

INSTRUCTIONS TO AUTHORS

SCOPE

Topics Covered

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SEE AUTHOR CHECKLIST

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Instructions to Authors are updated throughout the year. The current version is available at <http://journalitas.asm.org/t/175157>.

nipulation, and falsification of data constitute misconduct. As defined by the U.S. Department of Health and Human Services, fabrication is “making up data or results and recording or reporting them,” and falsification is “manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record” (42 Code of Federal Regulations, §93.103). All sources and methods used to obtain and analyze data, including any electronic preprocessing, should be fully disclosed; detailed explanations should be provided for any exclusions.

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Type every portion of the manuscript double-spaced (a minimum of 6 mm between lines), including figure legends, table footnotes, and References, and number all pages in sequence, including the abstract, figure legends, and tables. Place the last two items after the References section. Manuscript pages should have line numbers; manuscripts without line numbers may be editorially rejected by the editor, with a suggestion of resubmission after line numbers are added. The font size should be no smaller than 12 points. It is recommended that the following sets of characters be easily distinguishable in the manuscript: the numeral zero (0) and the letter “oh” (O); the numeral one (1), the letter “el” (l), and the letter “eye” (I); and a multiplication sign and the letter “ex” (x). Do not create symbols as graphics or use special fonts that are external to your word processing program; use the “insert symbol” function. Set the page size to 8.5 by 11 inches (ca. 21.6 by 28 cm). Italicize any words that should appear in italics, and indicate paragraph lead-ins in boldface type. Authors who are unsure of proper English usage should have their manuscripts checked by someone proficient in the English language.

Manuscripts may be editorially rejected, without review, on the basis of poor English or lack of conformity to the standards set forth in these Instructions.

Article Word Count

mSystems[™] article word counts are based on the article type. Research Articles should be approximately 5,000 words. Mini-reviews should be approximately 3,000 words maximum (with up to two figures or tables). Opinions and Hypotheses should be approximately 2,500 words maximum. Perspectives should be approximately 2,000 words maximum. Observations should be approximately 1,200 words maximum. Commentaries should be approximately 1,000 words maximum. Letters to the Editor and Replies should each be approximately 500 words maximum.

Authors will be asked to shorten overlong papers.

Supplemental Material

Authors should use discretion regarding supplemental material. Data that directly support the main conclusions of the manuscript should be part of the body of the manuscript to the greatest extent possible: both reviewers and readers prefer this practice.

Large or complex data sets or results that cannot readily be displayed in printed form because of space or technical limitations, such as data from gene expression, genomic, metagenomic, structural, proteomic, or video imaging analyses, can be included as supplemental material. In such cases, the manuscript submitted for review should include a distillation of the results so that the principal conclusions are fully supported without referral to the supplemental material.

Supplemental material can be posted by *mSystems*[™] or, if authors prefer, can be submitted by the authors for posting by a third-party service such as Dryad, figshare, or a similar repository. In the latter case, the assigned accession number(s) must be included in the manuscript submitted for review.

Supplemental material will be peer reviewed along with the manuscript and must be uploaded to the eJournalPress (eJP) peer review system at initial manuscript submission. For initial submission, this material must be uploaded **as a single PDF**. At the modification stage, however, each item in the supplemental material must be submitted as a separate file; i.e., multiple figures should not be zipped together or combined in a single PDF. ASM will post no more than 10 individual supplemental items. The maximum size permitted for an individual file is 3 MB (20 MB for movie or Excel data set files).

To ensure broad access, we ask that supplemental files be submitted in the following standard formats:

- **Text:** Word, RTF, or PDF files.
- **Figures:** TIFF, EPS, PPT, high-resolution PDF, JPEG, or GIF format.
- **Tables:** Word, RTF, or PDF files.
- **Data sets:** Excel (.xls), RTF, TXT, or PDF files.
- **Movies:** Audio Video Interleave (.avi), Quicktime (.mov), or MPEG files.

At the end of the manuscript text file, include a legend for each item in the supplemental material. **If it is necessary to cite references that are relevant only to these supplemental legends, use the style described for “Citations in abstracts”; do not include these references in the References section of the manuscript.** Supplemental material should be numbered with

an “S” (e.g., Movie S1, Fig. S1, Fig. S2, etc.), and each item should be cited at least once in the text.

Supplemental material will be peer reviewed along with the manuscript. Supplemental material posted by *mSystems*[™] will not be edited by the ASM Journals staff, and proofs will not be made available. Supplemental material posted by *mSystems*[™] will always remain associated with the article and is not subject to any modifications after publication.

Material that has been published previously (in print or online) is not acceptable for posting as supplemental material. Instead, the appropriate reference(s) to the original publication should be made in the manuscript text.

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Research Articles

Research Articles are limited to 5,000 words and should make fundamental contributions to our understanding in all areas of microbial research that use high-throughput and systems approaches. These articles should include the elements described in this section.

Title, running title, and byline. Each manuscript should present the results of an independent, cohesive study; thus, numbered series titles are not allowed. Avoid the main title/subtitle arrangement, complete sentences, and unnecessary articles. Indicate the specific organisms under study in the title or abstract as appropriate. On the title page, include the title, the running title (not to exceed 54 characters and spaces), the name of each author, the address(es) of the institution(s) at which the work was performed, each author’s affiliation, and a footnote indicating the present address of any author no longer at the institution where the work was performed. Place a number sign (#) in the byline after the name of the author to whom inquiries regarding the paper should be addressed (see “[Correspondent footnote](#)”).

Also include on the title page the word count for the abstract and the word count for the text (excluding the references, table footnotes, and figure legends).

Correspondent footnote. A single e-mail address for the corresponding author should be included on the title page of the manuscript. This information will be published with the article to facilitate communication, and the e-mail address will be used to notify the corresponding author of the availability of proofs and, later, of the PDF file of the published article.

