AMERICAN SOCIETY FOR MICROBIOLOGY | Journal of Clinical Microbiology®

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# INSTRUCTIONS TO AUTHORS

## SCOPE

The *Journal of Clinical Microbiology*® (JCM) is devoted to the dissemination of new knowledge concerning the laboratory diagnosis of human and animal infections. In addition, JCM is an appropriate forum for the publication of information related to the role of the laboratory in both the management of infectious diseases and the elucidation of the epidemiology of infections. The three principal attributes required of papers published in JCM are significance, relevance to the practice of clinical microbiology, and quality science. The significance of a paper depends on novelty, timeliness, and potential for impact on patient outcomes or clinical microbiology laboratory practice. These standards are applied to all papers, regardless of the specific technology studied.

The use of guidelines for the reporting of research studies can improve the accuracy and completeness of manuscripts. Authors of papers about the diagnostic accuracy of clinical assays should refer to the Standards for the Reporting of Diagnostic Accuracy (STARD) guidelines and checklist at http://stard-statement.org/. Authors of papers about molecular epidemiology should refer to the Strengthening the Reporting of Molecular Epidemiology for Infectious Diseases (STROME-ID) guidelines and checklist at http://www.thelancet.com/journals/laninf/article/PIIS1473-3099(13)70324-4/abstract.

ASM publishes a number of different journals covering various aspects of the field of microbiology. Each journal has a prescribed scope which must be considered in determining the most appropriate journal for each manuscript.

(i) With respect to antimicrobial agents, JCM will consider clinically relevant manuscripts (a) that pertain to *in vitro* susceptibility test methods; (b) that are concerned with quality control procedures related to antimicrobial susceptibility tests; (c) that deal with investigations of test methods aimed at measuring levels of antimicrobial agents in clinical specimens; or (d) that describe the use of antimicrobial agents as tools in the isolation, identification, or epidemiologic assessment of microorganisms associated with disease. Manuscripts pertaining to other aspects of antimicrobial agents, such as their basic mechanisms of action, the elucidation of resistance determinants, pharmacokinetics and pharmacodynamics, and the development of new agents, will be considered for publication in *Antimicrobial Agents and Chemotherapy*®.

(ii) Manuscripts that present the results of investigations with a primary focus on the basic mechanisms of pathogenesis of microorganisms or the pathophysiology of infections should be directed to *Infection and Immunity*® (for bacteria, parasites, and fungi) or the *Journal of Virology*® (for viruses).

(iii) Reports of clinical microbiology investigations or studies of the hospital population and the environment as they relate to nosocomial infections should be submitted to JCM. 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*®.

(iv) JCM considers papers involving immunologic assays for use in the diagnosis of infection. Manuscripts that pertain to studies that evaluate immune responses and elucidate immune mechanisms associated with infection, all studies that pertain to vaccines, and papers that address the assessment and laboratory diagnosis of immunologic diseases (e.g., autoimmune diseases and primary immunodeficiencies) are considered outside the purview of JCM and should be submitted to *mSphere* ®.

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

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

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

## EDITORIAL POLICY AND ETHICAL GUIDELINES

As a member of the Committee on Publication Ethics (COPE), ASM adheres to COPE's Best Practice Guidelines and expects authors to observe the high standards of publication ethics set out by COPE.

ASM requirements for submitted manuscripts are consistent with the Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals, as last updated by the International Committee of Medical Journal Editors in December 2014 (http://www.icmje.org/).

Authors are expected to adhere to the highest ethical standards. The following sections of these Instructions include detailed information about ASM's ethical standards. Failure to comply with the policies described in these Instructions may result in a letter of reprimand, a suspension of publishing privileges in ASM journals, and/or notification of the authors' institutions. Authors employed by companies whose policies do not permit them to comply with ASM policies may be sanctioned as individuals and/or ASM may refuse to consider manuscripts having authors from such companies.

### Use of Microbiological Information

The Council on Microbial Sciences (COMS) 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



Instructions to Authors are updated throughout the year. The current version is available on the journal website.

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 COMS resolution mentioned above. Members of the ASM Journals Board will evaluate the rare manuscript that might raise such issues during the review process. However, as indicated elsewhere in these Instructions, primary-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. We ask that authors pay particular attention to the NSAR Select Agents and Toxins list on the CDC website https://www.selectagents.gov/index.html and the U.S. Government Policy for Oversight of Life Sciences Dual Use Research of Concern (March 2012; http://www.phe.gov/s3/dualuse/Documents/us-policy-durc-032812.pdf).

## Use of Human Subjects or Animals in Research

Authors of manuscripts describing research involving human subjects or animal experimentation must obtain review and approval (or review and waiver) from their Institutional Review Board (IRB) or Institutional Animal Care and Use Committee (IACUC), as appropriate, prior to manuscript submission. Authors of manuscripts that describe multisite research must obtain approval from each institution's IRB or IACUC, as appropriate. Documentation of IRB or IACUC status must be made available upon request. In the event that institutional review boards or committees do not exist, the authors must ensure that their research is carried out in accordance with the Declaration of Helsinki, as revised in 2013 (https://jamanetwork.com/journals/jama/fullarticle/1760318), and/or the "International Guiding Principles for Biomedical Research Involving Animals," as revised by the International Council for Laboratory Animal Science (ICLAS) and the Councils for International Organizations of Medical Sciences (CIOMS) in 2012. A statement of IRB or IACUC approval or waiver (and reason for waiver) or a statement of adherence to the Declaration of Helsinki and/or Guiding Principles must be included in the Materials and Methods section. The sex of research subjects and animals, and of materials derived directly from them (e.g., primary cell lines and clinical samples), should be included in the Materials and Methods section or Results section if these data are available.

