

MOLECULAR AND CELLULAR BIOLOGY

2008 INSTRUCTIONS TO AUTHORS*

SCOPE

Molecular and Cellular Biology (MCB) is devoted to the advancement and dissemination of fundamental knowledge concerning the molecular biology of eukaryotic cells, of both microbial and higher organisms. Significant papers on cellular morphology and function, genome organization, regulation of genetic expression, morphogenesis, and somatic cell genetics (not simple linkage analyses) are invited for submission. In most cases, reports that emphasize methods and nucleotide sequence data alone (without experimental documentation of the functional significance of the sequence) will not be considered.

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 may be of assistance.

Most manuscripts concerning virus-infected cells should be submitted to the *Journal of Virology*. Those in which emphasis is clearly on the cell, with the virus being incidental, are appropriate for MCB.

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.

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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 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 mentioned above. Members of the ASM Publications Board will evaluate the rare manuscript that might 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.asm.org/Policy/index.asp>.

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 (initial submission and any subsequent versions), including appropriate citations and acknowledgments, and must also have agreed that the corresponding author has the authority to act on their behalf in all matters pertaining to publication of the manuscript. The corresponding author is responsible for obtaining such agreements and for informing the coauthors of the manuscript's status throughout the submission, review, and publication process. For Authors' Corrections and Retractions, signed letters of agreement from all of the authors must be submitted (see p. 12).

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.

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* Shading indicates material that has been added or significantly updated.

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It is incumbent upon the author to acknowledge any prior publication, including his own articles, of the data

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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 (online posting) date of the accepted manuscript. The accession numbers should be included in a separate paragraph at the end of the Materials and Methods section. 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 should provide the sequence data as supplemental material.

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 and reasonable.

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Analyses should specify the database, and the date of each analysis should be indicated as, e.g., January 2008. If relevant, the version of the software used should be specified.

See p. 14 for nucleic acid sequence formatting instructions.

The URLs of the databases mentioned above are as follows: DNA Data Bank of Japan (DDBJ), <http://www.ddbj.nig.ac.jp/>; EMBL Nucleotide Sequence Database (EMBL), <http://www.ebi.ac.uk/embl/>; and GenBank, National Center for Biotechnology Information (GenBank), <http://www.ncbi.nlm.nih.gov/>.

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The URLs of the databases mentioned above are as follows: Gene Expression Omnibus (GEO), <http://www.ncbi.nlm.nih.gov/projects/geo/>; ArrayExpress, [http://www.ebi.ac.uk/arrayexpress/?#ae=main\[0\]](http://www.ebi.ac.uk/arrayexpress/?#ae=main[0]); and Center for Information Biology Gene Expression Database (CIBEX), <http://cibex.nig.ac.jp/index.jsp>.

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MCB expects authors to deposit important microbial 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.

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by the editors and the ASM Journals Department.

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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.

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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.

Type every portion of the manuscript double spaced (a minimum of 6 mm between lines), including figure legends, table footnotes, and References, and number all pages in sequence, including the abstract, figure legends, and tables. Place the last two items after the References section. **Manuscript pages should have line numbers; manuscripts without line numbers may be editorially rejected by the editor, with a suggestion of resubmission after line numbers are added.** The font size should be no smaller than 12 points. It is recommended that the following sets of characters be easily distinguishable in the manuscript: the numeral zero (0) and the letter “oh” (O); the numeral one (1), the letter “el” (l), and the letter “eye” (I); and a multiplication sign (\times) 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 8½ by 11 inches (ca. 21.6 by 28 cm). Italicize or underline any words that should appear in italics, and indicate paragraph lead-ins in bold type.

Authors who are unsure of proper English usage should have their manuscripts checked by someone proficient in the English language.

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

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 (see “Correspondent footnote” below).

Also include on the title page the word count for the Materials and Methods section and the combined word count for the introduction, Results, and Discussion sections.

Study group in byline. A study group, surveillance team, working group, consortium, or the like (e.g., the Active Bacterial Core Surveillance Team) may be listed as a coauthor in the byline if its contributing members satisfy the requirements for authorship and accountability as described in these Instructions. The names (and

institutional affiliations if desired) of the contributing members may be given in a footnote keyed to the study group name in the byline or as a separate paragraph in Acknowledgments.

If the contributing members of the group associated with the work do not fulfill the criteria of substantial contribution to and responsibility for the paper, the group may not be listed in the author byline. Instead, it and the names of its contributing members may be listed in the Acknowledgments section.

Correspondent footnote. The complete mailing address, a single telephone number, a single fax number, and a single e-mail address for the corresponding author should be included on the title page of the manuscript. This information will be published in the article as a footnote to facilitate communication, and the e-mail address will be used to notify the corresponding author of the availability of proofs and, later, of the PDF file of the published article.

Abstract. Limit the abstract to **200 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 and 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).” 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, plasmids, etc.

