Broadening Our Horizons: JBMR and JBMR Plus Embrace Preprints

The ASBMR Publication Committee, together with the Editors-in-Chief of JBMR, JBMR Plus, and members of the editorial boards, have implemented a new policy that allows manuscripts that have been posted on noncommercial preprint servers to be submitted to the journals for consideration. The use of preprint servers is becoming more common, but, because it is still rare in the field of bone and mineral research, the concept is most likely unfamiliar to many readers of JBMR and JBMR Plus. To clarify the new policy decision, this editorial provides a brief overview of preprint servers and describes their role in biomedical research.

Picture this common scenario: a young biomedical researcher has spent years collecting data for a very exciting project and is finally ready to submit a manuscript. This researcher is also applying for an NIH grant. Do they (i) hold off on submitting the grant application, knowing that they will have a greater chance of receiving funding once their paper is accepted; (ii) submit the application right away, even though they are missing the crucial citation; or (iii) upload a draft of their manuscript to a preprint server, using the citation for their application while they wait for a response from the journal? Many researchers are unaware of option iii, but it demonstrates one of the primary utilities of preprint servers: rapid dissemination of results within the scientific community.

Preprint servers, such as bioRxiv, PeerJ Preprints, and arXiv-q bio, provide a way to publish and distribute scientific papers online with minimal hassle. Posting to a preprint server is free (with noncommercial servers), fast (within a few days, sometimes within 24 hours), and easy. Once submitted, a draft is checked for scientific content and plagiarism, and then added to the server archive without peer review, revisions, or editing. Servers assign each manuscript a persistent link (DOI), allowing the work to be searched and cited. Authors can use their DOI as a citation in grant applications, progress reports, and on their curriculum vitae (CV). Some servers (eg, bioRxiv) make the process of submitting the manuscript to the journal more streamlined by allowing authors to transfer their manuscripts directly from the server to a journal, which is a functionality we hope to integrate in the future. Once printed by a journal, most preprint servers will update the DOI link to the publication of record, so that versioning of the paper is fully transparent.

Preprint servers are open; anyone can read the articles without paying for a subscription. Readers who frequent the servers tend to be researchers in the field. Posting a paper, like publishing in a peer-reviewed journal, draws feedback and criticism from the community, which can inspire new experiments and foster collaborations. It can also help authors strengthen their work before they submit their manuscript to a peer-reviewed journal. In this way, preprint servers provide fast delivery of the latest information within the scientific community, while also taking advantage of peer input to improve a manuscript before publication. As part of the scientific record, preprint servers can be viewed as an early step in the refinement process of reporting new discoveries.

Despite their appeal, preprint servers had a bit of a rocky start in the biomedical research community. The concept of preprints is not new to the field. In the 1960s, the NIH began circulating papers in Information Exchange Groups (IEGs) to facilitate the exchange of ideas among experts in select subspecialties.(1) At the time, the relationship between preprint and canonical publication was not a positive one; in fact, some commercial journals viewed IEGs as competitors. Worried about losing novelty, in 1966 the American Association of Immunologists (AAI) banned manuscripts that had been circulated in an IEG from submission to their journal. Thirteen other journals soon followed suit, and Nature and Science both published editorials criticizing IEGs, implying that they encouraged a dangerous disregard for scientific integrity by distributing work without peer review. Many of the IEGs were dissolved soon after. In 1999, another attempt was made by the NIH to create a preprint server, called E-biomed, but it once again met with backlash from publishers and was shut down while still in the planning phase.

Since then, opinions on the use of open-source preprint servers have changed. Nature Publishing Group (NPG) modified its submission policy to allow preprints in 1997,(2) and even launched its own preprint server, Nature Precedings, which was open from 2007 to 2012. In 2013, PeerJ Preprints and the Cold Spring Harbor–run bioRxiv were established. Use of both servers has grown over the past 4 years. Part of this trend may be connected with frustration regarding the slow process of review and revision required to publish a paper in a high-tier journal. Initiatives such as Accelerating Science and Publication in Biology (ASAPBio) are attempting to shift the culture of biology to encourage acceptance of preprint servers. Proponents point out that preprints aren’t just good for the author; they’re good for the scientific community, and by natural extension good for the public.

