AMERICAN SOCIETY FOR MICROBIOLOGY | Infection and Immunity®

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INSTRUCTIONS TO AUTHORS

SCOPE

Infection and Immunity® (IAI) provides new insights into the interactions between bacteria, fungi, and parasites and their hosts. Specific areas of interest include host cellular and immune response to microbes, molecular mechanisms of action of beneficial microbes or host-associated microbial communities, microbial pathogenesis, virulence factors, experimental models of infection, host resistance or susceptibility, and the generation of innate and adaptive immune responses.

IAI will not consider papers that are preliminary, purely descriptive, or case studies. Clinical studies may be suitable for consideration by IAI if they provide novel insights into infectious disease pathogenesis or noncommunicable diseases associated with microbiota imbalances. IAI welcomes studies of the microbiome that relate to host-microbe interactions. Papers describing methodology are not encouraged; only under unusual circumstances will they be considered for publication.

IAI will consider manuscripts dealing with certain aspects of genomics. They should address comparative genomics of pathogenic and nonpathogenic organisms to develop new insights into the mechanisms of infection, vaccine development, evolution, host response, and host-microbiota interaction, and they should include the observations that lead to such insights. References used for the analysis may include URLs (http and ftp) from major sites (e.g., GenBank and Swiss-Prot). IAI will not consider reports that emphasize nucleotide sequence data alone (without experimental documentation of the functional and evolutionary significance of the sequence).

Studies of clinical immunology are more appropriate for *mSphere*®.

Papers describing microbial products or activities that are related to diagnosis or laboratory diagnostics should be submitted to either the *Journal of Clinical Microbiology*® or *mSphere*.

Clinical descriptions and papers concerning the microbiology of hospital environments or the epidemiology of infectious diseases should be submitted to the *Journal of Clinical Microbiology*.

Descriptions of newly recognized organisms should be submitted to the appropriate taxonomic journal.

Papers concerned with environmental ecology should be submitted to *Applied and Environmental Microbiology*®.

Papers concerned with antimicrobial agents should be submitted to *Antimicrobial Agents and Chemotherapy*®.

Papers concerned with viral infections should be submitted to the *Journal of Virology*®.

Studies that focus on establishing a novel proof of principle for nonviral microbial antigens as vaccine immunogens or that describe the construction and initial evaluation of new bacterial vectors are suitable for IAI; investigations that concern all other aspects of vaccine evaluation and design should be submitted to *mSphere*.

Papers concerned primarily with the cell biology, biochemistry, or genetics of eukaryotic pathogens should be submitted to *mSphere* or *Molecular and Cellular Biology*®.

Papers that utilize conserved microbial constituents (e.g., lipopolysaccharide and peptidoglycan) to stimulate innate immune responses, unless accompanied by experiments demonstrating relevance to the interaction between intact microbes and hosts or host cells, should be submitted to *mSphere*.

Questions about these guidelines may be directed to the editor in chief of the journal being considered.

If transfer to another ASM journal is recommended by an editor, the corresponding author will be contacted.

Note that a manuscript rejected by one ASM journal on scientific grounds or on the basis of its general suitability for publication is considered rejected by all other ASM journals.

ETHICS RESOURCES AND POLICIES

Ethics

Please refer to ASM Journals' Ethics Resources and Policies page (https://journals.asm.org/content/ethics-and-policies) for the ethical standards expected of manuscript submissions, as well as for specific recommendations on the proper use of microbiological information, the use of human subjects or animals in research, publishing ethics (including authorship, plagiarism, and image manipulation), conflicts of interest, and availability of data and materials. Please also see our page on permissions (https://journals.asm.org/content/permissions).

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SUBMISSION, REVIEW, AND PUBLICATION PROCESSES

Initial Submissions

For initial submissions, IAI welcomes papers in any format (format-neutral submissions). The reference style, the arrangement of sections of the paper, and other formatting issues are at the discretion of the author at initial submission. (For revised submissions and resubmissions, formatting guidelines are described in detail below.)

Submission Process

All submissions to IAI must be made electronically via the eJournalPress (eJP) online submission and peer review system at the following URL: https://iai.msubmit.net/cgi-bin/main.plex. (E-mailed submissions will not be accepted.) First-time users must create an Author account, which may be used for submitting to all ASM journals. Instructions for creating an Author account are available at the above URL via the "help for authors" link, and step-by-step instructions for submitting a manuscript via eJP are also available through the same link on the log-in screen or on the account holder's Home page. For initial submissions, manuscripts may be submitted in any format (format-neutral). Information on file types acceptable for electronic submission can be found under the Files heading in the help for authors screen.

Review Process

All manuscripts are considered to be confidential and are reviewed by the editors, members of the editorial board, or qualified *ad hoc* reviewers. To expedite the review process, authors must recommend at least three reviewers (who may be but are not necessarily members of the editorial board) with expertise in the field who are not members of their institution(s), who have not recently been associated with their laboratory(ies), and who could not otherwise be considered to pose a conflict of interest regarding the submitted manuscript. Impersonation of another individual during the review process is considered serious misconduct.

To facilitate the review, copies of in-press and submitted manuscripts that are important for judgment of the present manuscript should be included as supplemental material not for publication.