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 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. 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 additional 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 standard article or Rapid Report 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) **References listed in the References section.** The References section must include all journal articles (both print and online), books and book chapters (both print and online), patents, theses and dissertations, published conference proceedings, meeting abstracts from published abstract books or journal supplements, letters (to the editor), and company publications, as well as in-press journal articles, book chapters, and books (publication title must be given). 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. All listed references **must** be cited parenthetically by number in the text. Since title and byline information that is downloaded from PubMed does not always show accents, italics, or special characters, authors should refer to the PDF files or hard-copy versions of the articles and incorporate the necessary corrections in the submitted manuscript. Abbreviate journal names according to the *List of Journals Indexed for Medline* (National Library of Medicine, National Institutes of Health, 2007; available at <ftp://nlmpubs.nlm.nih.gov/online/journals/ljiweb.pdf>), the primary source for ASM style.

Follow the styles shown in the examples below for 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. **da Costa, M. S., M. F. Nobre, and F. A. Rainey.** 2001. Genus I. *Thermus* Brock and Freeze 1969, 295,^{AL} emend. Nobre, Trüper and da Costa 1996b, 605, p. 404–414. *In* D. R. Boone, R. W. Castenholz, and G. M. Garrity (ed.), *Bergey's manual of systematic bacteriology*, 2nd ed., vol. 1. Springer, New York, NY.
4. **Elder, B. L., and S. E. Sharp.** 2003. Cumitech 39, Competency assessment in the clinical laboratory. Coordinating ed., S. E. Sharp. ASM Press, Washington, DC.
5. **Falagas, M. E., and S. K. Kasiakou.** 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.}

6. **Fitzgerald, G., and D. Shaw.** In A. E. Waters (ed.), *Clinical microbiology*, in press. EFH Publishing Co., Boston, MA.* {Chapter title is optional.}
7. **Forman, M. S., and A. Valsamakis.** 2003. Specimen collection, transport, and processing: virology, p. 1227–1241. In P. R. Murray, E. J. Baron, M. A. Tenover, J. H. Tenover, and R. H. Tenover (ed.), *Manual of clinical microbiology*, 8th ed. ASM Press, Washington, DC.
8. **Garcia, C. O., S. Paira, R. Burgos, J. Molina, J. F. Molina, and C. Calvo.** 1996. Detection of salmonella DNA in synovial membrane and synovial fluid from Latin American patients. *Arthritis Rheum.* **39**(Suppl.):S185. {Meeting abstract published in journal supplement.}
9. **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, DC.
10. **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; the patent number is mandatory.}
11. **O'Malley, D. R.** 1998. Ph.D. thesis. University of California, Los Angeles. {Title is optional.}
12. **Rotimi, V. O., N. O. Salako, E. M. Mohaddas, and L. P. Philip.** 2005. Abstr. 45th Intersci. Conf. Antimicrob. Agents Chemother., abstr. D-1658. {Abstract title is optional.}
13. **Smith, D., C. Johnson, M. Maier, and J. J. Maurer.** 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.}
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.}

*A reference to an in-press ASM publication should state the control number (e.g., MCB00577-08) if it is a journal article or the name of the publication if it is a book.

Online references must provide the same information that print references do, but some variation is allowed. For online journal articles, posting or revision dates may replace the year of publication, and a DOI or URL may be provided in addition to or in lieu of volume and page numbers. Some examples follow.

1. **Charlier, D., and N. Glansdorff.** September 2004, posting date. Chapter 3.6.1.10, Biosynthesis of arginine and polyamines. In R. Curtiss III et al. (ed.),

EcoSal—Escherichia coli and Salmonella: cellular and molecular biology. ASM Press, Washington, DC. <http://www.ecosal.org/ecosal/index.jsp>. {Note that each chapter has its own posting date.}

2. **Dionne, M. S., and D. S. Schneider.** 2002. Screening the fruitfly immune system. *Genome Biol.* **3**:REVIEWS1010. <http://genomebiology.com/2002/3/4/reviews/1010>.
3. **Smith, F. X., H. J. Merianos, A. T. Brunger, and D. M. Engelman.** 2001. Polar residues drive association of polyleucine transmembrane helices. *Proc. Natl. Acad. Sci. USA* **98**:2250–2255. doi: 10.1073/pnas.041593698.
4. **Winnick, S., D. O. Lucas, A. L. Hartman, and D. Toll.** 2005. How do you improve compliance? *Pediatrics* **115**:e718–e724.

NOTE: A posting or accession date is required for any online reference that is periodically updated or changed.

(ii) References cited in the text. References to unpublished data, manuscripts submitted for publication, unpublished conference presentations (e.g., a report or poster that has not appeared in published conference proceedings), personal communications, patent applications and patents pending, computer software, databases, and websites (home pages) 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, posters, etc.}

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

... available in the GenBank database (<http://www.ncbi.nlm.nih.gov/Genbank/index.html>).

