



**Objective and scholarly peer review ensures that the conclusions reported are fully justified by the data.**

## Approaching the Critical Task of Peer Review

### The Value of High-Quality Peer Review

Virtually every published paper has benefited from, and been improved by, peer review. Reviewers help clarify and tighten my arguments. They catch large and small errors that would otherwise cause confusion. They point out worthwhile controls, or suggest new experiments that strengthen, and sometimes correct, initial interpretations. Thus, from my experience, as both author and editor, high-quality peer review is beneficial to the authors. The greatest value of good peer review is, however, to the journal's readers. Objective and scholarly peer review ensures that the conclusions reported are fully justified by the data. On a more subjective level, well-informed reviewers help editors prioritize and categorize papers, so that published manuscripts match the journal's scope and objectives. Although the standards for objective peer review should be the same for all journals—specifically, referees should insist that the experiments be rigorously performed, and that the presented evidence is of sufficient quality and quantity to justify the paper's conclusions—each journal has different goals that referees need to consider when they make their subjective recommendations.

Some journals present scientific vignettes to communicate with interdisciplinary audiences. Others, like *Molecular Biology of the Cell (MBC)*, publish complete and significant advances within a broad discipline. Still others are more focused on subdisciplines. Others function as archives for communicating important stepwise advances.

The subjective nature of peer review helps match the scientific and conceptual advances reported in each paper with the appropriate audience. This is a valuable task that helps readers sift through the plethora of resources listed on PubMed for the kind of information they seek.

### How to Review a Paper

The following is a step-by-step guide to reviewing papers, written from the perspectives of an author, who will hopefully benefit from your efforts, and an editor who is seeking your advice

before making a publication decision. With regard to the former beneficiary, my advice is to follow the Golden Rule: treat others as you want to be treated, and keep in mind that you are communicating with both your peers and their younger students and postdocs.

### Step 1: Accept the Assignment

Before you agree to review a manuscript ask yourself the following questions: Are you knowledgeable in this area of research? Do you have the expertise to assess the methodology and results? Can you be objective in your criticism? Is there a conflict of interest? Lastly, can you meet your commitment to review the manuscript within the allotted time, usually one to two weeks? If you answer “no” to any of these questions, then decline and recommend someone you think might be more appropriate.

### Step 2: Consider the Journal

If you are not already familiar with the journal's scope and philosophy, you can find these on each journal's home page. Many journals will include specific instructions to the referees regarding the criteria by which they prioritize manuscripts for publication.

### Step 3: Read the Paper

As you do, try to take two views: Look for the big picture but also pay close attention to the details. The big picture view should form the basis of your subjective opinion. Ask yourself the following questions. Has this paper taught me something useful and/or interesting? Would my students, postdocs, and colleagues find this information helpful? If the journal is interdisciplinary, then ask, would researchers outside this field benefit from reading these findings?

At *MBC* we ask our referees to help us prioritize papers by considering the following big questions:

- 1) Does this study significantly advance our knowledge, and/or provide new concepts or approaches that extend our understanding?
- 2) Are the advances presented of broad interest and significance to cell biologists?

In general, papers must satisfy both these criteria to meet *MBC* standards.

As for the details, look carefully at all of the data presented, including the Supplemental Material and any movies, and at how the experiments were performed. Is the approach or procedure appropriate? Are all the necessary controls in place? Is the quality of the data sufficient? Pay attention to the axes of graphs; is the scale chosen to make small differences look large? This is one of my pet peeves. Does the written description of the results match the data presented in the figures? Close inspection of these details will allow you to determine if the conclusions and interpretations are supported by the data.

As you read, you should also assess how effectively the authors have communicated their findings. Again, at *MBC*, we ask referees to assess whether the title and abstract accurately reflect the content and conclusions of the paper. This is critical given that the title and abstracts available from a PubMed search direct readers to important papers and help them to prioritize their reading. Does the introduction provide sufficient background to understand the significance of the findings that follow? Is it concise and relevant to the subject at hand? Are the results presented in a logical order? Are the experimental rationales established? Are the important conclusions and their significance stated clearly and concisely in the discussion? Are the findings placed in a larger context? Is the work of others considered and incorporated or inappropriately ignored? Is there unnecessary repetition; can the author be more succinct?

#### Step 4: Write Your Review

Adopt a professional and scholarly tone, and avoid inflammatory language; remember the Golden Rule! In an opening paragraph, make a general statement describing the major conclusions of the paper and your overall assessment of their validity and significance. This opening statement should reflect your “big picture” view of the paper. These comments help the editor decide whether the paper’s findings match her or his journal’s scope and objectives—and thus whether to reject a paper or to invite resubmission. Importantly, you should not make a recommendation regarding publication in your comments to the authors; instead reserve this opinion for your confidential remarks to the editor.

Subsequent paragraphs should focus on the details. Generate a list of specific criticisms and concerns (preferably numbered and subdivided into major and minor concerns) that justify your overall assessment of the paper and

provide constructive feedback to the authors. If possible, be specific about suggested additional controls or experiments needed to justify the conclusions. Is the suggested experiment doable and, if so, is it worth doing, or will it only add incrementally to the take-home message while unnecessarily delaying publication? If you disagree with an interpretation, be specific about alternatives. Check your work, as mistakes diminish your credibility to the author.


#### Step 5: Make Confidential Remarks to the Editor

Many journals have check boxes for prioritizing publication. Any recommendations regarding publication should be communicated confidentially to the editor and not to the authors. You might also indicate which of your concerns are more or less critical for the authors to address.

Peer review is our most important responsibility. It epitomizes the scholarship and collegiality that attract us to this profession. Although anonymous, it is often the most valuable form of communication. As a frequent beneficiary of peer review, I thank my colleagues for sharing their efforts and advice. ■

—Sandra Schmid

**... Avoid inflammatory language; remember the Golden Rule!**

**UNIVERSITY of VIRGINIA**

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This position will be opened until filled. Application material including a current curriculum vitae, names and addresses of 3 references should be sent to:

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