treated as new submissions. If you require additional time, please notify PNAS. Multiple revisions are rarely permitted, and there is no guarantee that revised papers will be accepted. Please consider the following when preparing revised submissions.

Resubmission/Revision Cover Letter. The cover letter should include a point-by-point response to the comments of the reviewers and editor. A detailed description of all changes made is required before PNAS can process the revision.

Manuscript Files. Files must be in production-ready format and should not include any embedded figures, tables, or schemes. Text files should be provided in Word, RTF, or LaTeX format. Figures and schemes should be uploaded individually in TIFF, EPS, PPT, or high-resolution PDF. Tables should also be uploaded individually in Word, RTF, or LaTeX format. SI should be designated as such using the file type and file format options in the "Add File" screen of the submission process. SI is required to be uploaded separately as a single PDF. Please see the SI section for details.

Please supply high-resolution files whenever possible. Resolution of at least 1200 dpi is needed for all line art, 600 dpi for images that combine line art with photographs/halftones, and 300 dpi for color or grayscale photographic images. Please review the PNAS Digital Art Guidelines.

When a revision is submitted to PNAS, all files must be in their final form.

Journal Cover Figures. Authors are invited to submit scientifically interesting and visually arresting cover images (see our archive). Illustrations need not be reprinted in the article but should be representative of the work. Images should be original, and authors grant PNAS a license to publish. Include a brief lay-language caption (50–60 words) and credit information (e.g., Image courtesy of...). Images should be 21 cm wide by 22.5 cm high. Files should be EPS or TIFF and should be in RGB color mode. Cover figure files may be submitted online when the paper is submitted or may be sent to PNASCovers@nas.edu; contact PNAS for instructions on submitting large files. Submissions provided outside the online submission system should include manuscript number, author name, phone, and email.

Manuscript Format

Manuscript Order. Many authors find it useful to organize their manuscript sections as follows: title page, abstract, significance statement, introduction, results, discussion, materials and methods, acknowledgments, references, and figure legends. If authors present information clearly and concisely, other variations to this format are allowed. Number all manuscript pages starting with the title page as page 1.

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Classification: Select a major (Physical, Social, or Biological Sciences) and a minor category from the following. Dual classifications are permitted between major categories and in exceptional cases, subject to Editorial Board approval, within a major category.

PHYSICAL SCIENCES: Applied Mathematics; Applied Physical Sciences; Astronomy; Biophysics and Computational Biology; Chemistry; Computer Sciences; Earth, Atmospheric, and Planetary Sciences; Engineering; Environmental Sciences; Mathematics; Physics; Statistics; and Sustainability Science.

SOCIAL SCIENCES: Anthropology; Economic Sciences; Environmental Sciences; Political Sciences; Psychological and

Cognitive Sciences; Social Sciences; and Sustainability Science.

BIOLOGICAL SCIENCES: Agricultural Sciences; Anthropology; Applied Biological Sciences; Biochemistry; Biophysics and Computational Biology; Cell Biology; Developmental Biology; Ecology; Environmental Sciences; Evolution; Genetics; Immunology and Inflammation; Medical Sciences; Microbiology; Neuroscience; Pharmacology; Physiology; Plant Biology; Population Biology; Psychological and Cognitive Sciences; Sustainability Science; and Systems Biology.

Title: Titles should be no more than three typeset lines (generally 135 characters including spaces) and should be comprehensible to a broad scientific audience. The organism studied should be included. Please provide a short title of fewer than 50 characters including spaces for mobile devices and RSS feeds.

Author Affiliation: Include department, institution, and complete address, with the ZIP/postal code, for each author. Use superscripts to match authors with institutions. Authors are strongly encouraged to supply their ORCID identifier.

Corresponding Author: The name, complete address, phone number, and email address of the author to whom correspondence and proofs should be sent. Email addresses will appear in the article footnotes.

Keywords: Keywords are listed below the article abstract. At least three keywords are required at submission.

Abstract. Provide an abstract of no more than 250 words on page 2 of the manuscript. Abstracts should explain to the general reader the major contributions of the article. References in the abstract must be cited in full within the abstract itself and cited in the text.

Significance Statement. Authors must submit a 120-word-maximum statement about the significance of their research paper written at a level understandable to an undergraduate-educated scientist outside their field of specialty. The primary goal of the Significance Statement is to explain the relevance of the work in broad context to a broad readership. The Significance Statement appears in the article itself and is required for all research papers.

Text. Describe procedures in sufficient detail so that the work can be repeated. Methods must be presented after results and discussion. Follow the spelling and usage given in *Webster's Third New International Dictionary or the Random House Dictionary of the English Language*. Avoid laboratory jargon. Correct chemical names should be given, and strains of organisms should be specified. Trade names should be identified by an initial capital letter with the remainder of the name lowercase. Names of suppliers of uncommon reagents or instruments should be provided. Use Système International units and symbols whenever possible. Statements of novelty and priority are not permitted in the text.

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Gene Nomenclature: Prior to submission, authors should consult Genecards, MGI Nomenclature page, HUGO Gene Nomenclature Committee, or equivalent resources, to ensure standardized nomenclature is used for species-specific gene and protein names. For proposed gene names, please submit the gene symbols to the appropriate nomenclature committee as these must be deposited and approved before publication of the article.

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