... using ABC software (version 2.2; Department of Microbiology, State University [<http://www.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.

(iii) References related to supplemental material. References that are related **only** to supplemental material hosted by ASM or posted on a personal/institutional website should not be listed in the References section of an article; include them with the supplemental material itself.

(iv) **Referencing publish-ahead-of-print manuscripts.** Citations of ASM Accepts manuscripts should look like the following example.

Wang, G. G., M. P. Pasillas, and M. P. Kamps. 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.

If an author of an article cites an ASM Accepts manuscript in his paper but wishes at the proof stage to change the reference entry to that for the published article, the following style should be used:

Wang, G. G., M. P. Pasillas, and M. P. Kamps. 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. (Subsequently published, *Mol. Cell. Biol.* **26**:3902–3916, 2006.)

Other journals may use different styles for their publish-ahead-of-print manuscripts, but citation entries must include the following information: author name(s), posting date, title, journal title, and volume and page numbers and/or DOI. The following is an example:

Zhou, F. X., H. J. Merianos, A. T. Brunger, and D. M. Engelman. 13 February 2001, posting date. Polar residues drive association of poly-leucine transmembrane helices. *Proc. Natl. Acad. Sci. USA* doi:10.1073/pnas.041593698.

Rapid Reports

The Rapid Report format is intended for accelerated review (usually within ca. 14 days) and presentation of *short* communications that are of *significant* interest to the broad readership of MCB. Rapid Report articles should describe definitive observations of outstanding interest that have the potential to open up new avenues of research.

Reports are limited to 4 typeset pages (inclusive of text, references, figures, and tables). The abstract is limited to 150 words. The format should be the same as that for regular articles (see above) except that the results and discussion should be combined into a single section entitled “Results and Discussion.”

Rapid Reports must be submitted via Rapid Review. The cover letter must specify that the manuscript is intended for the Rapid Report route. If approved for this route by the editor in chief, the manuscript will be transferred to an appropriate MCB editor and reviewed according to the same standards applied for traditional manuscripts. If accepted for publication, the manuscript will be posted as soon as possible (see “Publish ahead of

Print” above) and scheduled for the next available issue. An acceptance letter and copyright agreement will be mailed to the corresponding author, and the manuscript will be copyedited. Proofs will be made available electronically as for regular articles.

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 MCB.

Minireviews may be either solicited or proffered by authors responding to a recognized need. Irrespective of origin, Minireviews are subject to review and should be submitted via Rapid Review. The cover letter should state whether the article was solicited and by whom.

Minireviews do not have abstracts. In the Abstract section of the submission form, put “Not Applicable.” The body of the Minireview may have section headings, paragraph lead-ins, or both.

Guest Commentaries

Guest Commentaries are communications written in response to invitations issued by the editors and concern topics of interest to the broad readership of MCB that are not necessarily covered by Minireviews. They should raise issues of interest to the scholarly community, initiate or focus discussion, or propose position or consensus statements for 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, and the format is like that of a Minireview (see above). Commentaries should be submitted via Rapid Review.

Letters to the Editor

Letters to the Editor are intended only for comments on final, typeset articles published in the journal (*not* on publish-ahead-of-print manuscripts) and must cite published references to support the writer’s argument.

Letters may be **no more than 500 words long and must be typed double spaced**. Refer to a recently published Letter for correct formatting. Note that authors and affiliations are listed at the foot of the Letter. Provide only the primary affiliation for each author.

All Letters to the Editor must be submitted electronically, and the manuscript type (Comment Letter) must be selected from the drop-down list in the submission form. The cover letter should state the volume and issue in which the article was published, the title of the article, and the last name of the first author. In the Abstract section of the submission form, put “Not applicable.” Letters to the Editor do not have abstracts. The Letter must have a title, which must appear on the manuscript

and on the submission form. Figures and tables should be kept to a minimum.

The Letter will be sent to the editor who handled the article in question. If the editor believes that publication is warranted, he will solicit a reply from the corresponding author of the article and make a recommendation to the editor in chief. Final approval for publication rests with the editor in chief.

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

Errata

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. Submit Errata via Rapid Review (see "How To Submit Manuscripts," above). In the Abstract section of the submission form (a required field), put "Not Applicable." Upload the text of your Erratum as an MS Word file. 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 (e.g., an incorrect unit of measurement or order of magnitude used throughout, contamination of one of numerous cultures, or misidentification of a mutant strain, causing erroneous data for only a portion [noncritical] of the study). *Note that the addition of new data is not permitted.*

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

Submit an Author's Correction via Rapid Review (see "How To Submit Manuscripts," above). In the submission form, select Erratum as the manuscript type; there is no separate selection in Rapid Review for Authors' Corrections, but your Correction will be published as such if appropriate. In the Abstract section of the submission form (a required field), put "Not Applicable." Upload the text of your Author's Correction as an MS Word file. Please see a recent issue for correct formatting. Signed letters of agreement must be supplied as supplemental material (scanned PDF files).

