

JOURNAL OF BACTERIOLOGY

INSTRUCTIONS TO AUTHORS*

HOW TO SUBMIT MANUSCRIPTS

The *Journal of Bacteriology* (JB) will begin accepting ***electronic submissions*** in 2003. All electronic submissions must be made via the Rapid Review online submission and peer review system at the following URL: www.rapidreview.com/ASM2/author.html. E-mailed submissions will *not* be accepted. **Since we cannot predict the precise date when online submission will begin, please visit the above site before getting ready to submit your manuscript.** A message listing the ASM journals for which online submission has started will be posted. If the JB site is open, follow the instructions on the screen to create a user account and submit your manuscript electronically. If online submission is not yet available for JB, mail in your hard-copy manuscript. Once the online submission site is open, all manuscripts will follow an electronic review process (*exception:* if the original submission followed a hard-copy process, the modified manuscript will also be handled in hard copy). For a short time after JB's submission portal is opened, manuscripts received in hard copy will be scanned by the editorial staff of the ASM Journals Department and uploaded to the Rapid Review system so that review can proceed electronically. After this transitional period, we will not handle hard copy and will contact the author to request online submission. Specific instructions for making an online submission will be provided at the above URL. **Note that some of the requirements and processes outlined in these Instructions to Authors will not apply to electronic submissions.**

For ***hard-copy submissions***, send manuscripts directly to: Journals Department, American Society for Microbiology, 1752 N St., N.W., Washington, DC 20036-2904. *Since all submissions must be processed through this office, alternate routings, such as to an editor, will delay initiation of the review process*. The manuscript must be accompanied by a **cover letter** stating the following: the journal to which the manuscript is being submitted; the most appropriate section of the journal; the complete mailing address (including the street), e-mail address, and telephone and fax numbers of the corresponding author; and the former ASM manuscript number and year if it is a resubmission. The current e-mail addresses of the coauthors should also be indicated.

Authors may suggest an appropriate editor for new submissions. If we are unable to comply with such a request, the corresponding author will be notified before the manuscript is assigned to another editor. To expedite the review process, authors may recommend at least two or three reviewers who are not members of their institution(s) and have never been associated with them or their laboratory(ies). Please provide the name, mailing and e-mail addresses, phone and fax numbers, and area of expertise for each. Note that reviewers so recommended will be used at the discretion of the editor. Submit **three** complete hard copies of each manuscript, including figures and tables. (You **must** submit your manuscript on disk at the *modification stage* [see p. v].) 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 must have margins of at least 1 inch on all four sides. 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). If such distinctions cannot be made, please mark these items at the first occurrence for cell lines, strain and genetic designations, viruses, etc., on the modified manuscript so that they may be identified properly for the printer by the copy editor. See p. x for detailed instructions about illustrations.

Copies of in-press and submitted manuscripts that are important for judgment of the present manuscript should be included to facilitate the review. For hard-copy submissions, three copies of each such manuscript should be provided.

Authors who are unsure of proper English usage should have their manuscripts checked by someone proficient in the English language. Manuscripts that are deficient in this respect may be returned to the author before review.

EDITORIAL POLICY

Use of Microbiological Information

The Council Policy Committee (CPC) of the American Society for Microbiology affirms the long-standing position of the Society that microbiologists will work for the proper and beneficent application of science and will call to the attention of the public or the appropriate authorities misuses of microbiology or of information derived from microbiology. ASM members are obligated to discourage any use of microbiology contrary to the welfare of humankind, including the use of microbes as biological weapons. Bioterrorism violates the fundamental principles expressed in the Code of Ethics of the Society and is abhorrent to the ASM and its members.

ASM recognizes that there are valid concerns regarding the publication of information in scientific journals that could be put to inappropriate use as described in the CPC resolution above. Members of the ASM Publications Board will evaluate the rare manuscript that might

* Shading indicates material that has been added or updated.

raise such issues during the review process. However, as indicated elsewhere in these Instructions, research articles must contain sufficient detail, and material/information must be made available, to permit the work to be repeated by others. Supply of materials should be in accordance with laws and regulations governing the shipment, transfer, possession, and use of biological materials and must be for legitimate, bona fide research needs. Links to, and information regarding, these laws and regulations can be found at http://www.asmusa.org/pasrc/policylinks.htm.

General Requirements

Manuscripts submitted to the journal must represent reports of original research, and the original data must be available for review by the editor if necessary.

All authors of a manuscript must have agreed to its submission and are responsible for its content, including appropriate citations and acknowledgments, and must also have agreed that the corresponding author has the authority to act on their behalf on all matters pertaining to publication of the manuscript. The corresponding author is responsible for obtaining such agreements. For Authors' Corrections and Retractions, signed letters of agreement from all of the authors must be submitted (see p. x).

By submission of a manuscript to the journal, the authors guarantee that they have the authority to publish the work and that the manuscript, or one with substantially the same content, was not published previously, is not being considered or published elsewhere, and was not rejected on scientific grounds by another ASM journal.

It is expected that the authors will provide written assurance that permission to cite unpublished data or personal communications has been granted.

By publishing in the journal, the authors agree that any plasmids, viruses, and living materials such as microbial strains and cell lines newly described in the article are available from a national collection or will be made available in a timely fashion and at reasonable cost to members of the scientific community for noncommercial purposes.

Primary Publication

A scientific paper *or its substance* published in a serial, periodical, book, conference report, symposium proceeding, or technical bulletin, posted on a nonpersonal website, or made available through any other retrievable source, including CD-ROM and other electronic forms, is unacceptable for submission to an ASM journal on grounds of prior publication.

Posting of a method/protocol on a nonpersonal website should not interfere with the author's ability to have a manuscript utilizing that technique considered for publication in an ASM journal; however, ultimately, it is an editorial decision whether the method constitutes the substance of a paper.

Posting of a limited amount of original data on a personal/university/company website or websites of small collaborative groups working on a problem does not preclude subsequent submission to, and publication by, an ASM journal. The posted data, however, may not constitute the substance of the submission. Specific questions about this policy may be referred to the Publications Board chairman on a case-by-case basis. Posting of theses and dissertations on a personal/university-hosted website does not preclude subsequent submission to, and publication by, an ASM journal.

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It is incumbent upon the author to acknowledge any prior publication of the data contained in a manuscript submitted to an ASM journal. A copy of the relevant work should accompany the paper.

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Authorship

An author is one who made a substantial contribution to the overall design and execution of the experiments; therefore, ASM considers all authors responsible for the entire paper. Individuals who provided assistance, e.g., supplied strains or reagents or critiqued the paper, need not be listed as authors but may be recognized in the Acknowledgments section.

All authors must agree to the order in which their names are listed in the byline. Footnotes regarding attribution of work (e.g., X. Jones and Y. Smith contributed equally to . . .) are not permitted. If necessary, such statements may be included in the Acknowledgments section.

A change in authorship (order of listing or addition or

deletion of a name) after submission of the manuscript will be implemented only after receipt of signed statements of agreement from all parties involved. Disputes about authorship may delay review and/or publication of the manuscript.