When a manuscript is submitted to the journal, it is given a control number (e.g., IAI00123-19) and assigned to one of the editors. **(Always refer to this control number in communications with the editor and the Journals Department.)** From there it is assigned to at least two independent experts for peer review. A single-blind review, where authors' identities are known to reviewers, is applied. It is the responsibility of the corresponding author to inform the coauthors of the manuscript's status throughout the submission, review, and publication processes. The reviewers operate under strict guidelines set forth in "Reviewer Guidelines" (https://journals.asm.org/content/reviewer-guidelines) and are expected to complete their reviews expeditiously.

The corresponding author is notified, generally within 6 to 8 weeks after submission, of the editor's decision to accept, reject, or require modification. When modification is requested, the corresponding author must either submit the modified version within 2 months or withdraw the manuscript. A point-by-point response to the reviews must be uploaded as a separate file (identified as such), and a compare copy of the manuscript (without figures) should be included as a Marked Up Manuscript if the editor requested one.

Manuscripts that have been rejected with the option to resubmit, or withdrawn after being returned for modification, may be resubmitted to the same ASM journal if the major criticisms have been addressed. A manuscript rejected on sci-

entific grounds or on the basis of its general suitability for publication by one ASM journal, with the exception of *mBio*®, is considered rejected by all other ASM journals. A rejection from *mBio* does not disqualify a manuscript from being newly submitted to another ASM journal (the rejection by *mBio* need not be mentioned in the cover letter). A manuscript rejected solely on the basis of scope may be resubmitted to a more appropriate ASM journal.

The cover letter of every resubmitted manuscript must state that the manuscript is a resubmission, and the former manuscript control number must be provided. A point-by-point response to the review(s) must be uploaded as a separate file (identified as such), and a copy of the revised manuscript tracking the changes must be included as a Marked Up Manuscript. Manuscripts resubmitted to the same journal are normally handled by the original editor. Manuscripts rejected with the option to resubmit may be resubmitted only once unless permission has been obtained from the original editor or from the editor in chief.

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IAI offers expedited review for manuscripts previously reviewed by certain highly selective non-ASM journals. If you feel, after addressing any outstanding reviewer comments from the other journal, that the manuscript may be suitable for publication in IAI, please include the following items in your submission:

- A cover letter declaring the previous submission and requesting expedited review
- A PDF file of the entire previously submitted manuscript uploaded as "Supplemental Material NOT for Publication"
- A "Response to Reviewers" file containing the previous decision letter(s), all previous reviews, any manuscript correspondence, and your point-by-point response to the reviews, including page and line numbers where changes have been made
- A tracked-changes file showing the revisions made, uploaded as a "Marked Up Manuscript" file

In many cases, manuscripts considered for expedited review may be accepted for publication without additional rounds of review, depending on any additional minor revisions that might be requested by the editor.

Notification of Acceptance

When an editor has decided that a manuscript is acceptable for publication on the basis of scientific merit, the author and the Journals Department are notified. A PDF version of the accepted manuscript is posted online as soon as possible (see below).

The text files undergo an automated preediting, cleanup, and tagging process specific to the particular article type, and the illustrations are examined. If all files have been prepared according to the criteria set forth in these Instructions and those in the eJP online manuscript submission system, the acceptance procedure will be completed successfully. If there are problems that would cause extensive corrections to be made at the copyediting stage or if the files are not acceptable for production, ASM Journals staff will contact the corresponding author. Once all the material intended for publication has been determined to be adequate, the manuscript is scheduled for the next available issue. The editorial staff of the ASM Journals Department completes the editing of the manuscript to bring it into conformity with prescribed standards.

Accepted Manuscripts

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Instructions on how to cite such manuscripts may be found in "References."

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Questions about proofs should be directed to the ASM Journals Department (e-mail, jkanotz@asmusa.org; telephone, 202-942-9301).

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TABLE 1 Publication fees[a]

Fee type	Fee ($) for all members except supporting members	Fee ($) for supporting members and nonmembers
Page charge (per page)	85	170
Open-access APC (in lieu of page charges)	2,400	3,300
Supplemental material (flat fee)	220	340

[a]Publication fees do not apply to Minireviews, Commentaries, Editorials, Letters to the Editor, or corrections.

Publication Fees

Authors who choose open access will be assessed the article processing charge (APC) indicated in Table 1. Authors who do not choose open access and whose research was supported by grants, special funds (including departmental and institutional), or contracts (including governmental) or whose research was done as part of their official duties (government or corporate, etc.) are required to pay the page charges noted in Table 1 (based on the number of typeset pages, including illustrations, in the article) and to sign the ASM copyright transfer agreement.

Authors are also charged a flat fee for posting supplemental material as an adjunct to their published article (exception: no fee is charged for supplemental material associated with fee-exempt papers).

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Minireviews, Commentaries, Editorials, Letters to the Editor, and corrections are not subject to page charges.

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ORGANIZATION AND FORMAT

Editorial Style

The editorial style of ASM journals conforms to the *ASM Style Manual for Journals* (American Society for Microbiology, 2019, in-house document [you may find the ASM Word List helpful]) and *How To Write and Publish a Scientific Paper*, 7th ed. (Greenwood, Santa Barbara, CA, 2011), as interpreted and modified by the editors and the ASM Journals Department.