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. Submit Retractions via Rapid Review (see "How To Submit Manuscripts," above). In the Abstract section of

the submission form (a required field), put "Not Applicable." Upload the text of your Retraction as an MS Word file. Letters of agreement signed by all of the authors must be supplied as supplemental material (scanned PDF files). The Retraction will be assigned to the editor in chief of the journal, and 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

Digital files that are acceptable for production (see below) must be provided for all illustrations on return of the modified manuscript. (On initial submission, the entire paper may be submitted in PDF format.)

We strongly recommend that before returning their modified manuscripts, authors check the acceptability of their digital images for production by running their files through Rapid Inspector, a tool provided at the following URL: <http://rapidinspector.cadmus.com/RapidInspector/zmw/index.jsp>. Rapid Inspector is an easy-to-use Web-based application that identifies file characteristics that may render the image unusable for production.

Illustrations may be continuous-tone images, line drawings, or composites. Color graphics may be submitted, but the cost of printing in color must be borne by the author. Suggestions about how to reduce costs and ensure accurate color reproduction are given below.

The preferred format for tables is MS Word; however, WordPerfect and Acrobat PDF are also acceptable (see the section on tables below).

Application	Macintosh	
	Black and white	Color (CMYK) ^a
Adobe Illustrator 6.0, 7.0, 8.0, 9.0, 10.0, 11.0 CS	EPS	EPS
Adobe InDesign 1.0	EPS	EPS
Adobe PageMaker 6.5	EPS	EPS
Adobe Photoshop 4.0, 5.0, 5.5, 6.0, 7.0, 8.0 CS	TIFF	TIFF
Adobe Photoshop 5.0 LE	TIFF	N/A ^b
ChemDraw Pro 5.0	EPS/TIFF	EPS/TIFF
Corel Photo-Paint 8.0	TIFF	EPS
CorelDRAW 6.0, 8.0	EPS/TIFF	EPS
Deneba Canvas 6.0, 7.0, 8.0	EPS/TIFF	EPS
Macromedia FreeHand 7.0, 8.0, 9.0	EPS	EPS
PowerPoint 98, 2001	PPT ^c	N/A ^b
Prism 3 by GraphPad	TIFF	N/A ^b
Synergy Kaleidagraph 3.08, 3.51	EPS	N/A ^b

^aColor graphics must be saved and printed in the CMYK mode, *not* RGB.

^bASM accepts only black-and-white, not color, graphics created with Kaleidagraph, Adobe Photoshop 5.0 LE, Prism 3 by GraphPad, and PowerPoint.

^cFor instructions on saving PowerPoint files, refer to the Cadmus digital art website at <http://art.cadmus.com/da/index.jsp>.

Windows

Application	File type	
	Black and white	Color (CMYK) ^a
Adobe Illustrator 7.0, 8.0, 9.0, 10.0, 11.0 CS	EPS	EPS
Adobe InDesign 1.0	EPS	EPS
Adobe PageMaker 6.5	EPS	EPS
Adobe Photoshop 4.0, 5.0, 5.5, 6.0, 7.0, 8.0 CS	TIFF	TIFF
Adobe Photoshop 5.0 LE	TIFF	N/A ^b
ChemDraw Pro 5.0	EPS/TIFF	EPS/TIFF
Corel Photo-Paint 8.0, 9.0	TIFF	EPS
CorelDRAW 7.0, 8.0, 9.0	EPS/TIFF	EPS
Deneba Canvas 6.0, 7.0	EPS/TIFF	EPS
Macromedia FreeHand 7.0, 8.0, 9.0	EPS	EPS
PowerPoint 97, 2000, XP	PPT ^c	N/A ^b
Prism 3 by GraphPad	TIFF	N/A ^b
SigmaPlot 8.01	EPS	EPS

^aColor graphics must be saved and printed in the CMYK mode, *not* RGB.
^bASM accepts only black-and-white, not color, graphics created with Adobe Photoshop 5.0 LE, Prism 3 by GraphPad, and PowerPoint.
^cFor instructions on saving PowerPoint files, refer to the Cadmus digital art website at <http://art.cadmus.com/da/index.jsp>.

Image Manipulation

Computer-generated images may be processed only minimally. Processing (e.g., changing contrast, brightness, or color balance) is acceptable only if applied to all parts of the image, as well as to the controls, equally, and descriptions of all such adjustments and the tools used (both hardware and software) must be provided in the manuscript. Unprocessed data and files must be retained by the authors and be provided to the editor on request.