Conflict of Interest

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The copyright transfer agreement asks that authors who were U.S. Government employees and who wrote the article as part of their employment duties be identified. This is because works authored solely by such U.S. Government employees are not subject to copyright protection, so there is no copyright to be transferred. The other provisions of the copyright transfer agreement, such as author representations of originality and authority to enter into the agreement, apply to U.S. Government employee-authors as well as to other authors.

ASM also requires that copyright transfer agreements be signed for cover artwork/photographs.

Use of Human Subjects or Animals in Research

The use of human subjects or other animals for research purposes is regulated by the federal government and individual institutions. Manuscripts containing information related to human or animal use should clearly state that the research has complied with all relevant federal guidelines and institutional policies. Copies of these guidelines and policy statements must be available for review by the editor if necessary.

Patient Identification

When isolates are derived from patients in clinical studies, do not identify them by using the patients' initials, even as part of a strain designation. Change the initials to numerals or use randomly chosen letters. Do not give hospital unit numbers; if a designation is needed, use only the last two digits of the unit. (Note: established designations of some viruses and cell lines, although they consist of initials, are acceptable [e.g., JC virus, BK virus, and HeLa cells].)

Nucleotide and Amino Acid Sequences

It is expected that newly determined nucleotide and/or amino acid sequence data will be deposited and GenBank/EMBL/DDBJ accession numbers will be included in the manuscript no later than the modification stage of the review process. It is also expected that the sequence data will be released to the public no later than the publication date of the article. The accession number should be included in a separate paragraph at the end of the Materials and Methods section for full-length papers or at the end of the text for Notes. If conclusions in a manuscript are based on the analysis of sequences and a GenBank/EMBL/DDBJ accession number is not provided at the time of the review, authors may be required to provide the sequence data as a file on a floppy disk.

It is expected that when previously published sequence accession numbers are cited in a manuscript, the original citations (e.g., journal articles) will be included in the References section when possible or reasonable.

Authors are also expected to do elementary searches

and comparisons of nucleotide and amino acid sequences against the sequences in standard databases (e.g., GenBank) immediately before manuscripts are submitted and again at the proof stage.

Database address information is as follows.

DDBJ: Center for Information Biology and DNA Data Bank of Japan, National Institute of Genetics, 1111 Yata, Mishima, Shizuoka 411-8540, Japan; telephone, 81-559-81-6853; fax, 81-559-81-6849; e-mail, ddbj@ddbj.nig.ac.jp (for data submissions); URL, http://www.ddbj.nig.ac.jp.

EMBL: EMBL Nucleotide Sequence Submissions, European Bioinformatics Institute, Wellcome Trust Genome Campus, Hinxton, Cambridge CB10 1SD, United Kingdom; telephone, 44-1223-494499; fax, 44-1223-494472; e-mail, datasubs@ebi.ac.uk; URL, http://www.ebi.ac.uk.

GenBank: National Center for Biotechnology Information, National Library of Medicine, Bldg. 38A, Rm. 8N-803, Bethesda, MD 20894; telephone, 301-496-2475; fax, 301-480-9241; e-mail, info@ncbi.nlm.nih.gov; URL, http://www.ncbi.nlm.nih.gov.

See p. xiii for nucleic acid sequence formatting instructions.

Structural Determinations

It is expected that coordinates for new structures of macromolecules will be deposited in the Protein Data Bank and assigned identification codes will be included in the manuscript no later than the modification stage of the review process. It is also expected that the coordinates will be released to the public no later than the publication date of the article. Authors are encouraged to send coordinates with their original submission, however, so that reviewers can examine them along with the manuscript.

Compliance

Failure to comply with the policies described above may result in a letter of reprimand, a suspension of publishing privileges in ASM journals, and/or notification of the authors' institutions.

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Articles published in this journal represent the opinions of the authors and do not necessarily represent the opinions of ASM. ASM does not warrant the fitness or suitability, for any purpose, of any methodology, kit, product, or device described or identified in an article. The use of trade names is for identification purposes only and does not constitute endorsement by ASM.

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For a **corresponding author who is an ASM member**, page charges are currently $53 per page for the first six pages and $71 per page for each page in excess of six (subject to change without notice). To obtain the member rate, the *corresponding author* must be an ASM member and must include his member number on the reprint/page charge form.

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If the research was not supported by any of the means described above, a request to waive the charges may be sent to the Journals Department, ASM, 1752 N St., N.W., Washington, DC 20036-2904, with the submitted manuscript. This request, which should be separate from the cover letter, must indicate how the work was supported and should be accompanied by copies of the title page and Acknowledgments section.

Minireviews and Guest Commentaries are not subject to page charges.

Scope

JB publishes descriptions of basic research on bacteria and other microorganisms. Topics that are considered include structure and function, biochemistry, enzymology, metabolism and its regulation, molecular biology, genetics, plasmids and transposons, general microbiology, plant microbiology, chemical or physical characterization of microbial structures or products, and basic biological properties of organisms.

ASM publishes a number of different journals covering various aspects of microbiology. Each journal has a prescribed scope that must be considered in determining the most appropriate journal for each manuscript. The following guidelines should be of assistance.

(i) JB will consider papers that describe the use of antibiotics and antimicrobial agents as tools for elucidating the basic biological processes of microorganisms. However, papers dealing with antimicrobial agents, including manuscripts dealing with the susceptibility to, resistance to, biosynthesis of, and metabolism of such agents, are more appropriate for *Antimicrobial Agents and Chemotherapy*.

(ii) JB will consider manuscripts that emphasize the interrelationship of the bacteriophage and the host cell, manuscripts about work in which viruses were used as tools for elucidating the structure or biological processes of microorganisms, and manuscripts that concern phages that are related to transposable elements or plasmids.

(iii) Manuscripts describing new or novel methods or improvements in media and culture conditions will not be considered by JB unless they are applied to the study of basic problems in microbiology. Such manuscripts are

more appropriate for *Applied and Environmental Microbiology* or for the *Journal of Clinical Microbiology*.

(iv) Manuscripts dealing with ecology or environmental studies or with the application of microorganisms to agricultural or industrial processes are more appropriate for *Applied and Environmental Microbiology*.

(v) Manuscripts dealing with the immune system or with topics of medical interest are more appropriate for *Infection and Immunity*.

(vi) In most cases, reports that emphasize methods and nucleotide sequence data alone (without experimental documentation of the functional and evolutionary significance of the sequence) will not be considered by JB.

(vii) Manuscripts describing work, with a new organism, that largely repeats published research done with a different organism will be considered if they significantly increase the understanding of the original property, if they provide an extensive basis for evolutionary comparison, or if the work is of unusual importance because of its relationship to other properties of the new organism. Manuscripts that describe genes or enzymes, for example, that differ only in minor ways from the prototypes are not suitable for JB.

(viii) The criteria described in section vii above also apply to genome maps. Manuscripts describing a genome map should provide an extensive basis for evolutionary comparisons or significantly increase our fundamental understanding of the organism or system.

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.

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.