The editors and the Journals Department reserve the privilege of editing manuscripts to conform with the stylistic conventions set forth in the aforesaid publications and in these Instructions. Please note that ASM uses the serial comma.

On receipt at ASM, an accepted manuscript undergoes an automated preediting, cleanup, and tagging process specific to the particular article type. To optimize this process, manuscripts must be supplied in the correct format and with the appropriate sections and headings at the revision stage (for initial submissions, see the first paragraph of Submission, Review, and Publication Processes above).

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. 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.

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.

Authors who are unsure of proper English usage should have their manuscripts checked by someone proficient in the English language or engage a professional language editing service for help.

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- Format references in ASM style.
- Provide references for accession numbers and code (with URLs).
- Confirm that genetic and chemical nomenclature conforms to instructions.
- Include as supplemental material not for publication in-press and submitted manuscripts that are important for judgment of the present manuscript.

Supplemental Material

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. The decision to publish the material online with the accepted article is made by the editor. It is possible that a manuscript will be accepted but that the supplemental material will not be.

All supplemental text, tables, and figures should be combined in a single self-contained document (PDF), and no supplemental material should be included in the main manuscript. Supplemental data set and movie files may be uploaded separately. The number of supplemental material files is limited to 10. Supplemental files should be submitted in the following standard formats.

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scription of how the data are used in the paper. The maximum file size is 20 MB. Please review this sample file for guidance.

- **Movies** (Audio Video Interleave [.avi], QuickTime [.mov], or MPEG files) should be submitted at the desired reproduction size and length and should be accompanied by a legend. The maximum file size is 20 MB.

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See also "Publication Fees."

Research Articles

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Abstract. Limit the abstract to **250 words or fewer** and concisely summarize the basic content of the paper without presenting extensive experimental details. Avoid abbreviations and references, and do not include diagrams. Include a succinct description of the microbe and its associated disease. 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.

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 and include a succinct description of the microbe and its associated disease. 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 of the following: text, table(s), or figure(s). Avoid extensive use of graphs to present data that might be more concisely presented in the text or tables. For example, except in unusual cases, double-reciprocal plots used to determine apparent K_m values should not be presented as graphs; instead, the values should be stated in the text. Similarly, graphs illustrating other methods commonly used to derive kinetic or physical constants (e.g., reduced-viscosity plots and plots used to determine sedimentation velocity) need not be shown except in unusual circumstances. All tabular data must be accompanied by either standard deviation values or standard errors of the means. The number of replicate determinations (or animals) used for making such calculations must also be included. All statements concerning the significance of the differences observed should be accompanied by probability values given in parentheses. The statistical procedure used should be stated in Materials and Methods. Limit photographs (particularly photomicrographs and elec-

tron micrographs) 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 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 "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.

As noted on ASM Journals' Ethics Resources and Policies page, a paragraph dedicated to new accession numbers for nucleotide and amino acid sequences, microarray data, protein structures, gene expression data, and MycoBank data should appear at the end of Materials and Methods with the paragraph lead-in "Data availability." Please also provide references (with URLs) for the accession numbers.

Acknowledgments. Statements regarding sources of direct financial support (e.g., grants, fellowships, and scholarships, etc.) should appear in the Acknowledgments. A funding statement indicating 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.") may be included. 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." Statements regarding indirect financial support (e.g., commercial affiliations, consultancies, stock or equity interests, and patent-licensing arrangements) are also allowed. It is the responsibility of authors to provide a general statement disclosing financial or other relationships that are relevant to the study.

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Appendixes. Appendixes that contain additional material to aid the reader are permitted. Titles, authors, and reference sections that are distinct from those of the primary article are not allowed. If it is not feasible to list the author(s) of the appendix in the byline or the Acknowledgments section of the primary article, rewrite the appendix so that it can be considered for publication as an independent article. Equations, tables, and figures should be labeled with the letter "A" preceding the numeral to distinguish them from those cited in the main body of the text.

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
- Data sets
- Code

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; available at https://www.ncbi.nlm.nih.gov/nlmcatalog/journals), 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 at https://endnote.com/style_download/american-society-for-microbiology-asm-journals-2/; 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]). Note that DOIs are not needed for most references. ASM copy editors will automatically insert DOIs on all references in the CrossRef and PubMed databases during copyediting. URLs for government reports and other references not indexed in these databases should be provided if desired; URLs for citations of database accession numbers and code/software should be provided by you.

Follow the styles shown in the examples below.