Illustrations

File types and formats. As mentioned above, **illustrations may be supplied as PDF files for reviewing purposes only on initial submission; in fact, we recommend this option to minimize file upload time. At the modification stage, production quality digital files must be submitted:** TIFF or EPS files from supported applications or PowerPoint files (black and white only). Except for figures produced in PowerPoint, all graphics submitted with modified manuscripts must be bitmap, grayscale, or CMYK (*not* RGB). Halftone images (those with various densities or shades) must be grayscale, *not* bitmap.

Color PowerPoint files are *not* accepted because the application, designed for developing on-screen computer presentations, uses the RGB color mode whereas the printing process uses the CMYK color mode. Colors that are represented in a PowerPoint image may not be reproducible on a printing press. Although black-and-white Microsoft PowerPoint files are accepted, we do *not* recommend the use of PowerPoint. PowerPoint requires users to pay close attention to the fonts used in their images (see the section on fonts below). If instructions for fonts are not followed *exactly*, images prepared for publication are subject to missing characters, improperly converted characters, or shifting/obscuring of elements

or text in the figure. **Use of PowerPoint is therefore not recommended for either color or black-and-white illustrations.**

Acceptable file types and formats for production are given in the charts above. More-detailed instructions for preparing illustrations are available at <http://art.cadmus.com/da/index.jsp>. Please review this information before preparing your files. If you require additional information, please send an e-mail inquiry to digitalart@cadmus.com.

Minimum resolution. It is extremely important that a high enough resolution is used. Any imported images must be at the correct resolution before they are placed. Note, however, that the higher the resolution, the larger the file and the longer the upload time. Publication quality will *not* be improved by using a resolution higher than the minimum. Minimum resolutions are as follows:

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

Size. All graphics **MUST 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.

- Maximum width for a 1-column figure: 3⁵/₁₆ inches (ca. 8.4 cm)
- Maximum width for a 2-column figure: 6⁷/₈ inches (ca. 17.4 cm)
- Minimum width for a 2-column figure: 4¹/₄ inches (10.8 cm)
- Maximum height: 9¹/₁₆ inches (23.0 cm)

Contrast. Illustrations must contain sufficient contrast to withstand the inevitable loss of contrast and detail inherent in the printing process. See also “Color illustrations” below.

Labeling and assembly. All final lettering, labeling, tooling, etc., **must** be incorporated into the figures. It cannot be added at a later date. If a figure number is included, it **must** appear 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: Helvetica, Times Roman, European PI, Mathematical PI, or Symbol. All fonts other than

these five must be converted to paths (or outlines) in the application with which they were created. For proper font use in PowerPoint images, refer to the Cadmus digital art website, http://art.cadmus.com/da/instructions/ppt_disclaimer.jsp.

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

Color illustrations. *The cost of printing in color must be borne by the author.* The current color cost per figure may be accessed from the submission form in Rapid Review. For accepted manuscripts, the total cost of the color will be included in the acceptance letter sent out by ASM. Adherence to the following guidelines, in addition to the general ones below, will help to minimize costs and to ensure color reproduction that is as accurate as possible.

Because of the requirements of print production, color illustrations **must** be in the CMYK (cyan, magenta, yellow, black) color space. The “normal” color mode for most computer software is RGB (red, green, blue), which is also the color space of your computer monitor. Since CMYK is a smaller color space (meaning it can define fewer colors), colors often shift when an RGB file is converted to CMYK. In particular, figures showing red or green fluorescence and those with a significant range of colors may be difficult or impossible to reproduce during the printing process.

Color illustrations must be supplied in the CMYK color mode, as either (i) CMYK TIFF images with a resolution of at least 300 pixels per inch (raster files, consisting of pixels) or (ii) Illustrator-compatible EPS files with CMYK color elements (vector files, consisting of lines, fonts, fills, and images). See the charts above for a list of supported applications.

We cannot accept any Microsoft Office files (PowerPoint, Word, Excel) for color illustrations because they are restricted to the RGB color space.

Drawings

Submit graphs, charts, complicated chemical or mathematical formulas, diagrams, and other drawings as finished products not requiring additional artwork or typesetting. No part of the graph or drawing may be handwritten. *All* elements, including letters, numbers, and symbols, *must* be easily readable, and both axes of a graph must be labeled. Keep in mind that the journal is published both in print and online and that the same electronic files submitted by the authors are used to produce both.

When creating line art, please use the following guidelines:

1. **All art MUST be submitted at its intended publication size.** For acceptable dimensions, see “Size” above.

2. **Avoid using screens (i.e., shading)** in line art. It can be difficult and time-consuming to reproduce these images without moiré patterns. Various pattern backgrounds are preferable to screens, as long as the fill patterns are not imported from another application. If you must use images containing screens,

- Generate the image at line screens of 85 lines per inch or lower.
- When applying multiple shades of gray, differentiate the gray levels by at least 20%.
- Never use levels of gray below 20% or above 70% as they will fade out or become totally black upon scanning and reduction.