## Patient Identification

Informed consent is not needed if the patient cannot be identified from any material in a manuscript. In the absence of informed consent, identifying details, such as patient initials, specific dates, specific geographic exposures, or other identifying features (including body features in figures), should be omitted, but this must not alter the scientific meaning. Important information that is relevant to the scientific meaning should be stated so that the patient cannot be identified, e.g., by stating a season instead of a date or a region instead of a city. If a patient can be identified from the material in a manuscript, all efforts should be made to obtain informed consent to publish from patients or parents/legal guardians of minors. Informed consent requires that the patient have the opportunity to see the manuscript prior to submission. The written consent must state either that the patient has seen the complete manuscript or that the patient declines to do so. Patient consent should be archived with the authors and be available upon request. A statement attesting the receipt and archiving of written patient consent should be included in the published article.

## Publishing Ethics

**Authorship.** ASM journals follow the criteria for authorship as outlined in the International Committee of Medical Journal Editors (ICMJE) Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals ("Defining the Role of Authors and Contributors"). Briefly, an author is one who makes a substantial contribution to the design, execution, and/or analysis and interpretation of experiments in addition to drafting, revising, and/or approving the initial submission and any subsequent versions of the article. All authors of a manuscript must have agreed to its submission and are responsible for appropriate portions of its content. Submission of a paper before all coauthors have read and approved it is considered an ethical violation.

**Author contribution statements.** As explained in the ICMJE recommendations, all persons designated as authors should qualify for authorship, and all those who qualify should be listed. ASM encourages transparency in authorship by publishing author contribution statements. Authors are strongly encouraged to include such statements in the Acknowledgments section.

**Corresponding author.** The corresponding author takes primary responsibility for communicating with the journal and coauthors throughout the submission, peer review, and publication processes. The corresponding author is responsible for ensuring that all coauthors have read and approved submissions, including appropriate citations, acknowledgments, and byline order. Additionally, the corresponding author and the study's primary investigator(s), if different, are required to have examined the raw data represented in the manuscript, affirm that such representations accurately reflect the original data, and ensure that the original data are preserved and retrievable.

**Consortium authorship.** 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 only may be given as a separate paragraph in the Acknowledgments section. If the contributing members of the group associated with the work do not fulfill the criteria of substantial contribution to and

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Plagiarism is not limited to the text; it can involve any part of the manuscript, including figures and tables, in which material is copied from another publication without permission and attribution. An author may not reuse his or her own previously published work without attribution; this is considered text recycling (also known as self-plagiarism).

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**Image manipulation.** Submitted figures must reflect original data. Please refer to the "Image manipulation" section in Illustrations and Tables for an overview of permissible manipulations, unacceptable adjustments, and required information to be disclosed in the figure legends of images.

ASM applies forensic imaging tools to screen selected manuscripts for inappropriate manipulation of figures. If unacknowledged and/or inappropriate image manipulations are detected, the matter will be referred to the journal's ethics panel for consideration.

**Fabrication, manipulation, and falsification of data.** As a member of the Committee on Publication Ethics (COPE), ASM encourages authors to consult COPE's "Code of Conduct and Best Practice Guidelines for Journal Editors" (https://publicationethics.org/files/Code_of_conduct_for_journal_editors_0.pdf). Fabrication, manipulation, and falsification of data constitute misconduct. As defined by the U.S. Department of Health and Human Services, fabrication is "making up data or results and recording or reporting them," and falsification is "manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record" (42 Code of Federal Regulations, §93.103). All sources and methods used to obtain and analyze data, including any electronic preprocessing, should be fully disclosed; detailed explanations should be provided for any exclusions.

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- A conference report or symposium proceedings
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- A public website (see "Preprint policy")
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- Posting of a limited amount of original data on a personal/university/corporate website or websites of small collaborative groups working on a problem
- Deposit of unpublished sequence data in a public database
- Preliminary disclosures of research findings as meeting posters, webcast as meeting presentations, or published in abstract form as adjuncts to a meeting, e.g., part of a program
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## Data and Materials

**Availability of data and materials.** By publishing in the journal, the authors agree that, subject to requirements or limitations imposed by local and/or U.S. Government laws and regulations, any materials and data that are reasonably requested by others are available from a publicly accessible collection or will be made available in a timely fashion, at reasonable cost, and in limited quantities to members of the scientific community for noncommercial purposes. Similarly, the authors agree to make available computer programs and/or code, originating in the authors' laboratory, that is the only means of confirming the conclusions reported in the article but that is not available commercially. The program(s) and suitable documentation regarding its (their) use may be provided by any of the following means: (i) as a program transmitted via the Internet, (ii) as an Internet server-based tool, or (iii) as a compiled or assembled form on a suitable medium. The authors guarantee that they have the authority to comply with this policy either directly or by means of material transfer agreements through the owner. ASM asks authors to assert this in a "Data availability" paragraph, which should appear at the end of the Materials and Methods section (or at the end of the text) of their submitted manuscript.

**Data citation.** To promote reproducibility, ASM expects researchers to identify and cite data sets and/or code used in their experiments and studies. These may be large or complex data sets that can include, but are not limited to, data from microarray, genomic, structural, proteomic, or video imaging analyses. **Authors should cite both the data set repository and the published article in which the data set and/or code was originally described.** Citations of data should be included in the reference list with persistent unique identifiers (e.g., active URLs, accession numbers, etc.). If computer code or software was created to generate results or interpret data, then a statement to that effect should be included in the "Data availability" paragraph. For cases in which the software is publicly available (e.g., FigTree to generate phylogenetic trees), the URL of the software informational page should be provided. **It is preferred that authors use established, publicly available data type-specific repositories.** If there is no appropriate repository available, general publicly available repositories should be used (e.g., Dryad, figshare, etc.). Examples of proper data citation are included in the "References" section of these Instructions to Authors.