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. Bina XR, Taylor DL, Vikram A, Ante VM, Bina JE. 2013. *Vibrio cholerae* ToxR downregulates virulence factor production in response to cyclo(Phe-Pro). mBio 4: e00366-13.
3. Winnick S, Lucas DO, Hartman AL, Toll D. 2005. How do you improve compliance? Pediatrics 115:e718–e724.
4. 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.*}
5. Cox CS, Brown BR, Smith JC. J Gen Genet, in press.* {*Article title is optional; journal title is mandatory.*}
6. Forman MS, Valsamakis A. 2011. Specimen collection, transport, and processing: virology, p 1276–1288. *In* Versalovic J, Carroll KC, Jorgensen JH, Funke G, Landry ML, Warnock DW (ed), Manual of clinical microbiology, 10th ed, vol 2. ASM Press, Washington, DC.
7. 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.
8. Fitzgerald G, Shaw D. *In* Waters AE (ed), Clinical microbiology, in press. EFH Publishing Co, Boston, MA.* {*Chapter title is optional.*}
9. 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 C_1 compounds. Proceedings of the 4th International Symposium. American Society for Microbiology, Washington, DC.
10. Rotimi VO, Salako NO, Mohaddas EM, Philip LP. 2005. Abstr 45th Intersci Conf Antimicrob Agents Chemother, abstr D-1658. {*Abstract title is optional.*}
11. 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.*}
12. García CO, Paira S, Burgos R, Molina J, Molina JF, Calvo C, Vega L, Jara LJ, García-Kutzbach A, Cuellar ML, Espinoza LR. 1996. Detection of *Salmonella* DNA in synovial membrane and synovial fluid from Latin American patients using the polymerase chain reaction. Arthritis Rheum 39(Suppl 9):S185. {*Meeting abstract published in journal supplement.*}
13. O'Malley DR. 1998. PhD thesis. University of California, Los Angeles, CA. {*Title is optional.*}
14. 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.*}
15. 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.*}
16. Harrison F, Roberts AEL, Gabrilska R, Rumbaugh KP, Lee C, Diggle SP. 2015. A 1,000-year-old antimicrobial remedy with antistaphylococcal activity. mBio 6:e01129-15. {*Original article that describes how data submitted to a database were generated.*}
17. Harrison F, Roberts AEL, Gabrilska R, Rumbaugh KP, Lee C, Diggle SP. 2015. Data from "A 1,000-year-old antimicrobial remedy with antistaphylococcal activity." Dryad Digital Repository https://doi.org/10.5061/dryad.mn17p. {*Citation for the database where the data in the previous reference were deposited; the URL is necessary.*}
18. Wang Y, Rozen D. 2016. Colonization and transmission of the gut microbiota of the burying beetle, *Nicrophorus vespilloides*, through development. bioRxiv https://doi.org/10.1101/091702.

*A reference to an in-press ASM publication should state the control number (e.g., IAI00123-19) if it is a journal article or the name of the publication if it is a book.

In some online journal articles, posting or revision dates may serve as the year of publication; a DOI (preferred) or URL is required for articles with nontraditional page numbers or electronic article identifiers.

> 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.

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Citations of accepted ASM manuscripts 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:

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- Responsible party (senior author, collector, agency),
- Publication year,
- Complete name of a data set, including the name of the database or repository and its URL, **or** the name of the analysis software (if appropriate), including the version and project,
- Publisher (if appropriate), and
- Persistent unique identifier(s) (e.g., URL[s] or accession number[s]).

The following templates may be helpful.

Author. Year. Description of study topic. Retrieved from Database URL (accession no. ●●●●●●). {*Unpublished raw data.*}

Author. Year. Description or title of software (version). Repository URL. Retrieved day month year. {*Software or code.*}

Examples follow.

Christian SL, McDonough J, Liu C-Y, Shaikh S, Vlamakis V, Badner JA, Chakravarti A, Gershon ES. 2002. Data from "An evaluation of the assembly of an approximately 15-Mb region on human chromosome 13q32-q33 linked to bipolar disorder and schizophrenia." GenBank https://www.ncbi.nlm.nih.gov/nuccore/AF339794 (accession no. AF339794). {*Accession number.*}

Sun Z. 2013. Reprocessed: in-depth membrane proteomic study of breast cancer tissues. ProteomeXchange http://proteomecentral.proteomexchange.org/cgi/GetDataset?ID=RPXD000665 (accession number requested). {*Unassigned accession number.*}

Hogle S. 2015. Supplemental material for Hogle et al. 2015 mBio. figshare https://doi.org/10.6084/m9.figshare.1533034.v1. Retrieved 16 March 2017. {*Code and/or software.*}

Nesbitt HK, Moore JW. 2016. Data from "Species and population diversity in Pacific salmon fisheries underpin indigenous food security." Dryad Digital Repository https://doi.org/10.5061/dryad.ng8pf. {*Data set in repository.*}

Manuscript submissions that have appeared in preprint archives should cite the preprint in References, and the fact that a paper has appeared online before should be mentioned parenthetically at the end of the introductory section: (This article was submitted to an online preprint archive [1].) The reference should take the form noted above in reference 18.

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

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- Manuscripts submitted for publication
- Unpublished conference presentations (e.g., a report or poster that has not appeared in published conference proceedings)
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- Patent applications and patents pending
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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.*}
. . . as suggested by the World Health Organization (http://www.who.int/campaigns/immunizationweek/2017/en/).

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(P. S. Satheshkumar, A. S. Weisberg, and B. Moss, J Virol 87:10700–10709, 2013, doi:10.1128/JVI.01258-13)
(J. H. Coggin, Jr., p. 93–114, *in* D. O. Fleming and D. L. Hunt, ed., *Biological Safety. Principles and Practices*, 4th ed., 2006)

". . . in a recent report by D. A. Hopwood (mBio 4:e00612-13, 2013, doi:10.1128/mBio00612-13) . . . ."