Structured abstract. *mSystems*[™] Research Articles have structured abstracts with two sections: “Abstract” and “Importance.” The Abstract section should be 250 words or fewer and should concisely summarize the basic content of the paper with-

out presenting extensive experimental details. The Importance section should be 150 words or fewer and should provide a non-technical explanation of why the work was undertaken. For a discussion of how to evaluate the importance of a piece of research, see the essay by A. Casadevall and F. C. Fang ([Important Science—It's All About the SPIN, *Infect Immun* 77:4177–4180](#)). Avoid abbreviations and references, and do not include diagrams. When it is essential to include a reference, use the format shown under “References” below (see the [“Citations in abstracts”](#) section). Because the abstract will be published separately by abstracting services, it must be complete and understandable without reference to the text. Authors should indicate the specific organisms under study in the title or abstract as appropriate.

Introduction. The introduction should supply sufficient background information to allow the reader to understand and evaluate the results of the present study without referring to previous publications on the topic. The introduction should also provide the hypothesis that was addressed or the rationale for the present study. Choose references carefully to provide the most salient background rather than an exhaustive review of the topic.

Results. In the Results section, include the rationale or design of the experiments as well as the results; reserve extensive interpretation of the results for the Discussion section. Present the results as concisely as possible in one or more of the following: text, table(s), or figure(s). Data in tables (e.g., cpm of radioactivity) should not contain more significant figures than the precision of the measurement allows. Illustrations (particularly photomicrographs and electron micrographs) should be limited to those that are absolutely necessary to show the experimental findings. Number figures and tables in the order in which they are cited in the text, and be sure to cite all figures and tables.

Discussion. The Discussion section should provide an interpretation of the results in relation to previously published work and to the experimental system at hand and should not contain extensive repetition of the Results section or reiteration of the introduction. In short papers, the Results and Discussion sections may be combined.

Materials and Methods. The Materials and Methods section should include sufficient technical information to allow the experiments to be repeated. When centrifugation conditions are critical, give enough information to enable another investigator to repeat the procedure: make of centrifuge, model of rotor, temperature, time at maximum speed, and centrifugal force ($\times g$ rather than revolutions per minute). For commonly used materials and methods (e.g., media and protein concentration determinations), a simple reference is sufficient. If several alternative methods are commonly used, it is helpful to identify the method briefly as well as to cite the reference. For example, it is preferable to state “cells were broken by ultrasonic treatment as previously described (9)” rather than to state “cells were broken as previously described (9).” This allows the reader to assess the method without constant reference to previous publications. Describe new methods completely and give sources of unusual chemicals, equipment,

or microbial strains. When large numbers of microbial strains or mutants are used in a study, include tables identifying the immediate sources (i.e., sources from whom the strains were obtained) and properties of the strains, mutants, bacteriophages, and plasmids, etc.

A method or strain, etc., used in only one of several experiments reported in the paper may be described in the Results section or very briefly (one or two sentences) in a table footnote or figure legend. It is expected that the sources from whom the strains were obtained will be identified.

Acknowledgments. Please do not include information about direct funding in the Acknowledgments. (See [“Funding information.”](#)) Statements regarding indirect financial support may, however, be included. It is the responsibility of authors to provide a general statement disclosing financial or other relationships that are relevant to the study. (See the [“Conflict of Interest”](#) section, above.) Recognition of personal assistance should be given as a separate paragraph, as should any statements disclaiming endorsement or approval of the views reflected in the paper or of a product mentioned therein.

Funding information. In the fields associated with the Funding Sources question in the online submission form, authors should list any sources of funding, providing relevant grant numbers where possible, and the authors associated with the specific funding sources. In the event that your submission is accepted, the funding source information provided in the submission form may be published, so please ensure that all information is entered accurately and completely. (It will be assumed that the absence of any information in the Funding Sources fields is a statement by the authors that no support was received.)

Authors may also provide a funding statement. In general, an appropriate funding statement will indicate what role, if any, the funding agency had in your study (for example, “The funders had no role in study design, data collection and interpretation, or the decision to submit the work for publication.”). Funding agencies may have specific wording requirements, and compliance with such requirements is the responsibility of the author.

In cases in which research is not funded by any specific project grant, funders need not be listed, and the following statement may be used: “This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.”

References. In the reference list, references are numbered in the order in which they are cited in the article (citation-sequence reference system). In the text, references are cited parenthetically by number in sequential order. Data that are not published or not peer reviewed are simply cited parenthetically in the text (see section ii [below](#)).

(i) **References listed in the References section.** The following types of references must be listed in the References section:

- Journal articles (both print and online)
- Books (both print and online)
- Book chapters (publication title is required)
- Patents

- Theses and dissertations
- Published conference proceedings
- Meeting abstracts (from published abstract books or journal supplements)
- Letters (to the editor)
- Company publications
- In-press journal articles, books, and book chapters

Provide the names of all the authors and/or editors for each reference; long bylines should not be abbreviated with “et al.” All listed references must be cited in the text. Abbreviate journal names according to the [PubMed Journals Database](#) (National Library of Medicine, National Institutes of Health), the primary source for ASM style. Do not use periods with abbreviated words. The EndNote output style for ASM Journals’ current reference style can be found [here](#); click “Open” and then “Download and Install” to save it to your EndNote Styles folder (it should replace any earlier output styles for ASM journals [all ASM journals use the same reference style]).

Follow the styles shown in the examples below for print references.