Culture Deposition

JB encourages authors to deposit important strains in publicly accessible culture collections and to refer to the collections and strain numbers in the text. Since the authenticity of subcultures of culture collection specimens that are distributed by individuals cannot be ensured, authors should indicate laboratory strain designations and donor sources as well as original culture collection identification numbers.

Links to Supplementary Material

Authors are encouraged to include the URLs of their websites if they contain data that might supplement those in the article itself and/or be of interest or assistance to readers. Such addresses should be included in the relevant text, not as footnotes.

Editorial Style

The editorial style of ASM journals conforms to the *ASM Style Manual for Journals* (American Society for Microbiology, 2003, in-house document) and *How To Write and Publish a Scientific Paper*, 5th ed. (Oryx Press, 1998), 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.

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. When a manuscript is submitted to the journal, it is given a number (e.g., JB 47-03) and assigned to one of the editors. For hard-copy submissions, all coauthors are notified of this number and the editor to whom the manuscript has been assigned. **(Always refer to this number in communications with the editor and Journals Department.)** It is the responsibility of the corresponding author to inform the coauthors of the manuscript's status throughout the review and publication processes. The reviewers operate under strict guidelines set forth in "Guidelines for Reviewers" (www.journals.asm.org/misc/reviewguide.shtml) and are expected to complete their reviews expeditiously. The corresponding author is notified, generally within 4 to 6 weeks after submission, of the editor's decision to accept, reject, or require modification. When a manuscript is returned to the corresponding author for modification, it should be returned to the editor within 2 months; otherwise it may be considered withdrawn. A point-for-point response to the reviews must be included with the revised manuscript; an extra hard copy of the revised manuscript (without figures) should have the changes highlighted with a colored marker.

Manuscripts that have been rejected, or withdrawn after being returned for modification, may be resubmitted if the major criticisms have been addressed. As with initial submissions, resubmitted manuscripts should be sent to the Journals Department of ASM, *not to the editor*, and should be accompanied by a cover letter stating that the manuscript is a resubmission. A point-for-point response to the original reviews, as well as a copy of the resubmitted manuscript with the changes highlighted, should be included. Resubmitted manuscripts are normally handled by the original editor. Manuscripts cannot be resubmitted more than once unless permission has been obtained from the original editor or from the editor in chief.

NOTE: Manuscripts and illustrations are returned to the author at the discretion of the editor.

Manuscripts Submitted on Disk

JB will publish only manuscripts that are supplied electronically. Once the online submission/review system is implemented (in 2003 [see p. i]), the native files uploaded to the system will be used by the copy editor and

the printer to generate proofs. Until that time, disks supplied by the author at the modification stage will be used.

For hard-copy submissions, although hard copy *only* must be supplied at the time of submission, a disk containing the revised version of the article **must** be sent to the editor at the **modification stage**. Because the disk undergoes an automated preediting, cleanup, and tagging process specific to the particular article type before being copyedited (see Notification of Acceptance, below), it is important that the article on disk be formatted correctly with all the proper sections and headings. **See Organization and Format, p. vii.** Double-spaced hard copy which **exactly** matches the file on disk **must** be supplied also. (For submission of illustrations on disk, see the section on computer-generated images on p. xi.) We do not at present accept e-mailed files. Disks and CDs will **not** be returned. Failure to supply a disk at the modification stage will result in delayed publication. Please keep the following in mind:

- Do not use the compare feature in your word processing program to highlight changes in the revised version.
- Do not convert text to ASCII since this will result in loss of fonts and formatting that we want to preserve.
- Do not create symbols as graphics. Use the "insert symbol" function in your word processing program.
- Set page size to 8½ by 11 inches.
- Italicize or underline any words that should appear in italics.
- Include all section heads (see Organization and Format, p. vii), and indicate paragraph lead-ins in bold type.
- Label the disk clearly with the manuscript control number and the name of the file. Indicate whether it contains text only or both text and figures.
- Provide the name and version of the word processing software used (a wide range of applications is supported, but we *cannot* translate PDF or PostScript files or files created with BIBTEX; Chi-Writer; ClarisWorks 1.0; EG Word; Enable 4.0; Full Write version 2.0; Mathematica 3.0; Ready, Set, Go; or Scientific Writer 3.0), the operating system, the type of PC used (IBM compatible, Macintosh, or other), and the medium used to transmit files (see "Acceptable media" in the section on computer-generated images [p. xi] below).

Notification of Acceptance

When an editor has decided that a manuscript is acceptable for publication on the basis of scientific merit, the hard copy and disk are sent to the Journals Department. The disk undergoes an automated preediting, cleanup, and tagging process specific to the particular article type. If the disk has been prepared according to the criteria set forth in these instructions, this process will be completed successfully. If the disk fails, the author will be required to supply one that has been prepared correctly. Once a disk has been determined to be adequate, the manuscript is scheduled for the next available issue and an acceptance letter indicating the month of publication, approximate page proof dates, and table of contents section is mailed to the corresponding author. The editorial staff of the ASM Journals Department completes the editing of the manuscript to bring it into conformity with prescribed standards.

Page Proofs

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The proof stage is not the time to make extensive corrections, additions, or deletions. Important new information that has become available between acceptance of the manuscript and receipt of the proofs may be inserted as an addendum in proof with the permission of the editor. If references to unpublished data or personal communications are added, it is expected that written assurance granting permission for the citation will be included. Limit changes to correction of spelling errors, incorrect data, and grammatical errors and updated information for references to articles that have been submitted or are in press. If URLs have been provided in the article, recheck the sites to ensure that the addresses are still accurate and the material that you expect the reader to find is indeed there.

Questions about *late proofs and problems in the proofs* should be directed to the ASM Journals Department (telephone, 202-942-9243). Questions about *accessing or viewing your PDF proofs* should be directed to Katie Gay of Cadmus Professional Communications at 804-261-3155 or gayk@cadmus.com.

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ORGANIZATION AND FORMAT

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.

Full-Length Papers

Full-length papers 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. On the title page, include the title, running title (not to exceed 54 characters and spaces), name of each author, 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 an asterisk after the name of the author to whom inquiries regarding the paper should be directed, and **give that author's primary telephone and fax numbers and e-mail address.**

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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. When it is essential to include a reference, use the same format as shown for the References section but omit the article title. 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. Use only those references required to provide the most salient background rather than an exhaustive review of the topic.

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)." The reader should be allowed 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, plasmids, etc.

Enzyme purifications should be described in this section, but the results of such procedures should be described in the Results section.

A method, 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.

Results. The Results section should include the results of the experiments. 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 (e.g., calibration plots for molecular weight by gel filtration or electrophoresis) need not be shown except in unusual circumstances. Limit photographs (particularly photomicrographs and electron 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.

Acknowledgments. The source of any financial support received for the work being published must be indicated in the Acknowledgments section. (It will be assumed that the absence of such an acknowledgment is a statement by the authors that no support was received.) The usual format is as follows: "This work was supported by Public Health Service grant CA-01234 from the National Cancer Institute."

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.