**Culture deposition.** JCM expects 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.

**Authentication of cell lines.** Cell line misidentification or contamination can adversely impact the validity of research findings. Authors should describe the source along with the date and method used for authentication of any cell lines used in manuscripts submitted to this journal. Cell lines used less than 6 months after receipt from a cell bank that performs authentication do not require reauthentication, but the source and method of authentication should be reported in the Materials and Methods section.

**Provision of requisite information for molecular applications.** Authors of manuscripts which contain quantitative real-time PCR applications are encouraged to consult the article concerning minimum information for publication of quantitative real-time PCR experiments (the MIQE guidelines) by Bustin et al. (Clin Chem 55:611–622, 2009) for guidance as to what information should be considered for inclusion in their submission.

Newly determined nucleotide and/or amino acid sequence data must be deposited and GenBank/ENA/DDBJ accession numbers must be included in the manuscript no later than the modification stage of the review process. It is expected that the sequence data will be released to the public no later than the publication (online posting) date of the accepted manuscript. Authors are encouraged to comply with community metadata standards, such as the "Minimal Information about any (X) Sequence" (MIxS) checklist (http://gensc.org/projects/mixs-gsc-project/), when submitting to GenBank, ENA, or DDBJ. The accession numbers should be included in a separate paragraph with the lead-in "Accession number(s)" at the end of the Materials and Methods section. If conclusions in a manuscript are based on the analysis of sequences and a GenBank/ENA/DDBJ accession number is not provided at the time of the review, authors should provide the annotated sequence data as supplemental material not for publication.

It is expected that when previously published sequence accession numbers are cited in a manuscript, the original published article(s), as well as a citation of the database where the accession number is deposited, will be included in the References section.

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.

Analyses should specify the database, and the date of each analysis should be indicated as, e.g., 6 January 2018. If relevant, the version of the software used should be specified.

See "Presentation of Nucleic Acid Sequences" 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/; European Nucleotide Archive (ENA), https://www.ebi.ac.uk/ena/; and GenBank, National Center for Biotechnology Information, https://www.ncbi.nlm.nih.gov/nucleotide.

**Proper use of locus tags as systematic identifiers for genes.** To comply with recommendations from the International Nucleotide Sequence Database (INSD) Collaborators and to avoid conflicts in gene identification, researchers should implement the following two fundamental guidelines as standards for utilization of locus tags in genome analysis, annotation, submission, reporting, and publication. (i) Locus tag prefixes are systematic gene identifiers for all of the replicons of a genome and as such should be associated with a single genome project submission. (ii) New genome projects must be registered with the INSD, and new locus tag prefixes must be assigned in cooperation with the INSD to ensure that they conform to the agreed-upon criteria.

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The URLs of the databases mentioned above are as follows: Gene Expression Omnibus (GEO), https://www.ncbi.nlm.nih.gov/geo/; ArrayExpress, https://www.ebi.ac.uk/arrayexpress/; and Center for Information Biology Gene Expression Database (CIBEX), http://cibex.nig.ac.jp/data/index.html.

**MycoBank.** New scientific names of fungi along with key nomenclatural and descriptive material must be deposited in MycoBank (http://www.mycobank.org) and the assigned accession number(s) must be included in the manuscript no later than the modification stage of the review process. It is expected that the data will be released to the public no later than the

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## SUBMISSION, REVIEW, AND PUBLICATION PROCESSES

### Submission Process

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

### Review Process

All manuscripts are considered to be confidential and are reviewed by the editors, members of the editorial board, or qualified *ad hoc* reviewers.

To expedite the review process, authors must recommend at least three editorial board members who have expertise in the field, who are not members of their institution(s), who have not recently been associated with their laboratory(ies), and who could not otherwise be considered to pose a conflict of interest regarding the submitted manuscript. Impersonation

of another individual during the review process is considered serious misconduct.

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

When a manuscript is submitted to the journal, it is given a control number (e.g., JCM00123-18) and assigned to one of the editors. (**Always refer to this control number in communications with the editor and the Journals Department.**) From there it is assigned to at least two independent experts for peer review. A single-blind review, where authors' identities are known to reviewers, is applied. It is the responsibility of the corresponding author to inform the coauthors of the manuscript's status throughout the submission, review, and publication processes. The reviewers operate under strict guidelines set forth in "Guidelines for Reviewers" (http://www.journals.asm.org/site/misc/reviewguide.xhtml) 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 modification is requested, the corresponding author must either submit the modified version within 2 months or withdraw the manuscript. A point-by-point response to the reviews must be uploaded as a separate file (identified as such), and a compare copy of the manuscript (without figures) should be included as a Marked Up Manuscript if the editor requested one.

Manuscripts that have been rejected with the option to resubmit, or withdrawn after being returned for modification, may be resubmitted to the same ASM journal if the major criticisms have been addressed. A manuscript rejected on scientific grounds or on the basis of its general suitability for publication by one ASM journal, with the exception of *mBio*®, is considered rejected by all other ASM journals. A rejection from *mBio* does not disqualify a manuscript from being newly submitted to another ASM journal (the rejection by *mBio* need not be mentioned in the cover letter). A manuscript rejected solely on the basis of scope may be resubmitted to a more appropriate ASM journal.

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Examples follow.

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

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

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

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

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

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

- 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
- Websites

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

. . . similar results (R. B. Layton and C. C. Weathers, unpublished data).