1. **Caserta E, Haemig HAH, Manias DA, Tomsic J, Grundy FJ, Henkin TM, Dunny GM.** 2012. *In vivo* and *in vitro* analyses of regulation of the pheromone-responsive *prgQ* promoter by the PrgX pheromone receptor protein. *J Bacteriol* **194**:3386–3394.
 2. **Falagas ME, Kasiakou SK.** 2006. Use of international units when dosing colistin will help decrease confusion related to various formulations of the drug around the world. *Antimicrob Agents Chemother* **50**:2274–2275. (Letter.) {“Letter” or “Letter to the editor” is allowed but not required at the end of such an entry.}
 3. **Cox CS, Brown BR, Smith JC.** *J Gen Genet*, in press. *{Article title is optional; journal title is mandatory.}
 4. **Forman MS, Valsamakis A.** 2003. Specimen collection, transport, and processing: virology, p 1227–1241. In Murray PR, Baron EJ, Pfaller MA, Tenover JC, Tenover FC (ed), *Manual of clinical microbiology*, 8th ed. ASM Press, Washington, DC.
 5. **da Costa MS, Nobre MF, Rainey FA.** 2001. Genus I. *Thermus* Brock and Freeze 1969, 295, ^{AL} emend. Nobre, Trüper and da Costa 1996b, 605, p 404–414. In Boone DR, Castenholz RW, Garrity GM (ed), *Bergey’s manual of systematic bacteriology*, 2nd ed, vol 1. Springer, New York, NY.
 6. **Fitzgerald G, Shaw D.** In Waters AE (ed), *Clinical microbiology*, in press. EFH Publishing Co, Boston, MA. *{Chapter title is optional.}
 7. **Green PN, Hood D, Dow CS.** 1984. Taxonomic status of some methylotrophic bacteria, p 251–254. In Crawford RL, Hanson RS (ed), *Microbial growth on C₁ compounds*. Proceedings of the 4th International Symposium. American Society for Microbiology, Washington, DC.
 8. **Rotimi VO, Salako NO, Mohaddas EM, Philip LP.** 2005. Abstr 45th Intersci Conf Antimicrob Agents Chemother, abstr D-1658. {Abstract title is optional.}
 9. **Smith D, Johnson C, Maier M, Maurer JJ.** 2005. Distribution of fimbrial, phage and plasmid associated virulence genes among poultry *Salmonella enterica* serovars, abstr P-038, p 445. Abstr 105th Gen Meet Am Soc Microbiol. American Society for Microbiology, Washington, DC. {Abstract title is optional.}
 10. **Garcia CO, Paira P, Burgos R, Molina J, Molina JF, Calvo C.** 1996. Detection of salmonella DNA in synovial membrane and synovial fluid from Latin American patients. *Arthritis Rheum* **39**(Suppl):S185. {Meeting abstract published in journal supplement.}
 11. **O’Malley DR.** 1998. Ph.D. thesis. University of California, Los Angeles, CA. {Title is optional.}
 12. **Stratagene.** 2006. Yeast DNA isolation system: instruction manual. Stratagene, La Jolla, CA. {Use the company name as the author if none is provided for a company publication.}
 13. **Odell JC.** April 1970. Process for batch culturing. US patent 484,363,770. {Include the name of the patented item/process if possible; the patent number is mandatory.}
- *A reference to an in-press ASM publication should state the control number (e.g., mSystems00001-16) if it is a journal article or the name of the publication if it is a book.
- Online references must provide essentially the same information that print references do. For online journal articles, posting or revision dates may replace the year of publication, and a DOI (preferred) or URL is required for articles with nontraditional page numbers or electronic article identifiers.
1. **Johnson J, Robinson VR.** 2016. Cleavage of JPS-1 in cells infected with human rhinovirus. *mSystems* **1**(1):e00001-15. doi:10.1128/mSystems.00001-15.
 2. **Dionne MS, Schneider DS.** 2002. Screening the fruitfly immune system. *Genome Biol* **3**:reviews1010-reviews1010.2. doi:10.1186/gb-2002-3-4-reviews1010.
 3. **Winnick S, Lucas DO, Hartman AL, Toll D.** 2005. How do you improve compliance? *Pediatrics* **115**:e718–e724. doi:10.1542/peds.2004-1133.
 4. **Magalon A, Mendel RR.** 15 June 2015, posting date. Biosynthesis and insertion of the molybdenum cofactor. *EcoSal Plus* 2015 doi:10.1128/ecosalplus.ESP-0006-2013.
 5. **Lipkin WI.** 2015. Middle East respiratory syndrome coronavirus recombination and the evolution of science and public health in China. *mBio* **6**(5):e01381-15. doi:10.1128/mBio.01381-15.
- Note: a posting or accession date is required for any online reference that is periodically updated or changed.
- Citations of **ASM Accepts** manuscripts (articles from other, issue-based ASM journals that are published ahead of the issue) should look like the following example.
- Wang GG, Pasillas MP, Kamps MP.** 15 May 2006. Persistent transactivation by Meis1 replaces Hox function in myeloid leukemogenesis models: evidence for co-occupancy of Meis1-Pbx and Hox-Pbx complexes on promoters of leukemia-associated genes. *Mol Cell Biol* doi:10.1128/MCB.00586-06.
- Other journals may use different styles for their publish-ahead-of-print manuscripts, but citation entries must include the following information: author name(s), posting date, title,

journal title, and volume and page numbers and/or DOI. The following is an example:

Zhou FX, Merianos HJ, Brunger AT, Engelman DM. 13 February 2001, posting date. Polar residues drive association of polyoleucine transmembrane helices. *Proc Natl Acad Sci U S A* doi:10.1073/pnas.041593698.

(ii) References cited in the text. References that should be cited in the text include:

- Unpublished data
- Manuscripts submitted for publication
- Unpublished conference presentations (e.g., a report or poster that has not appeared in published conference proceedings)
- Personal communications
- Patent applications and patents pending
- Computer software, databases, and websites (home pages)

These references should be made parenthetically in the text as follows:

- ... similar results (R. B. Layton and C. C. Weathers, unpublished data).
- ... system was used (J. L. McInerney, A. F. Holden, and P. N. Brighton, submitted for publication).
- ... as described previously (M. G. Gordon and F. L. Rattner, presented at the Fourth Symposium on Food Microbiology, Overton, IL, 13 to 15 June 1989). *{For nonpublished abstracts and posters, etc.}*
- ... this new process (V. R. Smoll, 20 June 1999, Australian Patent Office). *{For non-U.S. patent applications, give the date of publication of the application.}*
- ... available in the GenBank database (<http://www.ncbi.nlm.nih.gov/Genbank/index.html>).
- ... using ABC software (version 2.2; Department of Microbiology, State University [<http://www.state.micro.edu>]).