Appendixes. Appendixes, which contain supplementary material to aid the reader, are permitted. Titles, authors, and References 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, either full-length or Note style. 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. (i) Works listed in References. The References section must include all journal articles (both print and online), books and book chapters (both print and online), patents, theses and dissertations, and published conference proceedings (not abstracts; see below), as well as in-press journal articles, book chapters, and books (publication title must be given). All listed references **must** be cited in the text. Arrange the citations in **alphabetical order** (letter by letter, ignoring spaces and punctuation) by first author and **number consecutively**. Provide the names of **all** the authors for each reference. Abbreviate journal names according to *BIOSIS Serial Sources* (BIOSIS, Philadelphia, Pa., 2003). Cite each listed reference by number in the text.

Follow the styles shown in the examples below.

Print references:

1. **Arendsen, A. F., M. Q. Solimar, and S. W. Ragsdale.** 1999. Nitrate-dependent regulation of acetate biosynthesis and nitrate respiration by *Clostridium thermoaceticum*. J. Bacteriol. **181:**1489–1495.
2. **Cox, C. S., B. R. Brown, and J. C. Smith.** J. Gen. Genet., in press.* {*Article title is optional; journal title is mandatory.*}
3. **De Ley, J., M. Gillis, and J. Swings.** 1984. Family VI. *Acetobacteraceae* Gillis and De Ley 1980, 23^{VP}, p. 267–278. *In* N. R. Krieg and J. G. Holt (ed.), Bergey's manual of systematic bacteriology, vol. 1. Williams & Wilkins, Baltimore, Md.
4. **Dunne, W. M., Jr., F. S. Nolte, and M. L. Wilson.** 1997. Cumitech 1B, Blood cultures III. Coordinating ed., J. A. Hindler. American Society for Microbiology, Washington, D.C.
5. **Fitzgerald, G., and D. Shaw.** *In* A. E. Waters (ed.), Clinical microbiology, in press. EFH Publishing Co., Boston, Mass.* {*Chapter title is optional.*}
6. **Gershon, A. A., P. LaRussa, and S. P. Steinberg.** 1999. Varicella-zoster virus, p. 900–911. *In* P. R. Murray, E. J. Baron, M. A. Pfaller, F. C. Tenover, and R. H. Yolken (ed.), Manual of clinical microbiology, 7th ed. American Society for Microbiology, Washington, D.C.
7. **Green, P. N., D. Hood, and C. S. Dow.** 1984. Taxonomic status of some methylotrophic bacteria, p. 251–254. *In* R. L. Crawford and R. S. Hanson (ed.), Microbial growth on C1 compounds. Proceedings of the 4th International Symposium. American Society for Microbiology, Washington, D.C.
8. **Odell, J. C.** April 1970. Process for batch culturing. U.S. patent 484,363,770. {*Include the name of the patented item/process if possible.*}

9. **O'Malley, D. R.** 1998. Ph.D. thesis. University of California, Los Angeles. {*Title is optional.*}

*A reference to an in-press ASM publication should state the control number (e.g., JB 577-03) if it is a journal article or the name of the publication if it is a book.

Online references:

1. **Sullivan, C. J. (ed.).** 1999–2001. Fungi: an evolving electronic resource for the microbiological community. ASM Press. [Online.] http://link.asmusa.de/link/service/books/91090. Accessed 7 September 2001. {*For online-only books.*}
2. **van der Zeiss, L., and V. B. Danziger.** 1999. History of clinical microbiology. Clin. Microbiol. **100:**123–234. [Online.] {*For online versions of print journals.*}
3. **Zellnitz, F., and P. M. Foley.** 2 October 1998, posting {*or* revision} date. History of virology. Am. Virol. J. **1:**30–50. [Online.] http://www.avj.html. {*For online-only journals; page numbers may not be available.*}
4. **Zheng, Z., and J. Zou.** 5 September 2001. The initial step of the glycerolipid pathway: identification of glycerol-3-phosphate/dihydroxyacetone phosphate dual substrate acyltransferases in Saccharomyces cerevisiae. J. Biol. Chem. 10.1074/jbc.M104749200. {*For papers published online in manuscript form.*}

(ii) Items cited in the text. References to unpublished data, articles submitted for publication, meeting abstracts (including those published in journal supplements), personal communications, letters (irrespective of type) and authors' replies to letters, company publications, patent applications and patents pending, computer software, databases, and websites 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).

. . . in mitochondria (S. De Wit, C. Thioux, and N. Clumeck, Abstr. 34th Intersci. Conf. Antimicrob. Agents Chemother., abstr. 114, 1994).

. . . for other bacteria (A. X. Jones, personal communication).

. . . discussed previously (L. B. Jensen, A. M. Hammerum, R. L. Poulsen, and H. Westh, Letter, Antimicrob. Agents Chemother. **43:**724–725, 1999).

. . . discussed previously (S. L. W. On and P. A. R. Vandamme, Authors' Reply to Letter, J. Clin. Microbiol. **39:**2751–2752, 2001).

. . . the manufacturer (Sigma manual, Sigma Chemical Co., St. Louis, Mo.)

. . . this process (V. R. Smoll, 20 June 1999, Australian Patent Office). {*For non-U.S. patent applications, give the date of publication of the application.*}

. . . information found at the XYZ website (http://cbx_iou.pgr).

. . . the ABC program (version 2.2; Department of Microbiology, State University [http://www.stu.micro]).

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.

Notes

The Note format is intended for the presentation of brief observations that do not warrant full-length papers. Submit Notes in the same way as full-length papers. *They receive the same review, and they are not considered preliminary communications*.

Each Note must have an **abstract of no more than 50 words**. Do not use section headings in the body of the Note; report methods, results, and discussion in a single section. Paragraph lead-ins are permissible. The text should be kept to a minimum and if possible **should not exceed 1,000 words**; the number of figures and tables should also be kept to a minimum. **Materials and methods should be described in the text, not in the figure legends or table footnotes.** Present acknowledgments as in full-length papers, but do not use a heading. The References section is identical to that of full-length papers.

Minireviews

Minireviews are brief (**limit of 6 printed pages exclusive of references**) biographical profiles, historical perspectives, or summaries of developments in fast-moving areas. They must be based on published articles; they may address any subject within the scope of the journal.

Minireviews may be either solicited or proffered by authors responding to a recognized need. Irrespective of origin, Minireviews are subject to review, and three double-spaced copies of the manuscript should be sent directly to the ASM Journals Department. The cover letter should state whether the article was solicited and by whom.

Minireviews do not have abstracts. The body of the Minireview may either have section headings or be set up like a Note (see above).

Guest Commentaries

Guest Commentaries are communications written in response to invitations issued by the editors and concern relevant topics in bacteriology that are not necessarily covered by Minireviews. They should raise issues of interest to the scholarly community, initiate or focus discussion, and

propose needed position or consensus statements by the Academy of Microbiology, the National Academy of Sciences, and other leadership groups in research and education. Reviews of the literature, methods and other how-to papers, and responses targeted at a specific published paper are not appropriate. Guest Commentaries are subject to review.

The length may not exceed 4 printed pages. The format is like that of a Minireview (see above). Three double-spaced copies of the manuscript should be sent directly to the ASM Journals Department.