3. Use thick, solid lines that are no finer than 1 point in thickness.
4. No type should be smaller than 6 points at the final publication size.
5. Avoid layering type directly over shaded or textured areas.
6. Avoid the use of reversed type (white lettering on a black background).
7. Avoid heavy letters, which tend to close up, and unusual symbols, which the printer may not be able to reproduce in the legend.
8. If colors are used, avoid using similar shades of the same color and avoid very light colors.

In figure ordinate and abscissa scales (as well as table column headings), **avoid the ambiguous use of numbers with exponents.** Usually, it is preferable to use the appropriate Système International d’Unités (SI) symbols (μ for 10^{-6} , m for 10^{-3} , k for 10^3 , M for 10^6 , etc.). A complete listing of SI symbols can be found in the International Union of Pure and Applied Chemistry (IUPAC) publication *Quantities, Units and Symbols in Physical Chemistry* (Blackwell Science, Oxford, United Kingdom, 1993); an abbreviated list is available at <http://www.iupac.org/reports/1993/homann/index.html>. Thus, representation of 20,000 cpm on a figure ordinate should be made by the number 20 accompanied by the label kcpm.

Where powers of 10 must be used, the journal requires that the exponent power be associated with the number shown. In representing 20,000 cells per ml, the numeral on the ordinate 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 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, 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, 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

Tables that contain artwork, chemical structures, or shading must be submitted as illustrations in an acceptable format at the modification stage. The preferred format for regular tables is MS 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. **If your modified manuscript contains PDF tables, select “for re-**

TABLE 1. Effect of glucose on levels of catabolic enzymes and morphology in *M. rouxii*

Cell type	Enzyme activity				Pyruvate decarboxylase ^c
	Pyruvate kinase ^a		Phospho-fructokinase ^b	Glutamate dehydrogenase ^c	
	1 min	5 min			
Mycelium					
-Glucose	1,056	2	1.7	4.3	0.05
+Glucose	2,930	10	8.04	0.53	1.3
Yeast					
-Glucose	1,145	4	23.2	4.1	0.04
+Glucose	4,380	30	63.6	0.03	1.7

^a Nanomoles of pyruvate formed per milligram of protein in time shown (3, 9).

^b Millimoles of fructose 1,6-diphosphate produced per minute per milligram of protein (7).

^c Micromoles of NADH oxidized per minute per milligram of protein (10).

viewing purposes only” at the beginning of the file upload process.

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 (p. 18) of these Instructions for those that should be used in tables. Explanatory footnotes are acceptable, but more extensive table “legends” are not. Footnotes should not include detailed descriptions of the experiment. Tables must include enough information to warrant table format; those with fewer than six pieces of data will be incorporated into the text by the copy editor. Table 1 is an example of a well-constructed table.

Cover Photographs and Drawings

MCB 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 MCB; material should be related to the work presented in the manuscript. Unsolicited photos will be considered in hard-copy format (two copies) only; if an unsolicited photo is chosen for the cover, the author may be asked to submit digital files. No material submitted for consideration will be returned to the author. Authors will be notified only if their cover art is selected. 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 are available from the cover editor, Roger J. Davis (e-mail: mcbdavis@umassmed.edu).

NOMENCLATURE

Chemical and Biochemical Nomenclature

The recognized authority for the names of chemical compounds is *Chemical Abstracts* (CAS, Columbus, OH) and its indexes. *The Merck Index*, 14th ed. (Merck & Co., Inc., Whitehouse Station, NJ, 2006), is also an excellent source. For guidelines to the use of biochemical terminology, consult *Biochemical Nomenclature and Related Documents* (Portland Press, London, United Kingdom, 1992), available at <http://www.chem.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* (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, NY, 1992) and at <http://www.chem.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, and express enzyme activity either in katal (preferred) or in the older system of micromoles per minute.

Nomenclature of 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 Database 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).

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 (kingdoms, phyla, classes, orders, families, genera, species, and subspecies) are printed in italics and should be italicized (or underlined) in the manuscript; strain designations and numbers are not.

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., ASM Press, 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: Bacterial Nomenclature Up-to-Date (http://www.dsmz.de/microorganisms/main.php?contentleft_id=14) and List of Prokaryotic Names with Standing in Nomenclature (<http://www.bacterio.cict.fr/>).

Since the classification of fungi is far from complete, it is the responsibility of the author to determine the accepted binomial for a given organism. Sources for these names include *The Yeasts: a Taxonomic Study*, 4th ed. (C. P. Kurtzman and J. W. Fell, ed., Elsevier Science Publishers B.V., Amsterdam, The Netherlands, 1998), and *Ainsworth and Bisby's Dictionary of the Fungi*, 9th ed. (P. M. Kirk, P. F. Cannon, J. C. David, and J. A. Stalpers, ed., CABI Publishing, Wallingford, Oxfordshire, United Kingdom, 2001); see also <http://www.speciesfungorum.org/Names/Fundic.asp>.