URLs for companies that produce any of the products mentioned in your study or for products being sold may not be included in the article. However, company URLs that permit access to scientific data related to the study or to shareware used in the study are permitted.

(iii) Citations in abstracts. Since the abstract must be able to stand apart from the article, references cited in it should be clear without recourse to the References section. Use an abbreviated form of citation, omitting the article title, as follows.

- (M. J. Fraser, G. E. Smith, and M. D. Summers, *J Virol* **47**:287–300, 1983)
- (J. Scholefield, R. Manson, R. J. Johnston, R. Scott, and M. Spinell, p. 179–183, in R. C. Tilton, ed., *Rapid Methods and Automation in Microbiology*, 1981)
- “... the recent report of A. K. Datta and J. S. Pagano (*Antimicrob Agents Chemother* **24**:10–14, 1983) ...”

When necessary, this style should also be used for references cited in Addenda in Proof.

(iv) References related to supplemental material. If references must be cited in the supplemental material, list them in a **separate** References section within the supplemental material and cite them by those numbers; do not simply include citations of numbers from the reference list of the associated article. If the same reference(s) is to be cited in both the article itself and the supplemental material, then that reference would be listed in both References sections.

Resource Reports

Resource Reports (5,000 word limit) describe major technical advances and/or major informational databases that would be of interest in microbiology or allied fields. The manuscripts should include detailed methods and illustration of proof-of-principle so that the new methodology can be replicated and/or utilized by others. Resource Reports follow the same formatting guidelines as [Research Articles](#).

Methods and Protocols

Methods and Protocols manuscripts (5,000 word limit) describe major technical and methodological developments in systems biology. These can be bioinformatic or laboratory techniques or any protocols that practically advance the field of systems microbiology. The description of each method or protocol must include validation of, or application to, a relevant and important question in microbial cell biology or ecology and provide results demonstrating its performance in comparison to existing state-of-the-art techniques. Articles will be selected on the basis of importance to the field, methodological performance, and detailed description to enable application to the field immediately. Methods and Protocols follow the same formatting guidelines as [Research Articles](#).

Observations

Observations are short descriptions (maximum 1,200 words, with a maximum of 2 figures and 25 references) of research results of exceptional importance and unusual interest to the broad microbiology community, e.g., reports of a new type of organism, a new organelle, a new association of microbes and disease, etc.

The body of an Observation may have paragraph lead-ins. As with Research Articles, authors should include an abstract of 250 words or fewer as well as an Importance section of 150 words or fewer, providing a nontechnical explanation of why the work was undertaken.

Minireviews

Minireviews are brief (maximum 3,000 words, with a maximum of 2 figures or tables) summaries of important developments in microbiology research. They must be based on published articles and may address any subject within the scope of the journal.

Minireviews must have abstracts. Limit the abstract to 250 words or fewer. The body of the Minireview may have section headings and/or paragraph lead-ins.

Opinions and Hypotheses

Opinions and Hypotheses are short articles (maximum 2,500 words, with a maximum of 25 references) that present original and well-developed insights without complete supporting data. Although microbiology and allied fields are primarily experimental sciences, this article type places equal importance on new thought that is formulated in a manner that summarizes a problem, provides a new synthesis, and/or is suitable for subsequent experimental testing.

In this category, the journal provides a highly visible venue for the publication of ideas that have the potential to move fields and to challenge the *status quo*.

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Commentaries

Commentaries are short invited articles (maximum 1,000 words) that discuss *mSystems*[™] papers or issues of special interest. These are solicited by editors from reviewers or experts in the field.

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Perspectives

Perspectives are brief reviews (maximum 2,000 words) that offer a succinct overview of a specific topic with an emphasis on opinion and synthesis.

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Editorials (maximum 500 words) communicated by members of the *mSystems*[™] Board of Editors address issues of science, politics, or policy.

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Letters to the Editor are intended for comments on articles published in the journal and must cite published references to support the writer's argument. Letters may be no more than 500 words long and must be typed double-spaced.

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The Letter will be sent to the editor who handled the article in question. If the editor believes that publication is warranted, he/she will solicit a reply from the corresponding author of the

article and make a recommendation to the editor in chief. Final approval for publication rests with the editor in chief.

Please note that some indexing/abstracting services do not include Letters to the Editor in their databases.

ERRATA, AUTHOR CORRECTIONS, RETRACTIONS

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The Erratum section provides a means of correcting errors that occurred during the writing, typing, editing, or publication (e.g., a misspelling, a dropped word or line, or mislabeling in a figure) of a published article. Submit Errata via the *mSystems*[™] [online submission and peer review system](#). In the Abstract section of the submission form (a required field), put "Not Applicable." Upload the text of your Erratum as a Microsoft Word file.

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The Author Correction section provides a means of correcting errors of omission (e.g., author names or citations) and errors of a scientific nature that do not alter the overall basic results or conclusions of a published article (e.g., an incorrect unit of measurement or order of magnitude used throughout, contamination of one of numerous cultures, or misidentification of a mutant strain, causing erroneous data for only a portion [noncritical] of the study). Note that the addition of new data is not permitted.

For corrections of a scientific nature or issues involving authorship, including contributions and use or ownership of data and/or materials, all disputing parties must agree, in writing, to publication of the Correction. For omission of an author's name, letters must be signed by the authors of the article and the author whose name was omitted. The editor who handled the article will be consulted if necessary.

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Illustrations

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Nonlinear adjustments made to images, such as changes to gamma settings, should be fully disclosed in the figure legends at the time of submission. In addition, images created by compiling multiple files, including noncontiguous portions of the same image, should clearly distinguish that these multiple files are not a single image. This can be done by "[tooling](#)," or [inserting thin lines](#), between the individual images.

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Labeling and assembly. All final lettering and labeling must be incorporated into the figures. Put the figure number well outside the boundaries of the image itself. (Numbering may need to be changed at the copyediting stage.) Each figure must be supplied as a separate file, and any multipanel figures must be assembled into one file; i.e., rather than uploading a separate file for each panel in a figure, assemble all panels in one piece and supply them as one file.