Errata

The Erratum section provides a means of correcting errors that occurred during the writing, typing, editing, or printing (e.g., a misspelling, a dropped word or line, or mislabeling in a figure) of a published article. Send Errata directly to the Journals Department, both on disk and in hard copy **(only one hard copy is necessary). Please see a recent issue for correct formatting.**

Authors' Corrections

The Author's 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.

For omission of an author's name, the authors of the article and the author whose name was inadvertently omitted must agree, in writing, to publication of the correction. Copies of the agreement letters must accompany the correction and be sent directly to the Journals Department. Send the correction both on disk and in hard copy **(only one hard copy is necessary). Please see a recent issue for correct formatting.**

Corrections of a scientific nature (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) must be sent, both on disk and in hard copy, directly to the editor who handled the article and must be accompanied by signed letters of agreement from all of the authors of the article. If the editor believes that publication is warranted, he will send the correction to the Journals Department for publication. Note that the addition of new data is not permitted.

Retractions

Retractions are reserved for major errors or breaches of ethics that, for example, may call into question the source of the data or the validity of the results and conclusions of an article. Send a Retraction and an accompanying explanatory letter *signed by all of the authors* directly to the editor in chief of the journal. The editor who handled the paper and the chairman of the ASM Publications Board will be consulted. If all parties agree to the publication and content of the Retraction, it will be sent to the Journals Department for publication.

ILLUSTRATIONS AND TABLES

The figure number and authors' names should be written on all figures, either in the margin or on the back (marked lightly with a soft pencil). For micrographs especially, the top should be indicated as well. Do **not** include the figure number in any lettering or labeling applied to the figure. This information belongs in the legend and in any case may need to be changed before the article is published.

Do not cite references by number in camera-ready copy; the numbering may change when the manuscript is copyedited.

Do not clasp figures to each other or to the manuscript with paper clips. Insert small figures in an envelope. To avoid damage in transit, do not submit illustrations larger than 8½ by 11 inches.

Illustrations in published articles will not be returned to authors.

Continuous-Tone and Composite Illustrations

When submitting continuous-tone photographs (e.g., polyacrylamide gels), keep in mind the journal page width: 3 5/16 inches for a single column and 6 7/8 inches for a double column (maximum). Include only the significant portion of an illustration. Photos must be of sufficient contrast to withstand the inevitable loss of contrast and detail inherent in the printing process. **Submit one photograph of each continuous-tone figure for each copy of the manuscript; photocopies are not acceptable**. If possible, the figures submitted should be the size they will appear when published so that no reduction is necessary. If they must be reduced, make sure that *all* elements, including labeling, can withstand reduction and remain legible.

If a figure is a composite of a continuous-tone photograph and a drawing or labeling, the **original composite** (i.e., not a photograph of the composite) **must be provided** for the printer. This original, labeled "printer's copy," may be sent with the modified manuscript to the editor. Composites should be mounted on lightweight flexible backing, not on heavy cardboard.

Electron and light micrographs must be direct copies of the original negative. Indicate the magnification with a scale marker on each micrograph.

Color Photographs and Illustrations

Because the process of placing ink on paper by using printing presses is different from that used to produce a

photo print or a laser print, some differences in color and contrast between the photo you submit and the photo printed in the journal will be evident. (Figures showing red or green fluorescence and those with a significant range of colors may be difficult or impossible to reproduce exactly.) To help our printer minimize the differences and produce an image of the highest possible quality, please identify on a photocopy of your color figure any areas where fine detail or a good color match is particularly important. Explain what must be evident on the figure; e.g., circle a group of cells and say "Individual cells (red spots) must be clearly differentiated in here." **Include this marked photocopy when sending the revised version of the manuscript to the editor at the modification stage.**

The cost of printing in color must be borne by the author. Adherence to the following guidelines will help to minimize costs and to ensure color reproduction that is as accurate as possible.

Keep in mind the journal page width (3⅝ inches for a single column and 6⅞ inches for a double column) and height (9⅛ inches) and submit figures at the size they should appear when published so that no reduction is necessary. Include only the significant portions of illustrations so that the number of printed pages containing color figures is minimized. Make sure that all edges are straight and corners are square. To reduce the cost, mount separate panels together as a composite "plate" when possible and add any necessary labels and tooling (i.e., thin white lines between the parts) that is of even width. Composites should be mounted on lightweight flexible backing so that they can be wrapped around a scanner drum. (If a composite is mounted on a heavy board and cannot be wrapped on the drum, a transparency will have to be produced, at additional cost.)

For optimal color reproduction, plates should comprise parts containing similar colors of similar lightness or darkness. If necessary, separate unlike photos on a single plate into two separate plates; this will increase the cost, but the color rendition will be more accurate since the two plates will be scanned separately.

See also "Computer-Generated Images" below.

Cover Photographs and Drawings

JB publishes photographs and drawings on the front cover. Invitations are issued to authors whose manuscripts are returned for modification or whose manuscripts have been accepted for publication in JB; material should be related to the work presented in the manuscript. Unsolicited material will also be considered, however. No material submitted for consideration will be returned to the author. Copyright for the chosen material must be transferred to ASM. A short description of the cover material will be included at the end of the table of contents or the author index of the issue. Technical specifications for submission will be provided with the invitation and are also available from ASM.

Computer-Generated Images

We encourage authors to submit figures digitally if possible. The use of digital files results in a better final product than does the use of hard-copy printouts. Images produced by authors' desktop systems are digitized and printed as patterns of dots. This presents problems for the reproduction of such prints in the journal because the printing process also requires that the images be broken up into a dot pattern. Performing this process twice results in degradation of image quality and resolution. It is possible to use prints produced by desktop systems, but they will have to be scanned slightly out of focus to avoid interference of the dot patterns, and thus ASM cannot guarantee the quality of their reproduction. It is preferable either to replace these images with continuous-tone photographs of the figures in question, which can be scanned normally and will produce high-quality printed photographs, or to submit illustrations electronically. *Should you be interested in electronic submission of art, please read the instructions provided below* ***and*** *those posted on the Internet at http://cjs.cadmus.com/da.*

At the time of submission, submit **only** hard-copy printouts of each figure. With the revised manuscript, submit **both** a hard copy of each figure and a disk. Never send the only copy of a file. The disk must be locked and labeled clearly with the manuscript control number and the name(s) of the file(s). Indicate whether the disk contains only figures or both text and figures. **Failure to clearly label the disk will result in a delay of publication.** The hard copy MUST match the figure on the disk *exactly* (both content and size). Failure to submit hard copy or submission of a copy that does not match the disk version exactly will result in a delay of publication. The type of software used and the number of images stored must be indicated on each disk.

Acceptable applications and file types. Acceptable applications and file types are given in the tables below. Images produced with other types of software will NOT be accepted; ASM will instead use the hard copy submitted with the disk.