Names used for viruses should be those approved by the International Committee on Taxonomy of Viruses (ICTV) and published in *Virus Taxonomy: Eighth Report*

of the International Committee on Taxonomy of Viruses (C. M. Fauquet et al., ed., Elsevier Academic Press, San Diego, CA, 2005). In addition, the recommendations of the ICTV regarding the use of species names should generally be followed: when the entire species is discussed as a taxonomic entity, the species name, like other taxa, is italic and has the first letter and any proper nouns capitalized (e.g., *Tobacco mosaic virus*, *Murray Valley encephalitis virus*). When the behavior or manipulation of individual viruses is discussed, the vernacular (e.g., tobacco mosaic virus, Murray Valley encephalitis virus) should be used. If desired, synonyms may be added parenthetically when the name is first mentioned. Approved generic (or group) and family names may also be used.

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.

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 Genetics and Genomics Committee of the ASM Publications Board.

Before submission of manuscripts, authors may direct questions on genetic nomenclature to the committee's chairman: Maria Costanzo (e-mail: maria@genome.stanford.edu). Such a consultation should be mentioned in the manuscript submission letter.

Prokaryotes. The genetic properties of prokaryotes 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. In preparing a manuscript, follow the recommendations of Demerec et al. (*Genetics* 54:61–76, 1966) and the practices currently in use in the *Journal of Bacteriology* and described in its Instructions to Authors. A brief description follows.

(i) Phenotype designations must be employed 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. Phenotype designations generally consist of three-letter symbols; these are *not* italicized, and the first letter of the symbol is capitalized (e.g., Pol). Wild-type characteristics can be designated with a superscript plus (Pol⁺), and, when necessary for clarity, negative superscripts (Pol⁻) can be used to des-

ignate mutant characteristics. Lowercase superscript letters may be used to further delineate phenotypes (e.g., Str^r for streptomycin resistance). Phenotype designations should be defined.

(ii) Genotype designations are also indicated by a three-letter symbol. In contrast to phenotype designations, genotype designations are lowercase italic (e.g., *ara his rps*). If several loci govern related functions, these are distinguished by an italicized capital letter following the locus symbol (e.g., *araA araB*). Mutation sites are distinguished by placing serial isolation numbers (allele numbers) after the locus symbol (e.g., *ara-1 hisB5*). 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*. 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, Canada T2N 1N4.

(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) 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), and production of a hybrid protein (Hyb) 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 defined at the first occurrence in the text.

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_{K-12}* for the *his* gene of *E. coli* or strain K-12, respectively, may be used to distinguish this gene from the *his* gene in another species or strain. An abbreviation may also be used if it is explained. Similarly, a subscript can also be used to distinguish between genetic elements that have the same name. For example, the promoters of the *gln* operon can be designated *glnAp₁* and *glnAp₂*.

(v) Avoid the use of a 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., “either strain PA3092 or another strain containing the *leuC6* mutation”).

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. However, since locus tags are not genetic names, they should appear in roman type rather

than in italics. In addition, 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, 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.

Viruses. In most cases, viruses have no phenotype, since they have no metabolism outside host cells. Therefore, distinctions between phenotype and genotype are not made. Superscripts are used to indicate hybrid genomes. Genetic symbols may be one, two, or three letters. For example, a mutant strain of lambda may be designated λ *cI857 int2 red114 Aam11*; this strain carries mutations in genes *cI*, *int*, and *red* and an amber-suppressible (am) mutation in gene *A*. Host DNA insertions into viruses 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.

Eukaryotes. The nomenclature used for the genetics of lower eukaryotic microorganisms has not been as well formalized as that for bacteria and bacteriophages. Generally, authors should conform to current practices in identifying mutants and their genotypes. For organisms not mentioned below, it is advisable to consult the *Handbook of Microbiology*, 2nd ed. (A. I. Laskin and H. A. Lechevalier, ed., CRC Press, Boca Raton, FL, 1988) or the *Handbook of Genetics*, vol. 1, *Bacteria, Bacteriophages, and Fungi* (R. C. King, ed., Plenum Publishing Corp., New York, NY, 1974).

Gene names may begin with prefixes to indicate the genus and species from which the gene is derived only when needed for clarity when discussing genes with the same name from two different organisms (e.g., *ScURA3* versus *CaURA3*); the prefixes are not considered part of the gene name proper and are not italicized.

The genetic nomenclature of *Dictyostelium* is summarized in the *Trends in Genetics* “Genetic Nomenclature Guide” (p. S.5–S.6; Elsevier Science Ltd., Cambridge, United Kingdom, 1998; out of print). The most recent modifications can be found at <http://dictybase.org/GeneNames.html>.