Fonts. To avoid font problems, set all type in one of the following fonts: Arial, Helvetica, Times Roman, European PI, Mathematical PI, or Symbol. Courier may be used but should be limited to nucleotide or amino acid sequences, where a non-proportional (monospace) font is required. All fonts other than these must be converted to paths (or outlines) in the application with which they were created.

Compression. Images created with Macintosh applications may be compressed with Stuffit. Images created with Windows applications may be compressed with WinZip or PKZIP.

Color illustrations. All figures submitted in color will be processed as color. Adherence to the following guidelines will help to ensure color reproduction that is as accurate as possible.

Color illustrations should be supplied in the RGB color mode, as either (i) RGB TIFF images with a resolution of at least 300 pixels per inch (raster files, consisting of pixels) or (ii) Illustrator-compatible EPS files with RGB color elements (vector files, consisting of lines, fonts, fills, and images). For reprints, ASM's print provider will automatically create CMYK versions of color illustrations from the supplied RGB versions. Color in the reprints may not exactly match that in the online journal of record because of the smaller range of colors capable of being reproduced by CMYK inks on a printing press.

Drawings. Submit graphs, charts, complicated chemical or mathematical formulas, diagrams, and other drawings as finished products not requiring additional artwork or typesetting. All elements, including letters, numbers, and symbols, must be easily readable, and both axes of a graph must be labeled.

When creating line art, please use the following guidelines:

- i. All art must be submitted at its intended publication size. For acceptable dimensions, see "[Size](#)."
- ii. Avoid using screens (i.e., shading) in line art. It can be difficult and time-consuming to reproduce these images without moiré patterns. Various pattern backgrounds are preferable to screens, as long as the fill patterns are not imported from another application. If you must use images containing screens,
 - Generate the image at line screens of 85 lines per inch or lower.
 - When applying multiple shades of gray, differentiate the gray levels by at least 20%.
 - Never use levels of gray below 5% or above 95%, as they are likely to fade out or become totally black when output.
- iii. Use thick, solid lines that are no finer than 1 point in thickness.
- iv. No type should be smaller than 6 points at the final publication size.
- v. Avoid layering type directly over shaded or textured areas.
- vi. Avoid the use of reversed type (white lettering on a black background).
- vii. Avoid heavy letters, which tend to close up, and unusual symbols, which the printer may not be able to reproduce in the legend.
- viii. If colors are used, avoid using similar shades of the same color and avoid very light colors.

In figure ordinate and abscissa scales (as well as table column headings), avoid the ambiguous use of numbers with exponents. Usually, it is preferable to use the appropriate Système International d'Unités (SI) symbols (μ for 10^{-6} , m for 10^{-3} , k for 10^3 , and M for 10^6 , etc.). A complete listing of SI symbols

can be found in the International Union of Pure and Applied Chemistry (IUPAC) publication *Quantities, Units and Symbols in Physical Chemistry* (RSC Publishing, Cambridge, United Kingdom, 2011); an abbreviated list is available [here](#). Thus, representation of 20,000 cpm on a figure ordinate should be made by the number 20 accompanied by the label kcpm.

Where powers of 10 must be used, the journal requires that the exponent power be associated with the number shown. In representing 20,000 cells per ml, the numeral on the ordinate should be "2" and the label should be " 10^4 cells per ml" (not "cells per ml $\times 10^{-4}$ "). Likewise, an enzyme activity of 0.06 U/ml would be shown as 6 accompanied by the label 10^{-2} U/ml. The preferred designation would be 60 mU/ml (milliunits per milliliter).

Presentation of Nucleic Acid Sequences

Long nucleic acid sequences must be presented as figures in the following format to conserve space. Print the sequence in lines of approximately 100 to 120 nucleotides in a nonproportional (monospace) font (e.g., Courier) that is easily legible when published with a line length of 6 inches (ca. 15.2 cm). If possible, lines of nucleic acid sequence should be further subdivided into blocks of 10 or 20 nucleotides by spaces within the sequence or by marks above it. Uppercase and lowercase letters may be used to designate the exon-intron structure or transcribed regions, etc., if the lowercase letters remain legible at a 6-inch (ca. 15.2-cm) line length. Number the sequence line by line; place numerals representing the first base of each line to the left of the lines. Minimize spacing between lines of sequence, leaving room only for annotation of the sequence. Annotation may include boldface, underlining, brackets, and boxes, etc. Encoded amino acid sequences may be presented, if necessary, immediately above or below the first nucleotide of each codon, by using the single-letter amino acid symbols. Comparisons of multiple nucleic acid sequences should conform as nearly as possible to the same format.

Figure Legends

On initial submission, to assist review, figure legends may be incorporated in the image files and appear beneath the figures. At the modification stage, figure legends must be provided as text files separate from the image file.

Legends should provide enough information so that the figure is understandable without frequent reference to the text. However, detailed experimental methods must be described in the Materials and Methods section, not in a figure legend. A method that is unique to one of several experiments may be reported in a legend only if the discussion is very brief (one or two sentences). Define all symbols used in the figure and define all abbreviations that are not used in the text.

The main text file should also contain a legend for each item in the supplemental material (see "[Supplemental Material](#)").

Tables

Tables that contain artwork, chemical structures, or shading must be submitted as illustrations in an acceptable format at

the modification stage. The preferred format for regular tables is Microsoft Word; however, WordPerfect and Acrobat PDF are also acceptable. Note that a straight Excel file is not currently an acceptable format. Excel files must be either embedded in a Word or WordPerfect document or converted to PDF before being uploaded.

Tables should be formatted as follows. Arrange the data so that **columns of like material read down, not across**. The headings should be sufficiently clear so that the meaning of the data is understandable without reference to the text. See the “[Abbreviations](#)” section of these Instructions for those that should be used in tables. Explanatory footnotes are acceptable, but more-extensive table “legends” are not. Footnotes should not include detailed descriptions of the experiment. Tables must include enough information to warrant table format; those with fewer than six pieces of data will be incorporated into the text by the copy editor. [Table 1](#) is an example of a well-constructed table.