This style should also be used for 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.

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- To submit, upload the text and photos with your modified manuscript in the eJP online manuscript submission and peer review system. Include the biographical text after the References section of your manuscript, in the same file. Upload the head shots in the submission system as a "Minireview Bio Photo"; **include the author's name or enough of it for identification in each photo's file name.**

Contact the scientific editor if you have questions about what to write. Contact the production editor if you have questions about submitting your files.

Commentaries

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- 300 dpi for grayscale and color
- 600 dpi for combination art (lettering and images)
- 1,200 dpi for line art

Size. All graphics **should be submitted at their intended publication size**; that is, the image uploaded should be 100% of its print dimensions so that no reduction or enlargement is necessary. Resolution must be at the required level at the submitted size. Include only the significant portion of an illustration. White space must be cropped from the image, and excess space between panel labels and the image must be eliminated.

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Contrast. Illustrations must contain sufficient contrast to withstand the inevitable loss of contrast and detail inherent in the printing process.

Labeling and assembly. All final lettering and labeling must be incorporated into the figures. On initial submission, illustrations should be provided as PDF files, with the legends in the text file and with a legend beneath each image to assist review. At the modification stage, production-quality digital figure files (without legends) must be provided. 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 uploaded 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 in which a nonproportional (monospace) font is required. All fonts other than these must be converted to paths (or outlines) in the application with which they were created.

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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," above.

(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 patterns are not imported from another application. If you must use images containing screens,

(a) Generate the image at line screens of 85 lines per inch or less.

(b) When applying multiple shades of gray, differentiate the gray levels by at least 20%.

(c) 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) Use type that is no 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 in table column headings), avoid the ambiguous use of numbers with exponents. Usually, it is preferable to use the Système International d'Unités (SI) symbols (μ for 10^{-6}, m for 10^{-3}, k for 10^{3}, and M for 10^{6}, etc.). Thus, a representation of 20,000 cpm on a figure ordinate should be made by the number 20 accompanied by the label kcpm. 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*, 3rd ed. (RSC Publishing, Cambridge, United Kingdom, 2007), and at https://www.nist.gov/physical-measurement-laboratory/special-publication-811/.

When 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 might be shown as 6 accompanied by the label 10^{-2} U/ml. The preferred designation is 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 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, each legend should be placed in the text file *and* be incorporated into the image file beneath the figure to assist review.

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.

Tables

Tables that contain artwork, chemical structures, or complex 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 2 is an example of a well-constructed table.

Cover Photographs and Drawings

IAI publishes photographs and drawings on the front cover. Invitations to submit an illustration for consideration as cover art are issued to authors whose manuscripts are returned for modification or whose manuscripts have been accepted for publication in IAI; material should be related to the work presented in the manuscript. A short description of the cover material will be included at the end of the table of contents. No material submitted for consideration will be returned to the author. Authors will be notified if their cover art is selected. Copyright for the chosen material must be transferred to ASM. Submissions must include both a disk prepared in CMYK format and two, high-resolution glossy prints of the specified size. Technical specifications and comments on potential illustrations can be obtained from either of the cover editors, John H. Adams (usfmalaria@gmail.com) or Helene L. Andrews-Polymenis (HAndrews@medicine.tamhsc.edu).

NOMENCLATURE

Chemical and Biochemical Nomenclature

The recognized authority for the names of chemical compounds is *Chemical Abstracts* (CAS; http://www.cas.org/) and its indexes. *The Merck Index Online* (https://www.rsc.org/merck-index) is also an excellent source. For biochemical terminology, including abbreviations and symbols, consult *Biochemical Nomenclature and Related Documents* (Portland Press, London, United Kingdom, 1992), available at http://www.sbcs.qmul.ac.uk/iupac/bibliog/white.html, and the Instructions to Authors of the *Journal of Biological Chemistry* and the *Archives of Biochemistry and Biophysics*.

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 at http://www.sbcs.qmul.ac.uk/iubmb/enzyme/. 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 (http://www.beilstein-institut.de/en/projects/strenda/guidelines).

TABLE 2 Distribution of protein and ATPase in fractions of dialyzed membranes[a]

Membrane	Fraction	ATPase	
		U/mg of protein	Total U
Control	Depleted membrane	0.036	2.3
	Concentrated supernatant	0.134	4.82
E1 treated	Depleted membrane	0.034	1.98
	Concentrated supernatant	0.11	4.6

[a]Specific activities of ATPase of nondepleted membranes from control and treated bacteria were 0.21 and 0.20, respectively.

Amino Acid Sequences

Single-letter designations, rather than three-letter designations, should be used for sequences of amino acids.

Drugs

Chemical or generic names of drugs should be used; the use of code numbers or trade names is generally not permitted.

