Perspective

Proposal for ‘segmented peer review’ of multidisciplinary papers

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We propose a new process for peer review of multidisciplinary journal submissions called ‘segmented peer review’. The current translational research environment increasingly requires complex and multidisciplinary studies that span multiple distinct specialties within a single paper. Such papers present logistic and practical barriers to effective peer review. To address these barriers, papers undergoing segmented peer review require authors to explicitly i) identify each of the areas of expertise required to review the paper, ii) direct each reviewer to the relevant portions of the manuscript, and iii) suggest in-field reviewers. This segmentation of the paper is then followed by a ‘segmented peer review request’ tailored to the expertise of each potential reviewer, with a request to confine his/her review to those ‘in-scope’ aspects of the paper, while de-emphasizing any optional ‘out-of-scope’ comments. Each reviewer indicates the fitness for publication, or suitability for revision, of their particular segment of the manuscript. The segmented peer review process is completed when the editors integrate the segmented peer reviews. We propose segmented peer review as a fit-for-purpose process with tangible advantages for authors, reviewers, and journal editors. It should reduce the specific barriers to publication inherent in the evaluation of multidisciplinary research efforts.

Keywords: Multidisciplinary Peer-review Translational research

A B S T R A C T

We write to propose a new model of peer review for multidisciplinary translational research papers. Biological and translational research is increasingly a multidisciplinary process. There is a well understood need for research with a multidisciplinary approach to solve complex problems, with many funding agencies reflecting this as a requirement. At their best, translational research papers are stories that link several sequential aspects along the road to clinical application. For example, exemplary translational research may in a single paper propose a novel biological feature of interest in a specific disease, identify its prevalence in new analyses of established preclinical models, explore its clinical significance through bioinformatic analysis of publicly available genomics data, and validate it as a potentially modifiable drug target by loss of function or gain of function studies in preclinical models. As such, the resulting papers require the intellectual input of multiple experts, and are both more important and more complex than undisciplinary research papers. Such papers, however, present logistic and practical barriers to effective peer review. One such barrier, specific to multidisciplinary and interdisciplinary research is the contention that reviewers do not “interpret and apply evaluative criteria in identical ways because what counts as the proper criteria of the evaluation, and their relative weightings, are disputed” [1].

The complexity of multidisciplinary research is not appropriately addressed in the current research peer review process. In particular, journals have difficulty obtaining timely and appropriate reviews of multidisciplinary manuscripts that require expertise in several fields, even though articles “refereed and recommended for publication by a multidisciplinary set of referees were subsequently more likely to receive citations” [2]. Such manuscripts are daunting to a potential reviewer, as the breadth of such a paper is beyond the expertise of any one individual. Nonetheless, it is the implicit expectation that a reviewer comment on all aspects of a single manuscript, despite lack of expertise, and provide a global recommendation as to its suitability for publication. It is rare for a reviewer to request additional reviewers to compensate for their deficiencies. This results in i) rejection of requests to review, ii) inappropriate comments on areas outside the expertise of the individual reviewer, and iii) difficulty for the editors to re-assemble the reviewer’s comments into a cogent assessment of the merit of the paper. Below, we propose a new process to address this problem in which the review team is specifically tailored to be representative of the disciplines that generated the paper. We name this process ‘segmented peer review’.

Segmented peer review is a process where authors prospectively identify multidisciplinary papers that require segmented peer review, and in the process of the submission, explicitly i) identify each of the areas of expertise required to review the paper, ii) direct the reviewer to the relevant portions of the manuscript, and iii) suggest in-field reviewers. These additional parameters must either be explicitly detailed

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in the letter of submission, or ideally, required in an electronic submission stream for a specific category of publication designated ‘multidisciplinary for segmented peer review’. We present an illustrative letter of submission of a multidisciplinary translational paper:

Dear editor: RE: Evaluation of intratumoral rhubarb protein levels in invasive breast cancer – prognostic and treatment implications. This paper reflects work in disparate fields. We suggest the review process be segmented as follows:

(i) Immunohistochemistry. This comprises paragraphs 1-3 of methods and 1-5 of results and Figs. 1, 2, and 3. Expertise: Molecular Pathologist. Suggested reviewer: Dr. K.F. Cells, Kentucky.

(ii) Prognostic evaluation of a biomarker. This comprises paragraphs 4-6 of methods, paragraphs 6-9 of results, and Figs. 4 and 5. Expertise: Bioinformatics. Suggested reviewer: Dr. Heisenberg, Uncertain College.

(iii) Evaluation of the relationship between prognostic signal and breast cancer systemic therapy received. This comprises paragraph 7 of the methods, and Fig. 6. Expertise: Medical Oncologist. Suggested reviewer: Dr. M.E. Poison, Wellness Institute.

(iv) Evaluation of in vitro testing of rhubarb protein inhibition by CRISPR knockout assays. This comprises paragraph 8 of the methods, and Fig. 7. Expertise: Cell biologist. Suggested reviewer: Prof. IM Myopic, van Leeuwenhoek School for Tiny Things.

(v) Evaluation of in vivo effects of rhubarb protein inhibition on mammary cancer drug sensitivity using intravital microscopy. This comprises paragraph 9 of the methods, and Fig. 8. Expertise: Intra-vital microscopy. Suggested reviewer: Prof A. Hitchcock, Bates College.

This segmentation of the paper is then followed by a ‘segmented peer review request’ tailored to the expertise of the potential peer reviewer, with a request to confine his / her review to those aspects of the paper. Reviewers are approached as follows: “Dear expert in breast cancer immunohistochemistry. We have received a multidisciplinary paper, and to reduce your review time and in recognition of your expertise, we request your assistance in a segmented peer review of the manuscript: Evaluation of intratumoral rhubarb protein levels in invasive breast cancer – prognostic and treatment implications. Because of your expertise in breast cancer immunohistochemistry please confine your review to ‘in-scope’ comments on paragraphs 1-3 of methods, paragraphs 1-5 of results, and Figs. 1, 2, and 3. Indicate whether the methods and conclusions are scientifically valid, and where they need to be revised to be acceptable for publication in our journal. Should you wish to make additional comments on the paper outside of these areas, please return these as optional ‘out of scope’ comments. Your ‘out of scope’ comments will be considered by the editors but will be weighed less heavily than your ‘in-scope’ comments.”

Analogous letters will go to the other reviewers in the four other disciplines required for this paper.

The segmented peer review process will be completed when the editors evaluate and integrate the various reviews and synthesize the segmented peer reviews. Each reviewer indicates the fitness for publication and requirement for revision of their particular segment of the manuscript, thereby assisting the editors to appraise the entirety of the multidisciplinary submission in an equitable and efficient manner (summarized in Fig. 1).

In summary, we propose segmented peer review as a fit-for-purpose process with tangible advantages for authors, reviewers, and journal editors. It should reduce the specific barriers to publication inherent in the evaluation of multidisciplinary research efforts. We welcome all feedback and refinements to this proposal.

Author contributions

Deepak Dinakaran: Conceptualization, Writing - Original Draft, Writing - Review & Editing
Matthew Anaka: Writing - Revised Draft, Writing - Review & Editing
John Mackey: Conceptualization, Writing - Original Draft, Writing - Review & Editing

Declaration of Competing Interest

None
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