. . . system was used (J. L. McInerney, A. F. Holden, and P. N. Brighton, submitted for publication).
. . . as described previously (M. G. Gordon and F. L. Rattner, presented at the Fourth Symposium on Food Microbiology, Overton, IL, 13 to 15 June 1989). {*For nonpublished abstracts and posters, etc.*}
. . . this new process (V. R. Smoll, 20 June 1999, Australian Patent Office). {*For non-U.S. patent applications, give the date of publication of the application.*}
. . . as suggested by the World Health Organization (http://www.who.int/campaigns/immunization-week/2017/en/).

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

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

(P. S. Satheshkumar, A. S. Weisberg, and B. Moss, J Virol 87:10700–10709, 2013, doi:10.1128/JVI.01258-13)
(J. H. Coggin, Jr., p. 93–114, *in* D. O. Fleming and D. L. Hunt, ed., *Biological Safety. Principles and Practices*, 4th ed., 2006)
". . . in a recent report by D. A. Hopwood (mBio 4:e00612-13, 2013, doi:10.1128/mBio00612-13) . . . ."

This style should also be used for Addenda in Proof.

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

## Minireviews

Minireviews are expected to be focused discussions of defined topics relevant to clinical microbiologists. In general, they are to be submitted only following invitation by the editor in chief or the Minireview section editor of JCM. Suggestions for Minireview topics may be sent to the editor in chief by e-mail.

Minireviews are not expected to be comprehensive reviews of the literature but rather focused discussions and relevant updates of specific topics. They should not include the author's unpublished data, but they may include discussion of the author's work. A standard title page should be provided. This is followed by an abstract of 250 words or less and then the text of the Minireview, which should not exceed 6,000 words in length, exclusive of tables, figures, photographs, and references. Up to three tables, figures, or photographs, total, may be included. References should be limited to no more than 30. Minireviews will be sent for peer review.

## Commentaries

Commentaries are invited communications concerning topics relevant to the readership of JCM and are intended to engender discussion. Reviews of the literature, methods and other how-to papers, and responses targeted at a specific published paper are not appropriate. Commentaries are subject to review.

A standard title page should be provided. This is followed by an abstract of 250 words or less and then the text of the Commentary, which should not exceed 6,000 words in length, exclusive of tables, figures, photographs, and references. Up to two tables, figures, or photographs, total, may be included. References should be limited to no more than 30.

## Point-Counterpoint

Point-Counterpoint is a feature of JCM in which two experts present opposing views on a contemporary issue in the laboratory diagnosis of infectious diseases. This feature will be the lead article in the issue of JCM in which it appears. Participation as an author of a Point-Counterpoint feature is by invitation only.

A JCM editor will write a brief introductory piece of approximately 200 words outlining why a specific issue is important and then present the issue in the form of a question. The two experts will then each write a commentary, no more than 1,000 words in length, in which they present evidence in support of either the pro or con view. One table or one figure may be included. Since these discussions will be evidence based, authors may also cite up to 10 references. Unpublished or in-press data which reflect the current practice in their laboratory may be used but should not be the sole basis for their position.

Authors should send commentaries directly back to the JCM editor within 30 days of receipt of the introductory statement. Following receipt of both the pro and con commentaries, the editor will review the submissions and may return them to the author(s) with comments and/or suggested revisions. If revisions are required, the author(s) will have 14 days to craft a revised commentary, which will be sent directly back to the editor. Upon receipt of final commentaries, the JCM editor will write a brief summary consisting of no more than six one-sentence bullet points, outlining where the experts agree (no more than three points) and disagree (no more than three points). The JCM editor will then upload the introduction, both commentaries, and the summary in eJP.

## The Brief Case

The Brief Case is an educational feature with the objective of presenting concepts relevant to the practice of clinical microbiology. The cases should be germane to the routine practice of clinical microbiology and should not represent extremely rare or obscure events. The intended audience of the feature includes those training and practicing in clinical microbiology and infectious disease; in particular, the feature should

be useful to those in training. Cases that depend primarily on identification of an organism in an image are appropriate for the Photo Quiz featured on the cover of JCM and should not be submitted for The Brief Case. The Brief Case consists of two parts: (i) a case presentation and (ii) Closing the Brief Case.

**Case presentation.** The case presentation should include a short summary of the case of 300 to 500 words, followed by a discussion of 800 to 1,100 words. The discussion section should include resolution of any questions or issues raised in the case and a consideration of the important points about the identification of the relevant organism, the technology applied, or the clinical tests performed. The case presentation can include a total of two figures and/or tables. Three self-assessment questions based on material from the case and discussion follow the discussion section. Self-assessment questions are multiple-choice questions with four possible responses, with a single correct answer. Up to six references may be cited at the end of the case presentation.

**Closing the Brief Case.** The Closing the Brief Case part of the article begins with each self-assessment question repeated, followed by the correct answer and a brief explanation (up to four sentences). The questions and answers are followed by a "Take-Home Points" box with three to five bulleted key points from the case. This part of the article has no references.

**Submission.** The Brief Case should be submitted as two separate articles. The case presentation should be submitted in the "Brief Case" manuscript category. Closing the Brief Case should be submitted in the "Brief Case Closing" manuscript category.

## Photo Quiz

A Photo Quiz submission should present the findings of some relevant, interesting, and new observation pertinent to the practice of clinical microbiology in which a photograph is particularly useful in conveying important information **and** where the observation can serve as the basis for both a question and an answer. The photograph may be of a micrograph, some other laboratory material, a clinical lesion, or the results of an imaging study.

A Photo Quiz consists of two parts: (i) a case presentation featuring a photograph depicting some unusual and/or informative finding in clinical microbiology and (ii) an answer to the quiz. The case presentation and the answer must be submitted as two separate articles. Note that authors and affiliations are listed below the title.