Nomenclature of Microorganisms

Binary names, consisting of a generic name and a specific epithet (e.g., *Escherichia coli*), should be used for all microorganisms. 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 bacterial taxa (kingdoms, phyla, classes, orders, families, genera, species, and subspecies) are printed in italics and should be italicized in the manuscript; strain designations and numbers are not. Vernacular (common) names should be in lowercase roman type (e.g., streptococcus, brucella). For *Salmonella*, genus, species, and subspecies names should be rendered in standard form: *Salmonella enterica* at first use, *S. enterica* thereafter; *Salmonella enterica* subsp. *arizonae* at first use, *S. enterica* subsp. *arizonae* thereafter. Names of serovars should be in roman type with the first letter capitalized: *Salmonella enterica* serovar Typhimurium. After the first use, the serovar may also be given without a species name: *Salmonella* Typhimurium, *S.* Typhimurium, or *Salmonella* serovar Typhimurium. For other information regarding serovar designations, see *Antigenic Formulae of the Salmonella Serovars*, 9th ed. (P. A. D. Grimont and F.-X. Weill, WHO Collaborating Centre for Reference and Research on *Salmonella*, Institut Pasteur, Paris, France, 2007; see http://www.scacm.org/free/Antigenic%20Formulae%20of%20the%20Salmonella%20Serovars%202007%209th%20edition.pdf). For a summary of the current standards for *Salmonella* nomenclature and the Kaufmann-White criteria, see the article by Brenner et al. (J Clin Microbiol 38:2465–2467, 2000), the opinion of the Judicial Commission of the International Committee on Systematics of Prokaryotes (Int J Syst Evol Microbiol 55:519–520, 2005), and the article by Tindall et al. (Int J Syst Evol Microbiol 55:521–524, 2005).

The spelling of bacterial names should follow the *Approved Lists of Bacterial Names (Amended) & Index of the Bacterial and Yeast Nomenclatural Changes* (V. B. D. Skerman et al., ed., American Society for Microbiology, Washington, DC, 1989) and the validation lists and notification lists published in the *International Journal of Systematic and Evolutionary Microbiology* (formerly the *International Journal of Systematic Bacteriology*) since January 1989. In addition, two sites on the World Wide Web list current approved bacterial names: Prokaryotic Nomenclature Up-to-Date (https://www.dsmz.de/bacterial-diversity/prokaryotic-nomenclature-up-to-date.html) and List of Prokaryotic Names with Standing in Nomenclature (http://www.bacterio.net/). 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.

It is recommended that a strain be deposited in at least two recognized culture collections in different countries when that strain is necessary for the description of a new taxon (Int J Syst Evol Microbiol 50:2239–2244, 2000).

Since the classification of fungi is not 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 *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.

Microorganisms, viruses, and plasmids should be given designations consisting of letters and serial numbers. It is generally advisable to include a worker's initials or a descriptive symbol of locale or laboratory, etc., in the designation. Each new strain, mutant, isolate, or derivative should be given a new (serial) designation. This designation should be distinct from those of the genotype and phenotype, and genotypic and phenotypic symbols should not be included.

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.

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 at http://www.informatics.jax.org/ and in *Genetic Variants and Strains of the Laboratory Mouse*, 3rd ed. (M. F. Lyon et al., ed., Oxford University Press, Oxford, England, 1996).

Bacteria. The genetic properties of bacteria are described in terms of phenotypes and genotypes. The phenotype describes the observable properties of an organism. The genotype refers to the genetic constitution of an organism, usually in reference to some standard wild type. Use the recommendations of Demerec et al. (Genetics 54:61–76, 1966) as a guide to the use of these terms. If your manuscript contains information including genetic nomenclature, please refer to the Instructions to Authors of the *Journal of Bacteriology*.

Conventions for naming genes. It is recommended that (entirely) new genes be given names that are mnemonics of their function, avoiding names that are already assigned and earlier or alternative gene names, irrespective of the bacterium for which such assignments have been made. Similarly, it is recommended that, whenever possible, orthologous genes present in different organisms receive the same name. When homology is not apparent or the function of a new gene has not been established, a provisional name may be given by one of the following methods. (i) The gene may be named on the basis of its map location in the style *yaaA*, analogous to the style used for recording transposon insertions (*zef*) as discussed below. A list of such names in use for *E. coli* has been published by Rudd (Microbiol Mol Biol Rev 62:985–1019, 1998). (ii) A provisional name may be given in the style described by Demerec et al. (e.g., *usg*, gene upstream of *folC*). Such names should be unique, and names such as *orf* or *genX* should not be used. For reference, the Coli Genetic Stock Center's database includes an updated listing of *E. coli* gene names and gene products. It is accessible on the Internet (http://cgsc2.biology.yale.edu/index.php). A list can also be found in the work of Riley (Microbiol Rev 57:862–952, 1993). For the genes of other bacteria, consult the references given above. For prokaryotes, gene names should not begin with prefixes indicating the genus and species from which the gene is derived. However, subscripts may be used where necessary to distinguish between genes from different organisms or strains. For eukaryotes, such prefixes may be used for clarity when discussing genes with the same name from two different organisms (e.g., Sc*URA3* versus Ca*URA3*); the prefixes are not considered part of the gene name proper and are not italicized.

Locus tags. Locus tags are systematic, unique identifiers that are assigned to each gene in GenBank. All genes mentioned in a manuscript should be traceable to their sequences by the reader, and locus tags may be used for this purpose in manuscripts to identify uncharacterized genes. Authors should check GenBank to make sure that they are using the correct, up-to-date format for locus tags (e.g., uppercase versus lowercase letters and the presence or absence of an underscore, etc.). Locus tag formats vary between different organisms and also may be updated for a given organism, so it is important to check GenBank at the time of manuscript preparation.