Featured Image

Each collected bimonthly issue of *mSystems*[™] is represented by a featured image, derived from an article in the issue. These featured images are used to represent the issues in the online archives.

Invitations to submit a featured image are issued to authors whose manuscripts are returned for modification or whose manuscripts have been accepted for publication in *mSystems*[™]; material should be related to the work presented in the manuscript. Unsolicited art will also be considered. No material submitted for consideration will be returned to the author. Authors will be notified only if their image is selected. A license for the chosen material must be granted to ASM. Questions or suggestions regarding the featured image can be sent to the editor in chief, Jack Gilbert (gilbertjack@gmail.com).

NOMENCLATURE

Chemical and Biochemical Nomenclature

The recognized authority for the names of chemical compounds is [Chemical Abstracts](#) (CAS) and its indexes. *The Merck Index*, 15th ed. (RCS Books, Cambridge, United Kingdom, 2013), is also an excellent source. For guidelines on the use of biochemical terminology, consult [Biochemical Nomenclature and Related Documents](#) (Portland Press, London, United Kingdom, 1992) and the instructions to authors of the [Journal of Biological Chemistry](#) and the [Archives of Biochemistry and Biophysics](#).

Do not express molecular weight in daltons; molecular weight is a unitless ratio. Molecular mass is expressed in daltons.

For enzymes, use the recommended (trivial) name assigned by the Nomenclature Committee of the International Union of Biochemistry (IUB) as described in *Enzyme Nomenclature* (Academic Press, Inc., New York, NY, 1992) and its supplements and [here](#). If a nonrecommended name is used, place the proper (trivial) name in parentheses at first use in the abstract and text. Use the EC number when one has been assigned. Authors of papers describing enzymological studies should review the

standards of the [STRENDA Commission](#) for information required for adequate description of experimental conditions and for reporting enzyme activity data.

For nomenclature of restriction enzymes, DNA methyltransferases, homing endonucleases, and their genes, refer to the [article](#) by Roberts et al.

Drug Nomenclature

Chemical or generic names of drugs should be used; the use of code numbers or trade names is generally not permitted. When code names or corporate proprietary numbers are to be used, either the chemical structure of the compound or a published literature reference illustrating the chemical structure, if known, must be provided at the first occurrence of the code name or number. For compounds not identified by generic nomenclature, all previous or concurrent identification numbers or appellations should be listed in the manuscript.

Nomenclature of Organisms

Mice. For mouse strain and genetic nomenclature, ASM encourages authors to refer to the guidelines set forth by the International Committee on Standardized Genetic Nomenclature for Mice, available on the [Mouse Genome Informatics](#) home page and in *Genetic Variants and Strains of the Laboratory Mouse*, 3rd ed. (M. F. Lyon et al., ed., Oxford University Press, Oxford, England, 1996).

Viruses. Names used for viruses should be those approved by the International Committee on Taxonomy of Viruses (ICTV) and reported on the [ICTV website](#). In addition, the recommendations of the ICTV regarding the use of species names should generally be followed: when the entire species is discussed as a taxonomic entity, the species name, as with other taxa, is italic and has the first letter and any proper nouns capitalized (e.g., *Tobacco mosaic virus*, *Murray Valley encephalitis virus*). When the behavior or manipulation of individual viruses is discussed, the vernacular (e.g., tobacco mosaic virus, Murray Valley encephalitis virus) should be used. If desired, synonyms may be added parenthetically when the name is first mentioned. Approved generic (or group) and family names may also be used.

Bacteria. Binary names, consisting of a generic name and a specific epithet (e.g., *Escherichia coli*), should be used for all bacteria. Names of categories at or above the genus level may be used alone, but specific and subspecific epithets may not. A specific epithet must be preceded by a generic name, written out in full the first time it is used in a paper. Thereafter, the generic name should be abbreviated to the initial capital letter (e.g., *E. coli*), provided there can be no confusion with other genera used in the paper. Names of all taxa (kingdoms, phyla, classes, orders, families, genera, species, and subspecies) are printed in italics; strain designations and numbers are not. Two sites on the World Wide Web list current approved bacterial names: [Prokaryotic Nomenclature Up-to-Date](#) and [List of Prokaryotic Names with Standing in Nomenclature](#). For guidelines regarding new names and descriptions of new gen-

era and species, see the articles by [Tindall](#) and [Stackebrandt et al.](#) If there is reason to use a name that does not have standing in nomenclature, the name should be enclosed in quotation marks in the title and at its first use in the abstract and the text and an appropriate statement concerning the nomenclatural status of the name should be made in the text. “*Candidatus*” species should always be set in quotation marks.

Fungi. Since the classification of fungi is far from complete, it is the responsibility of the author to determine the accepted binomial for a given organism. Sources for these names include *The Yeasts: a Taxonomic Study*, 5th ed. (C. P. Kurtzman, J. W. Fell, and T. Boekhout, ed., Elsevier Science, Amsterdam, Netherlands, 2011), and *Ainsworth and Bisby’s Dictionary of the Fungi*, 10th ed. (P. M. Kirk, P. F. Cannon, D. W. Minter, and J. A. Stalpers, ed., CABI International, Wallingford, Oxfordshire, United Kingdom, 2008); see also <http://www.speciesfungorum.org/Names/Fundic.asp>.

Genetic Nomenclature

To facilitate accurate communication, it is important that standard genetic nomenclature be used whenever possible and that deviations or proposals for new naming systems be endorsed by an appropriate authoritative body. Review and/or publication of submitted manuscripts that contain new or nonstandard nomenclature may be delayed by the editor or the Journals Department so that they may be reviewed.

ABBREVIATIONS AND CONVENTIONS

Verb Tense

ASM strongly recommends that for clarity you use the past tense to narrate particular events in the past, including the procedures, observations, and data of the study that you are reporting. Use the present tense for your own general conclusions, the conclusions of previous researchers, and generally accepted facts. Thus, most of the abstract, Materials and Methods, and Results will be in the past tense, and most of the introduction and some of the Discussion will be in the present tense.