**Photo Quiz case presentation.** The text in the Photo Quiz case presentation should be limited to 200 to 300 words. The header for the case presentation should read "Photo Quiz."

Please include a photograph about 39 picas (6.5 inches) wide and 28 picas (4.625 inches) high. Since photos appearing with published Photo Quizzes appear on the cover of the journal, a high-resolution TIFF or EPS file is preferred. A short legend for the photo must be provided, and the photo must be cited in the case presentation. Refer to a recently published Photo Quiz for correct formatting.

**Answer to Photo Quiz.** The text of the answer to the Photo Quiz should also be limited to 200 to 300 words. The header to the answer should read "Answer to Photo Quiz." Four to six references may be cited at the end of the Photo Quiz answer.

**Submission.** The Photo Quiz case presentation should be submitted in the "Photo Quiz" manuscript category. The Photo Quiz answer should be submitted in the "Photo Quiz Answer" manuscript category.

## Letters to the Editor

Two types of Letters to the Editor may be submitted. The first type (Comment Letter) is intended for comments on final, typeset articles published in the journal (not on accepted manuscripts posted online) and must cite published references to support the writer's argument. The second type (New-Data Letter) may report new, concise findings that are not appropriate for publication as Research Articles.

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 below the title.

All Letters to the Editor must be submitted electronically, and the type of Letter (New Data or Comment) must be selected from the choices in the submission form. For Letters commenting on published articles, 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. Both types of 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.

A Letter commenting on a published article will be assigned to the editor in chief. The Letter may be sent for peer review. If the editor in chief believes that publication is warranted, he will solicit a reply from the corresponding author of the article and give approval for publication.

New-Data Letters will be assigned to an editor according to subject matter and will be sent for peer review.

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

## Errata

Errata provide a means of correcting errors that occurred during the writing, typing, editing, or publication (e.g., a misspelling, a dropped word or line, or mislabeling in a figure) of a published article. Submit Errata via the eJP online manuscript submission and peer review system (see "Submission, Review, and Publication Processes"). In the Abstract section of the submission form (a required field), put "Not Applicable." Upload the text of your Erratum as a Microsoft Word file. Please see a recent issue for correct formatting.

### Author Corrections

Author Corrections provide 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 [noncritical] portion 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 Correction via the eJP online manuscript submission and peer review system (see "Submission, Review, and Publication Processes"). Select Author Correction as the manuscript type. In the Abstract section of the submission form (a required field), put "Not Applicable." Upload the text of your Author Correction as a Microsoft Word file. Please see a recent issue for correct formatting. Signed letters of agreement must be supplied as supplemental material not for publication (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 the eJP online manuscript submission and peer review system (see "Submission, Review, and Publication Processes"). In the Abstract section of the submission form (a required field), put "Not Applicable." Upload the text of your Retraction as a Microsoft Word file. Letters of agreement signed by all of the authors must be supplied as supplemental material not for publication (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 chairperson of the ASM Journals 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.

### CrossMark

ASM has implemented CrossMark. CrossMark is a multipublisher initiative to provide a standard way for readers to locate the current version of an article. Clicking on the CrossMark logo will indicate whether an article is current or whether updates have been published. Additional information about CrossMark can be found on CrossMark's website and on ASM's CrossMark policy page.

## ILLUSTRATIONS AND TABLES

### Illustrations

**Image manipulation.** Digital images submitted for publication may be inspected by ASM production specialists for any manipulations or electronic enhancements that may be considered to be the result of scientific misconduct based on the guidelines provided below. Any images/data found to contain manipulations of concern will be referred to the editor in chief, and authors may then be requested to provide their primary data for comparison with the submitted image file. Investigation of the concerns may delay publication and may result in revocation of acceptance and/or additional action by ASM.

Linear adjustments to contrast, brightness, and/or color are generally acceptable, as long as the measures taken are necessary to view elements that are already present in the data and the adjustments are applied to the entire image and not just specific areas. Unacceptable adjustments to images include, but are not limited to, the removal or deletion, concealment, duplication (copying and pasting), addition, selective enhancement, or repositioning of elements within the image.

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

**File types and formats.** Illustrations may be continuous-tone images, line drawings, or composites. Color graphics may be submitted. Suggestions about how to ensure accurate color reproduction are given below.

On initial submission, figures may be uploaded as individual PDF files or combined and uploaded as a single PDF file. Place each legend in the text file, as well as on the same page with the corresponding figure to assist review. At the modification stage, production-quality digital files must be provided. Because the legends will be copyedited and typeset for final publication, they should appear within the main text, after the References section, and should not be included as part of the figure itself at this stage. All graphics submitted with modified manuscripts must be bitmap, grayscale, or in the RGB (preferred) or CMYK color mode. See "Color illustrations." Halftone images (those with various densities or shades) must be grayscale, not bitmap. JCM accepts TIFF or EPS files but discourages PowerPoint for either black-and-white or color images.

For instructions on creating acceptable EPS and TIFF files, refer to the Cadmus digital art website, http://art.cadmus.com/da/index.jsp. 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. For proper font use in PowerPoint images, refer to the Cadmus digital art website, http://art.cadmus.com/da/instructions/ppt_disclaimer.jsp. Note that, due to page composition system requirements, you must verify

that your PowerPoint files can be converted to PDF without any errors.

**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. Please note when using Rapid Inspector to check PowerPoint files that there is a known bug in the application that can occasionally fail PowerPoint Presentation (.pptx) files, even though the files meet all required production criteria. If you experience this bug, the issue can be corrected by saving the PowerPoint files as an older version, PowerPoint 97-2004 Presentation (.ppt), during the Save As process (use the drop-down format menu and select this format). Once you save your files as .ppt, they will pass Rapid Inspector if all required production criteria have been met.