"Mutant" versus "mutation." Keep in mind the distinction between a *mutation* (an alteration of the primary sequence of the genetic material) and a *mutant* (a strain carrying one or more mutations). One may speak about the mapping of a mu-

tation, but one cannot map a mutant. Likewise, a mutant has no genetic locus, only a phenotype.

"Homology" versus "similarity." For use of terms that describe relationships between genes, consult the articles by Theissen (Nature 415:741, 2002) and Fitch (Trends Genet 16:227–231, 2000). "Homology" implies a relationship between genes that have a common evolutionary origin; partial homology is not recognized. When sequence comparisons are discussed, it is more appropriate to use the term "percent sequence similarity" or "percent sequence identity," as appropriate.

Eukaryotes. FlyBase (http://flybase.org/) is the genetic nomenclature authority for *Drosophila melanogaster*. WormBase (http://www.wormbase.org/#01-23-6) is the genetic nomenclature authority for *Caenorhabditis elegans*. When naming genes for *Aspergillus* species, the nomenclature guidelines posted at http://www.aspergillusgenome.org/Nomenclature.shtml should be followed, and the *Aspergillus* Genome Database (http://www.aspgd.org/) should be searched to ensure that any new name is not already in use. The *Saccharomyces* Genome Database (https://www.yeastgenome.org/) and the *Candida* Genome Database (http://www.candidagenome.org/) are authorities for *Saccharomyces cerevisiae* and *Candida albicans* genetic nomenclature, respectively. For information about the genetic nomenclature of other eukaryotes, see the Instructions to Authors for *Molecular and Cellular Biology*.

Transposable elements, plasmids, and restriction enzymes. Nomenclature of transposable elements (insertion sequences, transposons, and phage Mu, etc.) should follow the recommendations of Campbell et al. (Gene 5:197–206, 1979), with the modifications given in the Instructions to Authors of the *Journal of Bacteriology*. The Internet site where insertion sequences of eubacteria and archaea are described and new sequences can be recorded is https://www-is.biotoul.fr.

The system of designating transposon insertions at sites where there are no known loci, e.g., *zef-123*::Tn*5*, has been described by Chumley et al. (Genetics 91:639–655, 1979). Whenever possible, use the nomenclature recommendations of Novick et al. (Bacteriol Rev 40:168–189, 1976) for plasmids and plasmid-specified activities, of Low (Bacteriol Rev 36:587–607, 1972) for F′ factors, and of Roberts et al. (Nucleic Acids Res 31:1805–1812, 2003) for restriction enzymes, DNA methyltransferases, homing nucleases, and their genes. The nomenclature for recombinant DNA molecules constructed *in vitro* follows the nomenclature for insertions in general. DNA inserted into recombinant DNA molecules should be described by using the gene symbols and conventions for the organism from which the DNA was obtained.

Tetracycline resistance determinants. The nomenclature for tetracycline resistance determinants is based on the proposal of Levy et al. (Antimicrob Agents Chemother 43:1523–1524, 1999). The style for such determinants is, e.g., Tet B; the space helps distinguish the determinant designation from that for phenotypes and proteins (TetB). Table 2 of the above-referenced article shows the correct format for genes, proteins, and determinants in this family.

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) demonstrat*ed* that XYZ cells *grow* at pH 6.8," "Figure 2 show*s* that ABC cells fail*ed* 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 inhibit*ed* . . . ."

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 to 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)
cDNA (complementary DNA)
RNA (ribonucleic acid)
cRNA (complementary RNA)
RNase (ribonuclease)
DNase (deoxyribonuclease)
rRNA (ribosomal RNA)
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)
ATPase and dGTPase, etc. (adenosine triphosphatase and deoxyguanosine triphosphatase, etc.)
NAD (nicotinamide adenine dinucleotide)
NAD^+ (nicotinamide adenine dinucleotide, oxidized)
NADH (nicotinamide adenine dinucleotide, reduced)
NADP (nicotinamide adenine dinucleotide phosphate)
NADPH (nicotinamide adenine

dinucleotide phosphate, reduced)
NADP$^+$ (nicotinamide adenine dinucleotide phosphate, oxidized)
poly(A) and poly(dT), etc. (polyadenylic acid and polydeoxythymidylic acid, etc.)
oligo(dT), etc. (oligodeoxythymidylic acid, etc.)
UV (ultraviolet)
PFU (plaque-forming units)
CFU (colony-forming units)
MIC (minimal inhibitory concentration)
Tris (tris[hydroxymethyl] aminomethane)
DEAE (diethylaminoethyl)
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)
approx (approximately)
avg (average)
concn (concentration)
diam (diameter)
expt (experiment)
exptl (experimental)
ht (height)
mo (month)
mol wt (molecular weight)
no. (number)
prepn (preparation)
SD (standard deviation)
SE (standard error)
SEM (standard error of the mean)
sp act (specific activity)
sp gr (specific gravity)
temp (temperature)
vol (volume)
vs (versus)
wk (week)
wt (weight)
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 prefix k for 10^3. Avoid compound prefixes such as mμ or $\mu\mu$. Use μg/ml or μg/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 units 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 "μmol/g" is preferable to "nmol/μg." It is also preferable that an unambiguous form, such as exponential notation, be used; for example, "μmol g^{-1} min^{-1}" is preferable to "μmol/g/min." Always report numerical data in the applicable SI units.