Macintosh

Application	File type	
	Black and white	Color (CMYK)[a]
Adobe Illustrator		
6.0	EPS	EPS
7.0	EPS	EPS
8.0	EPS	EPS
9.0	EPS/TIFF	EPS/TIFF
10.0	EPS/TIFF	EPS/TIFF
Adobe InDesign 1.0	EPS	EPS
Adobe PageMaker 6.5	EPS	EPS
Adobe Photoshop		
4.0	TIFF	TIFF
5.0	TIFF	TIFF
5.0 LE	TIFF	N/A[b]
5.5	TIFF	TIFF
6.0	TIFF	TIFF

Continued on following page

Macintosh—Continued

Application	File type	
	Black and white	Color (CMYK)[a]
CA CricketGraph III 1.5.3	EPS	N/A[b]
ChemDraw Pro 5.0	EPS/TIFF	EPS/TIFF
ClarisDraw 1.0	EPS	N/A[b]
Corel Photo-Paint 8.0	TIFF	EPS
CorelDRAW		
6.0	EPS/TIFF	EPS
8.0	EPS/TIFF	EPS
Deneba Canvas		
5.0	EPS/TIFF	EPS
6.0	EPS/TIFF	EPS
7.0	EPS	EPS
8.0	EPS	EPS
Macromedia FreeHand		
7.0	EPS	EPS
8.0	EPS	EPS
9.0	EPS	EPS
PowerPoint '98 and 2001	PPT[c]	N/A[b]
Prism 3 by GraphPad	TIFF	N/A[b]
QuarkXpress	EPS	EPS
Synergy Kaleidagraph		
3.08	EPS	N/A[b]
3.51	EPS	N/A[b]

[a] Color graphics must be saved and printed in the CMYK mode, *not* RGB.
[b] ASM accepts only black-and-white, not color, graphics created with Kaleidagraph, ClarisDraw, Adobe Photoshop 5.0 LE, Prism 3 by GraphPad, CricketGraph, and PowerPoint.
[c] For instructions on saving PowerPoint files, refer to Cadmus's digital art website at http://cjs.cadmus.com/da.

Windows

Application	File type	
	Black and white	Color (CMYK)[a]
Adobe Illustrator		
7.0	EPS	EPS
8.0	EPS	EPS
9.0	EPS/TIFF	EPS/TIFF
Adobe InDesign 1.0	EPS	EPS
Adobe PageMaker 6.5	EPS	EPS
Adobe Photoshop		
4.0	TIFF	TIFF
5.0	TIFF	TIFF
5.0 LE	TIFF	N/A[b]
5.5	TIFF	TIFF
6.0	TIFF	TIFF
ChemDraw Pro 5.0	EPS/TIFF	EPS/TIFF
Corel Photo-Paint		
8.0	TIFF	EPS
9.0	TIFF	TIFF
CorelDRAW		
7.0	EPS/TIFF	EPS
8.0	EPS/TIFF	EPS
9.0	EPS	EPS
Deneba Canvas		
6.0	EPS/TIFF	EPS
7.0	EPS	EPS
Macromedia FreeHand		
7.0	EPS	EPS
8.0	EPS	EPS
9.0	EPS	EPS
PowerPoint '97, 2000, and XP	PPT[c]	N/A[b]
Prism 3 by GraphPad	TIFF	N/A[b]
QuarkXpress	EPS	EPS
SigmaPlot 8.01	EPS	EPS

[a] Color graphics must be saved and printed in the CMYK mode, *not* RGB.
[b] ASM accepts only black-and-white, not color, graphics created with Adobe Photoshop 5.0 LE, Prism 3 by GraphPad, and PowerPoint.
[c] For instructions on saving PowerPoint files, refer to Cadmus's digital art website at http://cjs.cadmus.com/da.

Media. The following media are accepted.

3.5-inch floppy disks
Iomega Zip disks
CD-ROMs
Iomega Jaz disks

Disks and CD-ROMs will not be returned to the author.

Compression. Images created with Macintosh applications may be compressed with Stuffit or any self-extracting compression software. Images created with Windows applications may be compressed with PKZIP, WINZIP, or any self-extracting compression software. Please indicate on the disk whether the file is compressed.

Minimum resolution. It is extremely important that a high enough resolution is used. Minimum resolutions are as follows:

300 dpi for gray scale and color
600 dpi for lettering
1,200 dpi for line art

Size. All graphics MUST be submitted at their **actual size**; that is, they should be 100% of their print dimensions so that no scaling is necessary.

Maximum width for a 1-column figure: 3 5/16 inches
Maximum width for a 2-column figure: 6 7/8 inches
Minimum width for a 2-column figure: 4 1/8 inches
Maximum depth: 9 1/16 inches

Assembly. Make sure that any multipanel figures are assembled into one file; i.e., rather than sending a separate file for each panel in a figure, assemble all panels in one piece and supply them as one file.

All final lettering, labeling, tooling, etc., MUST be incorporated into the final supplied figures. It cannot be added at a later date. Do *not* include the figure number in the image.

Fonts. To avoid font problems, set all type in Helvetica, Times New Roman, European PI, Mathematical PI, or Symbol. All fonts must be Type 1 PostScript. All type set in illustration programs should be converted to paths or outlines to ensure the quality of the type without requiring that any fonts be sent. Do NOT use complex paths, areas that require trapping, or RGB files.

We strongly recommend that authors check the acceptability of their digital images for production by running their files through Rapid Inspector, a tool provided by our printer, Cadmus, at the following URL: http://rapidinspector.cadmus.com/mw. Rapid Inspector is an easy-to-use Web-based application that takes only minutes to identify problems that may cause the file to fail at any point during the production process.

If you require further information, please send an e-mail inquiry to digitalart@cadmus.com. Inquiries will be answered within 48 h, during normal business hours.

Since the contents of computer-generated images can be manipulated for better clarity, the Publications Board at its May 1992 meeting indicated that a description of

the software/hardware used should be indicated in the figure legend(s).

Drawings

Submit graphs, charts, sequences, complicated chemical or mathematical formulas, diagrams, and other drawings as glossy photographs made from finished drawings not requiring additional artwork or typesetting. Computer-generated graphics produced on high-quality laser printers are also usually acceptable. No part of the graph or drawing should be handwritten. Both axes of graphs must be labeled.

When creating line art, please use the following guidelines:

1. Submit the art as close to its final size as possible. Most graphs can be reduced to one-column width (3⅝ inches). If the art is larger than it will appear in the journal, *all* elements in the figure should be large enough to withstand reduction.

2. Avoid using screens in line art. It can be difficult and time-consuming to reproduce these images without moiré patterns. Various pattern backgrounds are preferable to screens.

3. If you must provide an image that has screens in it:

- Submit the image at its final size. 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 20% or above 70% as they will fade out or become totally black upon scanning and reduction.

4. Use thick, solid lines that are no finer than 1 point in thickness.

5. No type should be smaller than 9 point at the final reduced size.

6. Avoid layering type directly over shaded or textured areas.

7. Avoid the use of reversed type (white lettering on a black background).

8. Avoid heavy letters, which tend to close up, and unusual symbols, which the printer may not be able to reproduce in the legend.

