New investigator editorial: Acquiring writing and reviewing skills for your communication toolbox

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Editor’s Note

This editorial is one of a series of articles completely written by trainees or junior faculty related to various issues of importance to the development of professional skills. While using examples taken from American Physiological Society (APS) programs or conferences, it is meant to convey experiences and provide information and insight into opportunities available to young physiologists and is not meant to advertise or promote a specific APS program at the expense of other similar programs.

New Investigator Editorial

When I first started doing research, I used to think that good scientists should only experimentally test a phenomenon and observe the outcome. Never did it cross my mind that after doing good science, it was necessary to properly write it up. Since those initial thoughts, I have learned that publication is essential for my progress and advancement in my field. Moreover, one point that really struck me was the concept that without publication, science is dead.

Science is a social activity, which depends on good communication that includes publication. However, being able to express ideas clearly and succinctly in writing is not an easy process. Reading a good scientific paper is fun, but reading a poorly written one is tedious. Poorly written manuscripts preclude your work being published in high-impact journals and can impede publication in any journal. Improving your writing can only be advantageous, since competition among scientists to be published is intense, cost of publication is high, and publications are critical to funding (e.g., grant applications and progress reports).

As a postdoctoral fellow at a medical research institution, I thought that to write a good scientific paper you must only practice, practice, and practice. Although practice is an important component, I have come to appreciate that there are some basic principles that could assist me in this difficult process. A simple question that I had not thought about was, Should I include data in the manuscript abstract? Most scientists, including me, acquire their training in writing and reviewing scientific papers, not through formal instructions but by actually doing it (2). Despite being a third-year postdoctoral fellow, my command of writing and reviewing scientific manuscripts needed improving as the process is intimidating and stressful. In my case there are two major reasons for this: 1) lack of formal training in manuscript analysis and 2) English is not my first language.

Since I started my postdoctoral fellowship in the fall of 2012, my mentor Dr. R. Clinton Webb encouraged me to be a member of the American Physiological Society (APS) Cardiovascular Section. Since I have become a member, I have grown as a scientist and my research projects have been highlighted. I have been awarded the APS Cardiovascular Section Research Recognition Award (2014) and the Respiratory Section Research Recognition Award (2015) at Experimental Biology. Additionally, my project has been awarded an American Heart Association fellowship. Because of this recognition, I felt that I needed to invest in professional development to be a better scientist, including reviewer and writer for scientific journals. Being invited to review a manuscript is an honor, since you provide a service to the journal and scientific community and you are being recognized for your expertise (2). Thus I made the decision to attend formal training in writing and reviewing for scientific journals.

This year, in January, I had the opportunity to take part in The APS Professional Skills Training Course on Writing and Reviewing for Scientific Journals. This course was intended for graduate students, postdoctoral fellows, and faculty early in their careers who wanted to improve their manuscript writing from the abstract to the discussion, learning about the submission process, choosing a journal, responding to reviewers, and being a reviewer themselves (Table 1) (1, 3, 4, 6). This course educated me on some key basic principles and also brought to my attention a tremendous number of resources to which scientists can refer. I now know that data could be included in the abstract when you are submitting to a clinical science journal. For a basic science journal, it is generally considered more appropriate to only include the significance of your results and not the supporting data. On the other hand, what was uniformly championed was the idea that the manuscript should be clear and easy to understand.

The APS Professional Skills Training Course on Writing and Reviewing for Scientific Journals was very efficiently and

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Table 1. Important points to consider when structuring your paper and when critiquing scientific articles (1,3,4,6)

<table>
<thead>
<tr>
<th>Journal</th>
<th>Is the topic appropriate for the journal selected? Would another journal be more appropriate?</th>
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<tbody>
<tr>
<td>Title</td>
<td>Does the title describe the study?</td>
</tr>
<tr>
<td>Abstract</td>
<td>Is the abstract complete and understandable? Does the abstract present the material in a logical way? Does the abstract include information in all of the following categories: background, hypothesis, model system, general methodology, results (the significance of your results and not the supporting data), and significance?</td>
</tr>
<tr>
<td>Introduction</td>
<td>Does the introduction briefly review the pertinent literature and state the hypothesis?</td>
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<tr>
<td>Methods</td>
<td>Are the methods described in sufficient detail to permit another investigator to repeat the experiments?</td>
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<tr>
<td>Results</td>
<td>Do the results provide a logical progression through the experimental design? Are the results not duplicating information, particularly data, among text, figures or tables, and figures legends?</td>
</tr>
<tr>
<td>Discussion</td>
<td>Are the major findings of the study clearly described? Are the conclusions of the study consistent with the results?</td>
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effectively structured. Participants prepared for the workshop by completing a list of precourse assignments. These included reading the required confidentiality document, uploading your manuscript and introducing yourself on the discussion board, posting three things you would like to learn from the course, reading and critiquing manuscripts and abstracts from your assigned group members, developing a list of potential journals for publishing, and completing the precourse readings (these are articles and small chapters of books).

The workshop was held at Disney’s Contemporary Resort, Orlando, FL, and the course registration fee covered the cost of a joint occupancy room and meals for 3 days. On the first day, the participants met their group and instructor for a brief orientation session. In the following days, the workshop was divided into plenary sessions and small group sessions. The plenary sessions had different topics (Table 2), and a different instructor presented each topic. In the small group session, each participant met with her/his peer group member and the instructor, who was an expert in the field of his/her research.

In the plenary sessions, the instructors taught the essentials of manuscript writing and some pitfalls to avoid. One pitfall that I found especially useful was the avoidance of using a passive voice when writing. I now understand that using an active voice is clearer for the reader. Because the instructors are on journal editorial boards, as well as successful principal investigators, they were able to provide pertinent and specific examples from their own personal experiences about the writing and submission process. Notable examples included what was appropriate to include in a cover letter, as well as whether and when it may be appropriate to call the assigned editor of your manuscript. Since participating in this workshop, I now know that there is no correct order to write an article (e.g., starting with the results, starting with the methods, or starting with the discussion can all make sense), but as an individual you will develop your own order. Also, it is fundamental to write an outline even before concluding experiments, and a good hypothesis should contain the phenomenon, the direction, and the time. Those were only a few examples of what was taught in the plenary sessions that I will take forward in my own writing. Additional important topics that were discussed in the plenary sessions surrounded manuscript peer review (Table 1).

Regarding the small group sessions, we were able to discuss our draft manuscript that we submitted before arriving at the course. We also discussed how to select an appropriate journal, how to write to the editors, as well as how to respond to reviews. For me, one of the most memorable moments of the course was our small group discussions, where I was able to receive valuable critiques on my draft manuscript. I really valued the comments from an experienced scientist in my field, as well as my peer group members. Everyone in our group was very open to hearing suggestions and understanding that this is not the time to be defensive but rather open. This is what made the small group sessions work well. We were able to cover a lot of ground by having each of us realize the goal was improvement, not protection, of the manuscript draft. In the future, I will be more open to sharing my first drafts with coauthors, now that I understand this concept.

Overall, attending the APS workshop was a great opportunity to improve my skills of writing and reviewing manuscripts. One concept that I had previously known and the APS workshop only reinforced was that there is no workshop that will help if you are not motivated to perform the best science and write the best manuscript.

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GRANTS

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AUTHOR CONTRIBUTIONS

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REFERENCES