Representation of data as accurate to more than two significant figures must be justified by presentation of appropriate statistical analyses.

For a review of some common errors associated with statistical analyses and reports, plus guidelines on how to avoid them, see the articles by Olsen (Infect Immun 71:6689–6692, 2003; Infect Immun 82:916–920, 2014).

Statistics

Statistical analysis of data is a crucial component of scientific publication. Authors who are unsure of proper statistical analysis should have their manuscripts checked by a qualified statistician.

The following is a list of important items that must be considered before manuscript submission. Deficiencies in any of these areas may delay review and/or publication.

(i) Statistical analyses should be performed on all quantitative data regardless of how significant the differences look in the tables or figures.

(ii) Data should be appropriately analyzed as parametric (normally distributed) or nonparametric data.

(iii) Parametric and nonparametric data should be presented appropriately. Means and standard deviations or standard errors are appropriate ways of presenting data analyzed by parametric analyses (i.e., *t* test and analysis of variance [ANOVA]), but only medians and surrounding levels (quartiles, quintiles, and 10th and 90th percentiles, etc.) are appropriate for nonparametric statistics (Mann-Whitney test and Kruskal-Wallis test, etc.). Means have no meaning in nonparametric analyses.

(iv) For any data in which there are more than two comparisons (i.e., between one control and more than one experimental group), an analysis must be done for multigroup comparisons. Such an analysis would usually be an ANOVA for parametric data or a Kruskal-Wallis test for nonparametric data. *t* tests cannot be used when more than two groups are being compared (except as indicated below). Failure to use multigroup tests generates type 1 errors: concluding that two data sets within the overall data set being compared are different when in fact they are not. Exception: some statisticians argue that two-group comparisons can be used on multigroup data if the expected outcomes are appropriately anticipated before the experiment. For example, data generated by individually testing two unrelated factors for their effects on a target with only a single, untreated target as a control could be appropriately analyzed by *t* tests instead of ANOVA.

(v) For all appropriate multigroup comparisons, two *P* values must be generated and provided in the manuscript. The main *P* value applies to the overall data set and indicates that within that data set at least two groups differ from each other. The overall *P* value does not indicate which two groups are different. The main *P* value and the overall *P* value should be computed by using a *post hoc* test. For ANOVA, these *post hoc* tests are usually Dunnett's test (used to compare multiple experimental groups to a single control), the Fisher protected least significant difference (PLSD) test, the Tukey-Kramer test, and the Games-Howell test. Others may be used. Note that each *post hoc* test has certain underlying assumptions that may not be applicable to the data under analysis. For a Kruskal-Wallis nonparametric ANOVA, the Dunn procedure is appropriate to generate *P* values for two-group comparisons.

(vi) Data presented as endpoints (i.e., LD_{50} and ID_{50}, etc.) contain both the calculated value and a confidence interval with a statistical significance associated with it (95%, 99%, or similar confidence interval), calculated by logit or probit analysis. Simple LD_{50} values, such as Reed-Muench calculations, may not be used alone.

(vii) When samples are taken multiple times from one experimental entity (i.e., multiple serum samples from one ani-mal, gross pathology scores measured for the same animal over time, and growth curves, etc.), one cannot use analyses such as *t* tests, ANOVA, and the Mann-Whitney test, etc., because these tests assume that each measure is

independent. An entity with a high score on day 1 is more likely to have a high score on day 2 than is an entity with a low score. It is likely that some expert statistical help will be needed for these situations, usually involving regression analysis or survival analysis, etc.

(viii) Statistical significance and biological significance are not the same. There is nothing magical about a *P* value of 0.05. When results from large sample sizes are compared, a *P* value of <0.05 will often be obtained, as *P* value is a function of both sample size and effect size. If sample sizes are large, then more-rigorous (i.e., smaller) *P* values may be desirable. If sample sizes are small, *P* values of >0.05 may still be important. There should be both statistical and biological significance to the results and conclusions in the manuscript.

For a review of some common errors associated with statistical analyses and reports, plus guidelines on how to avoid them, see the articles by Olsen (Infect Immun 71:6689–6692, 2003; Infect Immun 82:916–920, 2014).

Isotopically Labeled Compounds

For simple molecules, labeling is indicated in the chemical formula (e.g., $^{14}CO_2$, $^{3}H_2O$, and $H_2{}^{35}SO_4$). 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}S-ATP) or to a word which is not a specific chemical name (e.g., ^{131}I-labeled protein, ^{14}C-amino acids, and ^{3}H-ligands).

For specific chemicals, the symbol for the isotope is placed in square 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	UDP-[U-^{14}C]glucose
L-[*methyl*-^{14}C]methionine	*E. coli* [^{32}P]DNA
[2,3-^{3}H]serine	fructose 1,6-[1-^{32}P]bisphosphate
[α-^{14}C]lysine	[γ-^{32}P]ATP