In figure ordinate and abscissa scales (as well as table column headings), **avoid 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}, M for 10^{6}, etc.). A complete listing of SI symbols can be found in the International Union of Pure and Applied Chemistry (IUPAC) "Manual of Symbols and Terminology for Physicochemical Quantities and Units" (Pure Appl. Chem. **21:**3–44, 1970). Thus, representation of 20,000 cpm on a figure ordinate should be made by the number 20 accompanied by the label kcpm.

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 would be "2" and the label would 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

Nucleic acid sequences of limited length which are the primary subject of a study may be presented freestyle in the most effective format. Longer nucleic acid sequences must be presented in the following format to conserve space. Submit the sequence as camera-ready copy with dimensions of 8½ by 11 inches (or slightly less) in standard (portrait) orientation. 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. If possible, lines of nucleic acid sequence should be further subdivided into blocks of 10 or 20 nucleotides by spaces within the sequences or by marks above it. Uppercase and lowercase letters may be used to designate the exon-intron structure, transcribed regions, etc., if the lowercase letters remain legible at a 6-inch 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, 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

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

Type each table on a separate page. 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 in 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. A well-constructed table is shown below.

TABLE 1. Induction of creatinine deiminase in *C. neoformans* and *C. bacillisporus*

N source[a]	*C. neoformans* NIH 12		*C. bacillisporus* NIH 191	
	Total enzyme[b]	Sp act (U/mg of protein)	Total enzyme	Sp act (U/mg of protein)
Ammonia	0.58	0.32	0.50	0.28
Glutamic acid	5.36	1.48	2.18	0.61
Aspartic acid	2.72	0.15	1.47	0.06
Arginine	3.58	2.18	3.38	2.19
Creatinine	97.30	58.40	104.00	58.30

[a] The inoculum was grown in glucose broth with ammonium sulfate, washed twice, and then transferred into the media with the N sources listed above.
[b] Enzyme units in cell extract obtained from ca. 10^{10} cells.

Tables that are to be typeset should not contain artwork, chemical structures, or shading. Tables that contain such material should be submitted as "camera-ready" copy; i.e., they can be photographically reproduced for publication. Camera-ready tables should not be hand lettered and must be carefully prepared to conform with the style of the journal. The advantage of submitting camera-ready copy is that the material will appear exactly as envisioned by the author and no second proofreading is necessary. This is particularly advantageous when there are long, complicated tables and when the division of material and spacing are important.

NOMENCLATURE

Chemical and Biochemical Nomenclature

The recognized authority for the names of chemical compounds is *Chemical Abstracts* (Chemical Abstracts Service, Ohio State University, Columbus) and its indexes. *The Merck Index*, 13th ed. (Merck & Co., Inc., Whitehouse Station, N.J., 2001), is also an excellent source. For guidelines to the use of biochemical terminology, consult *Biochemical Nomenclature and Related Documents* (1978; reprinted for The Biochemical Society, London, England) and the instructions to authors of the *Journal of Biological Chemistry* and the *Archives of Biochemistry and Biophysics* (first issues of each year).

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, N.Y., 1992). 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, and express enzyme activity either in katals (preferred) or in the older system of micromoles per minute.

Nomenclature of Microorganisms

Binary names, consisting of a generic name and a specific epithet (e.g., *Escherichia coli*), must 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 taxa (phyla, classes, orders, families, genera, species, and subspecies) are printed in italics and should be underlined (or 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* serovar Typhimurium. For other information regarding serovar designations, see *Identification and Serotyping of Salmonella and an Update of the Kaufmann-White Scheme* (A. C. McWhorter-Murlin and F. W. Hickman-Brenner, Centers for Disease Control and Prevention, Atlanta, Ga.) and *Antigenic Formulas of the Salmonella Serovars* (M. Y. Popoff and L. Le Minor, WHO Collaborating Centre for Reference and Research on *Salmonella*, Institut Pasteur, Paris, France, 1997).

The spelling of bacterial names should follow the *Approved Lists of Bacterial Names* (amended edition) (V. B. D. Skerman, V. McGowan, and P. H. A. Sneath, ed., American Society for Microbiology, 1989) and the validation 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: Bacterial Nomenclature Up to Date (http://www.dsmz.de/bactnom/bactname.htm) and List of Bacterial Names with Standing in Nomenclature (http://www.bacterio.cict.fr). If there is reason to use a name that does not have standing in nomenclature, the name should be enclosed in quotation

marks and an appropriate statement concerning the nomenclatural status of the name should be made in the text.

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, 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. Plasmids are named with a lowercase "p" followed by the designation in uppercase letters and numbers. To avoid the use of the same designation as that of a widely used strain or plasmid, check the designation against a publication database such as Medline.

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 by the Nomenclature Committee of the ASM Publications Board.

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. The guidelines that follow are based on the recommendations of Demerec et al. (Genetics **54:**61–76, 1966).

(i) Phenotypic designations must be used when mutant loci have not been identified or mapped. They can also be used to identify the protein product of a gene, e.g., the OmpA protein. Phenotypic designations generally consist of three-letter symbols; these are *not* italicized, and the first letter of the symbol is capitalized. It is preferable to use roman or arabic numerals (instead of letters) to identify a series of related phenotypes. Thus, nucleic acid polymerase mutants might be designated Pol1, Pol2, Pol3, etc. Wild-type characteristics can be designated with a superscript plus (Pol^+), and, when necessary for clarity, negative superscripts (Pol^-) can be used to designate mutant characteristics. Lowercase superscript letters may be used to further delineate phenotypes (e.g., Str^s for streptomycin sensitivity). Phenotypic designations should be defined.

(ii) Genotypic designations are also indicated by three-letter locus symbols. In contrast to phenotypic designations, these are lowercase italic (e.g., *ara his rps*). If several loci govern related functions, these are distinguished by italicized capital letters following the locus symbol (e.g., *araA araB araC*). Promoter, terminator, and operator sites should be indicated as described by Bachmann and Low (Microbiol. Rev. **44:**1–56, 1980), e.g., *lacZp*, *lacAt*, and *lacZo*.

(iii) Wild-type alleles are indicated with a superscript plus (*ara*$^+$ *his*$^+$). A superscript minus is not used to indicate a mutant locus; thus, one refers to an *ara* mutant rather than an *ara*$^-$ strain.

(iv) Mutation sites are designated by placing serial isolation numbers (allele numbers) after the locus symbol (e.g., *araA1 araA2*). If only a single such locus exists or if it is not known in which of several related loci the mutation has occurred, a hyphen is used instead of the capital letter (e.g., *ara-23*). It is essential in papers reporting the isolation of new mutants that allele numbers be given to the mutations. For *Escherichia coli*, there is a registry of such numbers: *E. coli* Genetic Stock Center, Department of Biology, Yale University, New Haven, CT 06511-5188. For the genus *Salmonella*, the registry is *Salmonella* Genetic Stock Center, Department of Biology, University of Calgary, Calgary, Alberta T2N 1N4, Canada. For the genus *Bacillus*, the registry is the *Bacillus* Genetic Stock Center, Ohio State University, Columbus, OH 43210.