For *Saccharomyces cerevisiae*, a gene name should always be indicated in italics and, for the wild-type locus (or dominant alleles), capital letters (e.g., *URA3*). Loss-of-function (hypomorphic) or altered-function (neomorphic) alleles of the same locus should always be indicated in italics and lowercase letters (e.g., *ura3Δ*). The product of a gene (i.e., a protein) should be indicated in roman type with an initial capital letter (e.g., *Ura3*). There is generally no need to add the suffix “p” to the symbol for a protein; however, in rare instances where it may be deemed necessary to indicate unambiguously that the symbol refers to a protein, the “p” suffix may be added (e.g., *Ura3p*). For the most recent information on *S. cerevisiae* gene names, consult the *Saccharomyces* Genome Database (SGD) at <http://www.yeastgenome>

.org/. Details on the format of *S. cerevisiae* locus and allele designations are provided in the SGD and are also described by Cherry (Trends Genet. **March**:11–12, 1995) (available for download as a PDF file at SGD, http://www.yeastgenome.org/sgdpub/Saccharomyces_cerevisiae.pdf). **Authors should use standard *S. cerevisiae* gene names, as listed in the SGD, in their submitted manuscripts and register new gene names with the SGD no later than the modification stage.**

The most recent information for *Neurospora crassa* can be found in *The Neurospora Compendium: Chromosomal Loci* (D. R. Perkins et al., Academic Press, San Diego, CA, 2001), and that for *Aspergillus* spp. can be found at <http://www.fgsc.net/nomenclature.htm>. The 1998 *Trends in Genetics* “Genetic Nomenclature Guide” (Elsevier Science Ltd., Cambridge, United Kingdom; out of print) contains nomenclature guidelines for several eukaryotic microbes: *Schizosaccharomyces pombe* (p. S.7–S.9), *Chlamydomonas reinhardtii* (p. S.18–S.19), *Neurospora crassa* (p. S.14–S.15), and *Aspergillus nidulans* (p. S.12–S.13). In addition, for *S. pombe*, the websites http://www.sanger.ac.uk/Projects/S_pombe/SP_Name_FAQ.shtml and <http://www-rcf.usc.edu/~forsburg/plasmids.html#nomenclature> may be helpful, and for *C. reinhardtii*, use <http://www.chlamy.org/chlamydb.html>.

For *Trypanosoma* and *Leishmania*, consult the article by Clayton et al. (Mol. Biochem. Parasitol. **97**:221–224, 1998).

For the most recent information on *Candida albicans*, consult the *Candida* Genome Database (CGD) at <http://www.candidagenome.org>. Details on the format of *C. albicans* gene nomenclature are described at <http://www.candidagenome.org/Nomenclature.shtml>. **Authors should use standard *C. albicans* gene names, as listed in the CGD, in their submitted manuscripts and should register new gene names with the CGD no later than the modification stage.**

Symbols for *Drosophila* mutations and chromosome aberrations are italicized; they should not contain Greek letters, subscripts, or spaces. The symbol for a mutant type is usually an abbreviation of its name and usually begins with the first letter of that name. Dominant and recessive mutations are indicated by initial capital and lowercase letters, respectively (e.g., *R* for roughened and *r* for rudimentary).

“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.

“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 share 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.

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 referred to in the Instructions to Authors in the *Journal of Bacteriology*. The Internet site where insertion sequences of eubacteria and archaea 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::Tn5*, has been described by Chumley et al. (Genetics **91**:639–655, 1979). 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 endonucleases, 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.

ABBREVIATIONS AND CONVENTIONS

Verb Tense

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

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

For an in-depth discussion of tense in scientific writing, see p. 191–193 in *How To Write and Publish a Scientific Paper*, 6th ed.

Abbreviations

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

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

It is often possible to use pronouns or to paraphrase a long word after its first use (e.g., “the drug” or “the substrate”). Standard chemical symbols and trivial names or their symbols (folate, Ala, 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)	SE (standard error)
approx (approximately)	SEM (standard error of the mean)
avg (average)	
concn (concentration)	sp act (specific activity)
diam (diameter)	sp gr (specific gravity)
expt (experiment)	temp (temperature)
exptl (experimental)	tr (trace)

ht (height)	vol (volume)
mo (month)	vs (versus)
mol wt (molecular weight)	wk (week)
no. (number)	wt (weight)
prepn (preparation)	yr (year)
SD (standard deviation)	

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 10³. 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.

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

For a review of basic statistical considerations for virology experiments, see the article by Richardson and Overbaugh (*J. Virol.* **79**:669–676, 2005).

Isotopically Labeled Compounds

For simple molecules, isotopic labeling is indicated in the chemical formula (e.g., ¹⁴CO₂, ³H₂O, and H₂³⁵SO₄). 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., ³²S-ATP) or to a word which is not a specific chemical name (e.g., ¹³¹I-labeled protein, ¹⁴C-amino acids, and ³H-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	<i>E. coli</i> [³² P]DNA
[α- ¹⁴ C]lysine	fructose 1,6-[1- ³² P]bisphosphate

MCB 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).