Be aware that it may be necessary to vary the tense in a single sentence. For example, it is correct to say “White (30) demonstrated that XYZ cells *grow* at pH 6.8,” “Figure 2 shows that ABC cells *failed* to grow at room temperature,” and “Air was removed from the chamber and the mice *died*, which *proves* that mice *require* air.” In reporting statistics and calculations, it is correct to say “The values for the ABC cells *are* statistically significant, indicating that the drug *inhibited*. . .”

For an in-depth discussion of tense in scientific writing, see *How To Write and Publish a Scientific Paper*, 7th ed.

Abbreviations

General. Abbreviations should be used as an aid to the reader, rather than as a convenience for the author, and therefore their **use should be limited**. Abbreviations other than those recommended by the IUPAC-IUB (*Biochemical Nomenclature and Related Documents*, 1992) should be used only

when a case can be made for necessity, such as in tables and figures.

It is often possible to use pronouns or to paraphrase a long word after its first use (e.g., “the drug” or “the substrate”). Standard chemical symbols and trivial names or their symbols (folate, Ala, and Leu, etc.) may also be used.

Define each abbreviation and introduce it in parentheses the first time it is used; e.g., “cultures were grown in Eagle minimal essential medium (MEM).” Generally, eliminate abbreviations that are not used at least three times in the text (including tables and figure legends).

Not requiring introduction. In addition to abbreviations for Système International d’Unités (SI) units of measurement, other common units (e.g., bp, kb, and Da), and chemical symbols for the elements, the following should be used without definition in the title, abstract, text, figure legends, and tables:

DNA (deoxyribonucleic acid)	NADP ⁺ (nicotinamide adenine dinucleotide phosphate, oxidized)
cDNA (complementary DNA)	
RNA (ribonucleic acid)	
cRNA (complementary RNA)	poly(A) and poly(dT), etc.
RNase (ribonuclease)	(polyacetylic acid and polydeoxythymidylic acid, etc.)
DNase (deoxyribonuclease)	oligo(dT), etc.
rRNA (ribosomal RNA)	(oligodeoxythymidylic acid, etc.)
mRNA (messenger RNA)	
tRNA (transfer RNA)	
AMP, ADP, ATP, dAMP, ddATP, and GTP, etc. (for the respective 5’ phosphates of adenosine and other nucleosides) (add 2’-, 3’-, or 5’- when needed for contrast)	UV (ultraviolet)
ATPase and dGTPase, etc. (adenosine triphosphatase and deoxyguanosine triphosphatase, etc.)	PFU (plaque-forming units)
NAD (nicotinamide adenine dinucleotide)	CFU (colony-forming units)
NAD ⁺ (nicotinamide adenine dinucleotide, oxidized)	MIC (minimal inhibitory concentration)
NADH (nicotinamide adenine dinucleotide, reduced)	Tris [tris(hydroxymethyl) aminomethane]
NADP (nicotinamide adenine dinucleotide phosphate)	DEAE (diethylaminoethyl)
NADPH (nicotinamide adenine dinucleotide phosphate, reduced)	EDTA (ethylenediaminetetraacetic acid)
	EGTA [ethylene glycol-bis(β-aminoethyl ether)-N,N,N’,N’-tetraacetic acid]
	HEPES (N-2-hydroxyethylpiperazine-N’-2-ethanesulfonic acid)
	PCR (polymerase chain reaction)
	AIDS (acquired immunodeficiency syndrome)

Abbreviations for cell lines (e.g., HeLa) also need not be defined.

The following abbreviations should be used without definition in tables:

amt (amount)	mol wt (molecular weight)
approx (approximately)	no. (number)
avg (average)	prepn (preparation)
concn (concentration)	SD (standard deviation)
diam (diameter)	SE (standard error)
expt (experiment)	SEM (standard error of the mean)
exptl (experimental)	sp act (specific activity)
ht (height)	sp gr (specific gravity)
mo (month)	

temp (temperature)	wk (week)
vol (volume)	wt (weight)
vs (versus)	yr (year)

Reporting Numerical Data

Standard metric units are used for reporting length, weight, and volume. For these units and for molarity, use the prefixes m, μ , n, and p for 10^{-3} , 10^{-6} , 10^{-9} , and 10^{-12} , respectively. Likewise, use the prefixes c for 10^{-2} and k for 10^3 . Avoid compound prefixes such as $m\mu$ or $\mu\mu$. Use $\mu\text{g/ml}$ or $\mu\text{g/g}$ in place of the ambiguous ppm. Units of temperature are presented as follows: 37°C or 324 K.

When fractions are used to express quantities such as enzymatic activities, it is preferable to use whole units, such as “g” or “min,” in the denominator instead of fractional or multiple units, such as μg or 10 min. For example, “pmol/min” is preferable to “nmol/10 min,” and “ $\mu\text{mol/g}$ ” is preferable to “nmol/ μg .” It is also preferable that an unambiguous form, such as exponential notation, be used; for example, “ $\mu\text{mol g}^{-1} \text{min}^{-1}$ ” is preferable to “ $\mu\text{mol/g/min}$.” Always report numerical data in the appropriate SI units.

For a review of some common errors associated with statistical analyses and reports, plus guidelines on how to avoid them, see these 2003 and 2014 articles by Olsen. For a review of

basic statistical considerations for virology experiments, see the article by [Richardson and Overbaugh](#).

Isotopically Labeled Compounds

For simple molecules, isotopic labeling is indicated in the chemical formula (e.g., $^{14}\text{CO}_2$, $^3\text{H}_2\text{O}$, and $\text{H}_2^{35}\text{SO}_4$). Brackets are not used when the isotopic symbol is attached to the name of a compound that in its natural state does not contain the element (e.g., $^{32}\text{S-ATP}$) or to a word that is not a specific chemical name (e.g., ^{131}I -labeled protein, ^{14}C -amino acids, and ^3H -ligands).

