

1 **Editorial for AJP-Cell Physiology**

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3 **Onward and Upward with Transparent Research Reporting**

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11 In 2015, APS Council and the APS Publications Committee, the latter led by  
12 Dr. Curt D. Sigmund, began an initiative on the transparency of research  
13 reporting in the APS Journals. At this time, concerns over biosciences  
14 research reproducibility, especially in areas such as pre-clinical cancer  
15 biology research, had become prominent [2, 7, 8]. As of 2017, multiple  
16 funding bodies, including the USA National Institutes of Health, have  
17 reconfigured their instructions for preparation of grant applications to give  
18 more emphasis to methodology, experimental design and the validation of key  
19 reagents [e.g., NIH: [grants.nih.gov/reproducibility/index.html](http://grants.nih.gov/reproducibility/index.html); UK Medical  
20 Research Council: [www.mrc.ac.uk/documents/pdf/methodology-and-  
21 experimental-design-in-applications-guidance-for-reviewers-and-applicants/](http://www.mrc.ac.uk/documents/pdf/methodology-and-experimental-design-in-applications-guidance-for-reviewers-and-applicants/)].

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23 The APS initiative included discussions between the Publications Committee,  
24 Editors of APS Journals and Editorial Advisory Board members on how  
25 guidance to authors for manuscript preparation could be aligned with the over-  
26 arching goal of enhancing the likelihood of research reproducibility. The  
27 discussions highlighted the central issue that any attempt at research  
28 reproduction (or extension) depends on access to sufficient information on the  
29 reagents, experimental procedures and statistical analyses utilised in the  
30 initial research study. Thus one major outcome was that in August 2016 the  
31 APS Journals updated their Instructions to Authors for manuscript and figure  
32 preparation. At the start of 2017, new questions for reviewers were introduced  
33 as part of the peer-review process for original research manuscripts. In this  
34 Editorial, I will discuss areas of Methods reporting that are of particular  
35 relevance to *AJP-Cell Physiology* and offer some points of guidance to  
36 potential authors. Of course, there are many aspects of reagent choice and  
37 experimental design that may affect the likelihood of research reproducibility.  
38 Several “hot-button” topics, including the selectivity of pharmacological  
39 inhibitors, or the specificity and reliability of commercial antibodies, have been  
40 addressed recently in *AJP-Cell Physiology* and will not be not covered further  
41 here [4, 10].

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43 Many readers of this editorial will be familiar with training graduate students to  
44 question their reagents, to be meticulous and timely with record-keeping, and  
45 to present comprehensive explanations on methods, reagents and statistical  
46 analyses when writing a research thesis. Nevertheless, this level of detail is  
47 far removed from the abbreviated style of methods writing that has come to  
48 predominate in modern bioscience research papers. From the beginning of  
49 the APS discussions, it was clear that certain practices in research reporting  
50 were and are a source of frustration for many Editors. Based on outcomes

51 from the APS discussions a new section has been included in the online APS  
52 Information for Authors, “Experimental Details to Report in Your Manuscript”  
53 ([www.the-aps.org/mm/Publications/Info-For-Authors/Experimental-Details-to-](http://www.the-aps.org/mm/Publications/Info-For-Authors/Experimental-Details-to-Report)  
54 [Report](http://www.the-aps.org/mm/Publications/Info-For-Authors/Experimental-Details-to-Report)). Extended background information is also provided in another new  
55 section “Promoting Transparent Reporting” ([http://www.the-](http://www.the-aps.org/mm/Publications/Info-For-Authors/Promoting-Transparent-Reporting)  
56 [aps.org/mm/Publications/Info-For-Authors/Promoting-Transparent-Reporting](http://www.the-aps.org/mm/Publications/Info-For-Authors/Promoting-Transparent-Reporting)).  
57 Prospective authors are strongly advised to consult both of these sections,  
58 which set out, in a clear and concise way, certain general expectations for  
59 quality control and depth of explanation for methods involving cell lines,  
60 antibodies, vertebrate animals, or samples from humans. Minimum standards  
61 for reporting on the sources of reagents, the presentation of immunoblots,  
62 statistical analyses, mathematical models, or the availability of computer code  
63 are covered, along with best practice expectations for the handling and  
64 presentation of digital images.