If you have additional questions about using the Rapid Inspector preflighting tool, please send an e-mail inquiry to helpdesk.digitalartsupport@cenveo.com.

**Minimum resolution.** It is extremely important that a high enough resolution is used. All separate images that you import into a figure file must be at the correct resolution before they are placed. (For instance, placing a 72-dpi image in a 300-dpi EPS file will not result in the placed image meeting the minimum requirements for file resolution.) 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 combination art (lettering and images)
- 1,200 dpi for line art

**Size.** All graphics **should be submitted at their intended publication size** 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 figure width: 6.875 inches (ca. 17.4 cm)
- Maximum figure height: 9.0625 inches (23.0 cm)

**Contrast.** Illustrations must contain sufficient contrast to be viewed easily on a monitor or on the printed page.

**Labeling and assembly.** All final lettering and labeling must be incorporated into the figures. On initial submission, illustrations should be provided as PDF files, with the legends in the text file and with a legend beneath each image to assist review. At the modification stage, production-quality digital figure files (without legends) must be provided. Put the figure number well outside the boundaries of the image itself. (Numbering may need to be changed at the copyediting stage.) Each figure must be uploaded as a separate file, and any multipanel figures must be assembled into one file; i.e., rather than uploading a separate file for each panel in a figure, assemble all panels in one piece and supply them as one file.

**Fonts.** To avoid font problems, set all type in one of the following fonts: Arial, Helvetica, Times Roman, European PI, Mathematical PI, or Symbol. Courier may be used but should be limited to nucleotide or amino acid sequences, where a nonproportional (monospace) font is required. All fonts other than these must be converted to paths (or outlines) in the application with which they were created. For proper font use in PowerPoint images, refer to the Cadmus digital art website, http://art.cadmus.com/da/instructions/ppt_disclaimer.jsp.

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

The final online version is considered the version of record for JCM and all other ASM journals. To maximize online reproduction, color illustrations should be supplied in the RGB color mode as either (i) RGB TIFF images with a resolution of at least 300 pixels per inch (raster files, consisting of pixels) or (ii) Illustrator-compatible EPS files with RGB color elements (vector files, consisting of lines, fonts, fills, and images). CMYK files are also accepted. Other than in color space, CMYK files must meet the same production criteria as RGB files. The RGB color space is the native color space of computer monitors and of most of the equipment and software used to capture scientific data, and it can display a wider range of colors (especially bright fluorescent hues) than the CMYK (cyan, magenta, yellow, black) color space used by print devices that put ink (or toner) on paper. For reprints, ASM's print provider will automatically create CMYK versions of color illustrations from the supplied RGB versions. Color in the reprints may not match that in the online journal of record because of the smaller range of colors capable of being reproduced by CMYK inks on a printing press. For additional information on RGB versus CMYK color, refer to the Cadmus digital art site, http://art.cadmus.com/da/guidelines_rgb.jsp.

## Drawings

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

When creating line art, please use the following guidelines:

(i) **All art must be submitted at its intended publication size.** For acceptable dimensions, see "Size," above.

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

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

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

(c) Never use levels of gray below 5% or above 95%, as they are likely to fade out or become totally black when output.

(iii) Use thick, solid lines that are no finer than 1 point in thickness.

(iv) Use type that is no smaller than 6 points at the final publication size.

(v) Avoid layering type directly over shaded or textured areas.

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

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

(viii) If colors are used, avoid using similar shades of the same color and avoid very light colors.

In figure ordinate and abscissa scales (as well as 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 ($\mu$ for $10^{-6}$, m for $10^{-3}$, k for $10^{3}$, and M for $10^{6}$, etc.). Thus, a representation of 20,000 cpm on a figure ordinate should be made by the number 20 accompanied by the label kcpm. A complete listing of SI symbols can be found in the International Union of Pure and Applied Chemistry (IUPAC) publication *Quantities, Units and Symbols in Physical Chemistry*, 3rd ed. (RSC Publishing, Cambridge, United Kingdom, 2007), and at https://www.nist.gov/physical-measurement-laboratory/special-publication-811/.

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

### Presentation of Nucleic Acid Sequences

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

### Figure Legends

On initial submission, each legend should be placed in the text file *and* be incorporated into the image file beneath the figure to assist review.

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

### Tables

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

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

## NOMENCLATURE

### Chemical and Biochemical Nomenclature

The recognized authority for the names of chemical compounds is *Chemical Abstracts* (CAS; http://www.cas.org/) and its indexes. *The Merck Index Online* (https://www.rsc.org

**TABLE 1** Distribution of protein and ATPase in fractions of dialyzed membranes[a]

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

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

/merck-index) is also an excellent source. For biochemical terminology, including abbreviations and symbols, consult *Biochemical Nomenclature and Related Documents* (Portland Press, London, United Kingdom, 1992) available at http://www.sbcs.qmul.ac.uk/iupac/bibliog/white.html, and the Instructions to Authors of the *Journal of Biological Chemistry* and the *Archives of Biochemistry and Biophysics*.

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

For enzymes, use the recommended (trivial) name assigned by the Nomenclature Committee of the International Union of Biochemistry (IUB) as described in *Enzyme Nomenclature* (Academic Press, Inc., New York, NY, 1992) and its supplements and at http://www.sbcs.qmul.ac.uk/iubmb/enzyme/. If a nonrecommended name is used, place the proper (trivial) name in parentheses at first use in the abstract and text. Use the EC number when one has been assigned. Authors of papers describing enzymological studies should review the standards of the STRENDA Commission for information required for adequate description of experimental conditions and for reporting enzyme activity data (http://www.beilstein-institut.de/en/projects/strenda/guidelines).