For specific chemicals, the symbol for the isotope introduced is placed in brackets directly preceding the part of the name that describes the labeled entity. Note that configuration symbols and modifiers precede the isotopic symbol. The following examples illustrate correct usage:

^{14}C urea	$[\gamma\text{-}^{32}\text{P}]\text{ATP}$
L-[methyl- ^{14}C]methionine	UDP-[U- ^{14}C]glucose
[2,3- ^3H]serine	SV40 [^{32}P]DNA
$[\alpha\text{-}^{14}\text{C}]$ lysine	fructose 1,6-[1- ^{32}P]bisphosphate

*mSystems*TM follows the same conventions for isotopic labeling as the *Journal of Biological Chemistry*, and more-detailed information can be found in their [instructions to authors](#).

Below is a quick checklist of formatting issues that we commonly ask authors to address. This list is not all inclusive. Authors are encouraged to review the Instructions to Authors for more guidelines and details. If this is a revision/resubmission, specific issues identified by the editor, reviewers, and/or ASM staff are listed in your decision letter; be sure to review and address these issues.

Cover Letter	<ul style="list-style-type: none"> <input type="checkbox"/> Address the cover letter to the journal, the editor in chief, or your suggested senior editor. <input type="checkbox"/> You may list suggested senior editors, editors, and/or reviewers in the cover letter. Do not list these in the manuscript itself.
Page Format/Length	<ul style="list-style-type: none"> <input type="checkbox"/> Double-space and left-justify the manuscript; use 12-point type and 1-inch margins; use portrait layout for 8.5" × 11" paper. Add continuous line numbers to assist editors/reviewers. <input type="checkbox"/> All article types have word limits, and some have limits on the numbers of figures and/or references. See the Instructions to Authors. <input type="checkbox"/> On the title page (first page of your manuscript), include the full working title, author byline with all authors' full names and affiliations, and the corresponding author's contact information.
Abstract/Importance	<ul style="list-style-type: none"> <input type="checkbox"/> Most article types require an abstract (see the Instructions to Authors for exceptions and for specific word limits). The abstract should concisely summarize the content of the paper without presenting extensive experimental details. <input type="checkbox"/> For Research Articles, Observations, and Resource Reports, include a separate Importance paragraph of ≤150 words. This is a nontechnical explanation of why the work was undertaken.
Acknowledgments	<ul style="list-style-type: none"> <input type="checkbox"/> The source(s) of any direct financial support (funding) received for the work being published must be indicated on the submission form; any other form(s) of assistance that you received may be noted in an Acknowledgments section. <input type="checkbox"/> Recognition of personal assistance should be given as a separate paragraph, as should any statements disclaiming endorsement or approval of the views reflected in the paper or of a product mentioned therein.
References	<ul style="list-style-type: none"> <input type="checkbox"/> The numbered citation (citation-sequence) reference method should be used. List and number references in the References section in the order in which they are cited in the text. Include the names of all authors for each work cited (instead of "et al."). <input type="checkbox"/> Refer to the Instructions to Authors for specific formatting instructions.
Tables	<ul style="list-style-type: none"> <input type="checkbox"/> Place all tables after the References section. <input type="checkbox"/> Refer to each table at the appropriate place in the body of the text. <input type="checkbox"/> Create tables using the Table function of Microsoft Word (preferably without using the spacing and tabbing features). Arrange the data so that columns of like material read down, not across. <input type="checkbox"/> Create fully descriptive table captions and place them above the body of the table. Create footnotes for content that does not conveniently fit in the title or in data cells. Use superscript lowercase italic letters in alphabetical order as the footnote symbols (<i>a</i>, <i>b</i>, <i>c</i>, etc.).
Figures	<ul style="list-style-type: none"> <input type="checkbox"/> Place all figures after the References section and after tables, if any. <input type="checkbox"/> On initial submission, figures may be supplied as PDF files. For revisions, they must be supplied as individual TIFF or EPS files. PowerPoint files are NOT accepted. <input type="checkbox"/> Multipanel figures must be assembled onto one page if at all possible. <input type="checkbox"/> Refer to each figure at the appropriate place in the body of the text. <input type="checkbox"/> On initial submission, set each figure legend directly beneath the corresponding figure. For revisions, the legend(s) should be provided in the manuscript file, separate from the figure file(s). <input type="checkbox"/> If any figure is being adapted or reproduced from a previously published version, secure all necessary permissions from the original authors and publishers and forward these to the <i>mSystems</i> production editor at the manuscript revision stage.
Supplemental Material	<ul style="list-style-type: none"> <input type="checkbox"/> On initial submission, supplemental text, tables, and figures should be combined and uploaded as a single PDF. Legends and descriptions for the supplemental material should appear at the end of the main manuscript file, not included with the supplemental file. <input type="checkbox"/> For revisions, each item in the supplemental material must be submitted as a separate file; i.e., multiple figures should not be zipped together or combined in a single PDF. <i>mSystems</i> will post no more than 10 individual supplemental items. <input type="checkbox"/> On the manuscript submission form, be sure to designate the supplemental file type correctly as either "FOR Publication" or "NOT for Publication" by <i>mSystems</i>. If not intended for publication, add the words "for reviewers only" wherever the supplemental material is mentioned in the manuscript. <input type="checkbox"/> Each different type of supplemental material should be numbered with a separate series of "S" numbers (e.g., a set of files that includes a movie and two figures should be numbered as Movie S1 and Fig. S1 and S2). Supplemental material must be cited at least once in the text. If references are included for supplemental material, add those references in the supplemental item itself and cite them by those numbers. Do not include references in the main text that are cited only in the supplemental material.
Revised Manuscripts	<ul style="list-style-type: none"> <input type="checkbox"/> In addition to the specific items mentioned above for revisions, please include a "Response to Reviewer Comments" file that addresses the editor/reviewer comments point by point, with line numbers to indicate where changes have been made. Do NOT include this file as part of the cover letter. <input type="checkbox"/> Upload a separate "Marked Up Manuscript" file showing the changes made to the paper. Your main manuscript upload must contain only a clean copy of the revised paper.