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66 These are all “common-sense” reporting procedures for researchers and  
67 prospective authors are presently *encouraged* to adopt these practices. The  
68 peer-review policy of APS is that manuscripts are accepted based on their  
69 scientific content and the presentation of the material. At *AJP-Cell*  
70 *Physiology*, we wish to promote especially the transparency of reporting for  
71 reagents and methods that are core technologies for cell-centric research. For  
72 example, in view of the importance of cell lines, strains and primary cultures in  
73 many papers published herein, we aim to promote transparency of research  
74 reporting of variables related to cell cultures. Articles in *AJP-Cell Physiology*  
75 have emphasised the need to report the sex of your cells in the Methods  
76 section [12, 13]. Another methodology that features in many *AJP-Cell*  
77 *Physiology* papers is immunoblotting: we expect to see appropriate  
78 quantification from immunoblots [9] and the Information for Authors also  
79 provides detailed guidance on how immunoblot panels should be annotated.  
80 Where needed, we will ask authors to make final minor figure or text  
81 corrections before acceptance for publication.

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83 Looking ahead into 2017 and beyond, what other aspects of data presentation  
84 would further improve transparency of reporting at *AJP-Cell Physiology*?  
85 Many papers published in *AJP-Cell Physiology* present data from multiple  
86 independent experiments in the form of bar graphs that display the mean,  $-/+$   
87 standard deviation or standard error of the mean [3]. More general use of the  
88 box-and-whisker plot or its variants [6] at *AJP-Cell Physiology* would provide  
89 better transparency on the distribution of the underlying data. As the APS  
90 Journal that is focused on Cell Physiology, *AJP-Cell Physiology* also receives  
91 many manuscripts that address questions of molecular localisation and/or co-  
92 localisation in cells, often demonstrated by presentation of digitally-merged,  
93 confocal fluorescence microscopy images. Aside from the general debate on  
94 the most meaningful method(s) to demonstrate molecular co-localisation,  
95 current digital imaging and post-acquisition image analysis software provide  
96 many valuable options for quantified analysis of co-localisation from confocal  
97 microscopy: we encourage authors submitting to *AJP-Cell Physiology* to  
98 embrace these methods. For transparency of reporting, the rationale for the  
99 metric chosen, the parameter settings applied, and the tests conducted to  
100 assess datapoint distribution [5] need to be stated in the Methods section.

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102 In January 2017, the “Reproducibility Project: Cancer Biology” published the  
103 results from its first five projects. These showed mixed success in research  
104 replication [11]. Clearly, transparency of reporting is only one aspect of good  
105 research practice that may improve research reproducibility and robustness  
106 [1], yet it is a rational step that can be applied with clear objectives. For *AJP-  
107 Cell Physiology* to meet the goal of enhanced transparency of research  
108 reporting will need concerted, stringent, yet benevolent, input from authors,  
109 reviewers and editors. Authors should reap benefits when preparing  
110 transparency materials for funding applications. For reviewers, the additional  
111 questions on the review form aim to make checking of central areas of  
112 transparent reporting systematic across all manuscripts. I hope that all  
113 contributors to *AJP-Cell Physiology* will be willing to “step up to the plate”. I  
114 thank the authors, reviewers and editors who are already putting into practice  
115 careful attention to methods reporting. Recent surveys in the USA and the UK  
116 attest that scientists are some of the most esteemed [14] or trusted [15]  
117 professionals. Striving to increase transparency is a contribution we can make  
118 to further strengthen rational, evidence-based advancement of knowledge.

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