For nomenclature of restriction enzymes, DNA methyltransferases, homing endonucleases, and their genes, refer to the article by Roberts et al. (Nucleic Acids Res 31:1805–1812, 2003).

## Drugs

Whenever possible, use generic names of drugs; the use of trade names is not permitted.

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

The spelling of bacterial names should follow the *Approved Lists of Bacterial Names (Amended) & Index of the Bacterial and Yeast Nomenclatural Changes* (V. B. D. Skerman et al., ed., American Society for Microbiology, Washington, DC, 1989) and the validation lists and notification lists published in the *International Journal of Systematic and Evolutionary Microbiology* (formerly the *International Journal of Systematic Bacteriology*) since January 1989. In addition, two sites on the World Wide Web list current approved bacterial names: Prokaryotic Nomenclature Up-to-Date (https://www.dsmz.de/bacterial-diversity/prokaryotic-nomenclature-up-to-date.html) and List of Prokaryotic Names with Standing in Nomenclature (http://www.bacterio.net/). If there is reason to use a name that does not have standing in nomenclature, the name should be enclosed in quotation marks in the title and at its first use in the abstract and the text and an appropriate statement concerning the nomenclatural status of the name should be made in the text. "*Candidatus*" species should always be set in quotation marks.

For guidelines regarding new names and descriptions of new genera and species, see the articles by Tindall (Int J Syst Bacteriol 49:1309–1312, 1999) and Stackebrandt et al. (Int J Syst Evol Microbiol 52:1043–1047, 2002). To validate new names and/or combinations, authors must submit three copies of their published article to the *International Journal of Systematic and Evolutionary Microbiology*.

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

Since the classification of fungi is not complete, it is the responsibility of the author to determine the accepted binomial for a given organism. Sources for these names include *The Yeasts: a Taxonomic Study*, 5th ed. (C. P. Kurtzman, J. W. Fell, and T. Boekhout, ed., Elsevier Science, Amsterdam, Netherlands, 2011), and *Dictionary of the Fungi*, 10th ed.

(P. M. Kirk, P. F. Cannon, D. W. Minter, and J. A. Stalpers, ed., CABI International, Wallingford, Oxfordshire, United Kingdom, 2008); see also http://www.speciesfungorum.org/Names/Fundic.asp.

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

Microorganisms, viruses, and plasmids should be given designations consisting of letters and serial numbers. It is generally advisable to include a worker's initials or a descriptive symbol of locale or laboratory, etc., in the designation. Each new strain, mutant, isolate, or derivative should be given a new (serial) designation. This designation should be distinct from those of the genotype and phenotype, and italicized 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.

**Bacteria.** The genetic properties of bacteria are described in terms of phenotypes and genotypes. The phenotype describes the observable properties of an organism. The genotype refers to the genetic constitution of an organism, usually in reference to some standard wild type. Use the recommendations of Demerec et al. (Genetics 54:61–64, 1966) as a guide to the use of these terms. If your manuscript contains information including genetic nomenclature, please refer to the Instructions to Authors of the *Journal of Bacteriology*.

**"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 have a common evolutionary origin; partial homology is not recognized. When sequence comparisons are discussed, it is more appropriate to use the term "percent sequence similarity" or "percent sequence identity," as appropriate.

**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.

**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. 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 and the presence or absence of an underscore, etc.). Locus tag formats vary between different organisms and also may be updated for a given organism, so it is important to check GenBank at the time of manuscript preparation.

**Viruses.** The genetic nomenclature for viruses differs from that for bacteria. In most instances, viruses have no phenotype, since they have no metabolism outside host cells. Therefore, distinctions between phenotype and genotype cannot be made. Superscripts are used to indicate hybrid genomes. Genetic symbols may be one, two, or three letters.

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

## ABBREVIATIONS AND CONVENTIONS

### Verb Tense

ASM strongly recommends that for clarity you use the **past** tense to narrate particular events in the past, including

the procedures, observations, and data of the study that you are reporting. Use the present tense for your own general conclusions, the conclusions of previous researchers, and generally accepted facts. Thus, most of the abstract, Materials and Methods, and Results will be in the past tense, and most of the introduction and some of the Discussion will be in the present tense.

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

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

## Abbreviations

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

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

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

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

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

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

The following abbreviations should be used without definition in tables:

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

**Drugs.** Should an author decide to abbreviate the names of antimicrobial agents in a manuscript, the following standard abbreviations are strongly recommended.

**Antibacterial agents.** Use the indicated abbreviations for the following antibacterial agents.

amikacin (AMK)
amoxicillin (AMX)
amoxicillin-clavulanic acid (AMC)
ampicillin (AMP)
ampicillin-sulbactam (SAM)
azithromycin (AZM)
azlocillin (AZL)
aztreonam (ATM)
carbenicillin (CAR)
cefaclor (CEC)
cefadroxil (CFR)
cefamandole (FAM)
cefazolin (CFZ)
cefdinir (CDR)
cefditoren (CDN)
cefepime (FEP)
cefetamet (FET)
cefixime (CFM)
cefmetazole (CMZ)
cefonicid (CID)
cefoperazone (CFP)
cefotaxime (CTX)
cefotetan (CTT)
cefoxitin (FOX)
cefpodoxime (CPD)
cefprozil (CPR)
ceftazidime (CAZ)
ceftibuten (CTB)
ceftizoxime (ZOX)
ceftriaxone (CRO)
cefuroxime (axetil) and cefuroxime (sodium) (CXM)
cephalexin (LEX)
cephalothin (CEF)
cephapirin (HAP)
cephradine (RAD)
chloramphenicol (CHL)
cinoxacin (CIN)
ciprofloxacin (CIP)
clarithromycin (CLR)
clinafloxacin (CLX)
clindamycin (CLI)
daptomycin (DAP)
dicloxacillin (DCX)
dirithromycin (DTM)
doxycycline (DOX)
enoxacin (ENX)
erythromycin (ERY)
fleroxacin (FLE)
fosfomycin (FOF)
gatifloxacin (GAT)
gentamicin (GEN)
grepafloxacin (GRX)
imipenem (IPM)
kanamycin (KAN)
levofloxacin (LVX)