(v) The use of superscripts with genotypes (other than + to indicate wild-type alleles) should be avoided. Designations indicating amber mutations (Am), temperature-sensitive mutations (Ts), constitutive mutations (Con), cold-sensitive mutations (Cs), production of a hybrid protein (Hyb), and other important phenotypic properties should follow the allele number [e.g., *araA230* (Am) *hisD21*(Ts)]. All other such designations of phenotype must be defined at the first occurrence. If superscripts *must* be used, they must be approved by the editor and they must be defined at the first occurrence.

Subscripts may be used in two situations. Subscripts may be used to distinguish between genes (having the same name) from different organisms or strains, e.g., $his_{E.\ coli}$ or $his_{\text{K-12}}$ for the *his* genes of *E. coli* or strain K-12 in another species or strain, respectively. An abbreviation may also be used if it is explained. Similarly, a subscript is also used to distinguish between genetic elements that have the same name. For example, the promoters of the *gln* operon can be designated $glnAp_1$ and $glnAp_2$. This form departs slightly from that recommended by Bachmann and Low (e.g., *desC1p*).

(vi) Deletions are indicated by the symbol Δ placed before the deleted gene or region, e.g., Δ*trpA432*, Δ(*aroP-aceE*)*419*, or Δ*his*(*dhuA hisJ hisQ*)*1256*. Similarly, other symbols can be used (with appropriate definition). Thus, a fusion of the *ara* and *lac* operons can be shown as Φ(*ara-lac*)*95*. Likewise, Φ(*araB′- lacZ*$^+$)*96* indicates that the fusion results in a truncated *araB* gene fused to an intact *lacZ* gene, and Φ(*malE- lacZ*)*97*(Hyb) shows that a hybrid protein is synthesized. An inversion is shown as IN(*rrnD-rrnE*)*1*. An insertion of an *E. coli his* gene into plasmid pSC101 at zero kilobases (0 kb) is shown as pSC101 Ω(0kb::K-12*hisB*)*4*. An alternative designation of an insertion can be used in simple cases, e.g., *galT236*::Tn*5*. The number *236* refers to the locus of the

insertion, and if the strain carries an additional *gal* mutation, it is listed separately. Additional examples, which utilize a slightly different format, can be found in the papers by Campbell et al. and Novick et al. cited below. It is important in reporting the construction of strains in which a mobile element was inserted and subsequently deleted that this fact be noted in the strain table. This can be done by listing the genotype of the strain used as an intermediate in a table footnote or by making a direct or parenthetical remark in the genotype, e.g., (F^-), ΔMu *c*ts, or *mal*::ΔMu *c*ts::*lac*. In setting parenthetical remarks within the genotype or dividing the genotype into constituent elements, parentheses and brackets are used without special meaning; brackets are used outside parentheses. To indicate the presence of an episome, parentheses (or brackets) are used (λ, F^+). Reference to an integrated episome is indicated as described for inserted elements, and an exogenote is shown as, for example, W3110/F′8(*gal*$^+$).

Any deviations from standard genetic nomenclature should be explained in Materials and Methods or in a table of strains. For information about the symbols in current use, consult Berlyn (Microbiol. Mol. Biol. Rev. **62:**814–984, 1998) for *E. coli* K-12, Sanderson and Roth (Microbiol. Rev. **52:**485–532, 1988) for *Salmonella* serovar Typhimurium, Holloway et al. (Microbiol. Rev. **43:**73–102, 1979) for the genus *Pseudomonas*, and Piggot and Hoch (Microbiol. Rev. **49:**158–179, 1985) for *Bacillus subtilis*.

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, homologous 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 *E. 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://cgsc.biology.yale.edu/cgsc.html). The Center's relational database can also be searched via Telnet; for access, send a request to berlyn@cgsc.biology.yale.edu. 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.

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

Strain designations. Do not use the genotype as a name (e.g., "subsequent use of *leuC6* for transduction"). If a strain designation has not been chosen, select an appropriate word combination (e.g., "another strain containing the *leuC6* mutation").

Bacteriophages. The genetic nomenclature for phages differs from that for bacteria and tends to have separate conventions for each phage. Genetic symbols may be one, two, or three letters and are italicized. For example, a mutant strain of λ might be designated λ *A*am11 *int*2 *red*114 *c*I857; this strain carries mutations in genes *c*I, *int*, and *red* and an amber-suppressible (am) mutation in gene *A*. Phenotypic symbols and designations of gene products are not italicized (e.g., "the Spi phenotype" or "Int protein"), and superscript plus and minus symbols can be used to indicate wild-type and mutant phenotypes, respectively. Host DNA insertions into phages should be delineated by square brackets, and the genetic symbols and designations for such inserted DNA should conform to those used for the host genome. Lists of gene symbols for several phages can be found in *Genetic Maps*, 5th ed. (S. J. O'Brien, ed., Cold Spring Harbor Laboratory, Cold Spring Harbor, N.Y., 1990). Relevant references for some of the more widely studied phages are as follows: for phage λ, Daniels et al. (p. 469–515, *in* R. W. Hendrix, J. W. Roberts, F. W. Stahl, and R. A. Weisberg, ed., *Lambda II*, Cold Spring Harbor Laboratory, Cold Spring Harbor, N.Y., 1983); for phage T4, Kutter et al. (p. 491–519, *in* J. D. Karam, ed., *Molecular Biology of Bacteriophage T4*, American Society for Microbiology, Washington, D.C., 1994); and for phage T7, Dunn and Studier (J. Mol. Biol. **166:**477-535, 1983).

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

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). 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-prime factors, and of Roberts (Nucleic Acids Res. **17:**r347–r387, 1989) for restriction enzymes and their

isoschizomers should be used. 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). The above-referenced article also gives 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 p. 207–209 in *How To Write and Publish a Scientific Paper*, 5th 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*, 1978) 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, Leu, etc.) may also be used.

It is strongly recommended that all abbreviations except those listed below be introduced in the first paragraph in Materials and Methods. Alternatively, 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, GTP, etc. (for the respective 5′ phosphates of adenosine and other nucleosides) (add 2′-, 3′-, or 5′- when needed for contrast); ATPase, dGTPase, etc. (adenosine triphosphatase, 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), poly(dT), etc. (polyadenylic acid, 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); and 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)
tr (trace)
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 μμ. 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 appropriate SI units.

Isotopically Labeled Compounds

For simple molecules, isotopic labeling is indicated in the chemical formula (e.g., $^{14}CO_2$, ^3H_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 that 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 introduced 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	[γ-^{32}P]ATP
L-[*methyl*-^{14}C]methionine	UDP-[U-^{14}C]glucose
[2,3-^{3}H]serine	*E. coli* [^{32}P]DNA
[α-^{14}C]lysine	fructose 1,6-[1-^{32}P]bisphosphate

This journal follows the same conventions for isotopic labeling as the *Journal of Biological Chemistry*, and more detailed information can be found in the instructions to authors of that journal (first issue of each year).

For your convenience, these Instructions are also available through the Internet at the following address: http://www.journals.asm.org.