linezolid (LZD)
lomefloxacin (LOM)
loracarbef (LOR)
meropenem (MEM)
methicillin (MET)
mezlocillin (MEZ)
minocycline (MIN)
moxalactam (MOX)
moxifloxacin (MXF)
nafcillin (NAF)
nalidixic acid (NAL)
netilmicin (NET)
nitrofurantoin (NIT)
norfloxacin (NOR)
ofloxacin (OFX)
oxacillin (OXA)
penicillin (PEN)
piperacillin (PIP)
piperacillin-tazobactam (TZP)
quinupristin-dalfopristin (Synercid) (Q-D)
rifabutin (RFB)
rifampin (RIF)
rifapentine (RFP)
sparfloxacin (SPX)
spectinomycin (SPT)
streptomycin (STR)
teicoplanin (TEC)
telithromycin (TEL)
tetracycline (TET)
ticarcillin (TIC)
ticarcillin-clavulanic acid (TIM)
tobramycin (TOB)
trimethoprim (TMP)
trimethoprim-sulfamethoxazole (SXT)
trovafloxacin (TVA)
vancomycin (VAN)

**β-Lactamase inhibitors.** Use the indicated abbreviations for the following β-lactamase inhibitors.

clavulanic acid (CLA)
sulbactam (SUL)
tazobactam (TZB)

**Antifungal agents.** Use the indicated abbreviations for the following antifungal agents.

amphotericin B (AMB)
clotrimazole (CLT)
flucytosine (5FC)
fluconazole (FLC)
itraconazole (ITC)
ketoconazole (KTC)
nystatin (NYT)
terbinafine (TRB)
voriconazole (VRC)

**Antiviral agents.** Use the indicated abbreviations for the following antiviral agents.

acyclovir (ACV)
cidofovir (CDV)
famciclovir (FCV)
foscarnet (FOS)
ganciclovir (GCV)
penciclovir (PCV)
valacyclovir (VCV)
zidovudine (AZT)

## 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.

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

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

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

## Statistics

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

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

(i) The same reference (gold) standard should be used for all samples for a given analyte. That reference standard might include more than one test, but it should be used and interpreted consistently for all samples. The reference standard should not include results from the test that is under study.

(ii) Do not use "sensitivity" or "specificity" to describe results which compare a new test to a non-reference standard. Use the terms "positive percent agreement" and "negative percent agreement" for these results, as recommended by the FDA guidance document "Statistical Guidance on Reporting Results from Studies Evaluating Diagnostic Tests" (http://www.fda.gov/RegulatoryInformation/Guidances/ucm071148.htm).

(iii) The use of discrepant analysis is seldom justified. If discrepant analysis is used, an explanation for its use must be included in the Materials and Methods section. The data should be presented as recommended in section 7.3 of the FDA guidance document "Statistical Guidance on Reporting Results from Studies Evaluating Diagnostic Tests." Sensitivity and specificity cannot be calculated using results of discrepant analysis. Retesting specimens that have initially discrepant results between two assays using the same assays does not yield valid results.

(iv) Positive and negative predictive values cannot be calculated when the natural prevalence of disease has been altered. Using patient populations that are enriched for positives or are known not to include positives precludes the use of positive predictive values and negative predictive values.

(v) Sensitivity, specificity, positive predictive values, negative predictive values, and other such proportional measurements must be reported with confidence intervals (typically 95% confidence intervals).

(vi) Bland-Altman plots should be used for comparisons between quantitative measurements by clinical tests (J. M. Bland and D. G. Altman, Lancet 327:307–310, 1986). Correlation plots with $R^2$ values may be included in addition to Bland-Altman plots.

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

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

(ix) Parametric and nonparametric data are presented appropriately. Means and standard deviations or standard errors are appropriate means of presenting data analyzed by parametric analyses (i.e., *t* test and analysis of variance [ANOVA]), but only medians and surrounding levels (quartiles, quintiles, and 10th and 90th percentiles, etc.) are

appropriate for nonparametric statistics (Mann-Whitney test and Kruskal-Wallis test, etc.). Means have no meaning in nonparametric analyses.

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

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

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

(xiii) When samples are taken multiple times from one experimental entity (i.e., multiple serum samples from one animal, gross pathology scores measured for the same animal over time or growth curves, etc.), one cannot use analyses such as *t* tests, ANOVA, or the Mann-Whitney test, etc., because these tests assume that each measure is independent. An entity with a high score on day 1 is more likely to have a high score on day 2 than is an entity with a low score. It is likely that some expert statistical help will be needed for these situations, usually involving regression analysis or survival analysis, etc.

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

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

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, labeling is indicated in the chemical formula (e.g., $^{14}CO_2$, $^{3}H_2O$, and $H_2{}^{35}SO_4$). Brackets are not used when the isotopic symbol is attached to the name of a compound that in its natural state does not contain the element (e.g., $^{32}$S-ATP) or to a word 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 | UDP-[U-$^{14}$C]glucose |
| L-[*methyl*-$^{14}$C]methionine | *E. coli* [$^{32}$P]DNA |
| [2,3-$^{3}$H]serine | fructose 1,6-[1-$^{32}$P]bisphosphate |
| [$\alpha$-$^{14}$C]lysine | [$\gamma$-$^{32}$P]ATP |