Even with these potential advantages, acceptance of preprint servers in the biomedical community still lags behind other fields of science. In contrast to physicists, who have used the preprint server arXiv for over 25 years, biologists are still hesitant to share their results in preprint. This is due to multiple factors—fear of being scooped and lack of awareness being the most prominent. However, new support from funding agencies and...
journals is shifting the attitude of the biomedical research community in favor of preprints. The NIH, for example, recently adopted a policy accepting preprint citations in grant applications and progress reports; this has created a compelling reason for researchers, particularly young investigators, to turn to the rapid distribution of online servers. But the debate is far from over. Preprint servers will require wider acceptance in the community to find their place in the publication pipeline. Publishers weigh the benefits and risks involved in accepting papers for submission that have appeared in preprint. Below are some of the key arguments.

Pros

Attracting young investigators

Because younger scientists are more likely to post preprints, journals that will not consider preprinted manuscripts may seem less appealing to new researchers.

Better-quality papers

Feedback from the scientific community in response to preprints encourages authors to refine their work, leading to high-quality initial submissions. This has the potential to minimize revisions and to make the editorial process run more smoothly.

Indication of interest level

Community excitement surrounding a paper is a good indicator of its potential impact, and could also draw more publicity for the final, peer-reviewed version when it is published. Journals can benefit from publishing the “definitive” version of a groundbreaking work, and preprint servers generally support this by updating their DOI to direct readers to the published version.

Supporting the rapid progress of science

Journals, as part of the scientific community, benefit from changes in science that accelerate the rate of discovery. Preprint servers allow rapid distribution of information, which has the potential to generate new hypotheses and foster collaborations at a faster rate. Preprint servers also widen the breadth of information that can be shared; eg, negative results rarely find acceptance in canonical publications but are not discouraged from preprint distribution.

Good company

Top tier journals such as Nature, Science, and Cell, have made themselves compatible with prepublication in established preprint servers. In addition, prominent journals in the bone and mineral research field, including Bone, Endocrine Reviews, and others, have policies allowing submission of manuscripts that have appeared as preprints.

Cons

No peer-review process

Preprint servers do not have a peer-review process, meaning everything printed on these servers is “self-policed” for rigor and accuracy. Misinterpretation and overstatement, both of which are often checked in the formal peer-review and editorial process, can make their way into a preprint.

Dilutes novelty of findings

Preprints can attract publicity, which some journals view as a strike against their novelty, one of the key metrics for acceptance. Under the Ingelfinger Rule, The New England Journal of Medicine (NEJM) views draft preprints as prior publication and thus unacceptable as manuscript submissions. Although most journals do not take this view, there are more subtle caveats at work that should be considered by both authors and journal editors. According to the Science editorial policies, “reporting the main findings of a paper in the mass media can compromise the novelty of the work and thus its appropriateness for Science.”

Competition with commercial journals

Funding for preprint servers is provided by nonprofit agencies and universities: arXiv relies primarily on Cornell University and the Simons Foundation; and bioRxiv is funded by Cold Spring Harbor Laboratories, the Lourie Foundation, and the Chan Zuckerberg Initiative. Costs to run and maintain preprint servers are diminished by the lack of peer-review, editing, and printing costs, keeping them streamlined and fast. Because of this, some fear that commercial journals will suffer a loss of submissions, particularly if scientists begin to view preprint as a sufficient endpoint for publication.

Lack of consensus regarding citation/priority

Preprint servers are still in their infancy, and there is no consensus for citing preprint work. Preprints are not universally accepted as intellectual priority, leading to worries about infringement and potential conflicts among authors that could pull journal editors into the fray.

Many of the arguments against preprints are entangled in the culture of biomedical research. This means change will happen slowly, but it also means that the key players—researchers, societies, funding agencies, and publishers—have a large amount of control over how these changes develop. For example, a shift in attitude toward preprints has occurred among publishers, from rejection in the 1960s to current acceptance. Many publishers now believe preprint and publication complement, rather than compete with, each other. Preprints allow researchers to share new information quickly, but peer review is still recognized as a hallmark of quality. Nature has argued for a synergistic relationship between preprint servers and canonical peer-review, arguing that “rapid dissemination in a preprint server and high-quality peer review and promotion through publication in a scientific journal should, in our view, go hand in hand.”

Perhaps the most evocative argument against submission to preprint servers (other than the ubiquitous fear of being “scooped”) is the loss of novelty that may come with posting a preprint, and the impact that this could have on the final editorial decision. Most journals are heavily invested in the novelty of the papers they publish, and have media embargos that prevent authors from discussing their work prior to publication. Some, like the NEJM, consider preprints to be on par with discussing the work with the media prior to submission. However, practical experience shows that preprint servers have more in common with a scientific conference than a press conference; they provide a venue for researchers to share their
work within a small community of specialists. The media is unlikely to pay special attention to preprint servers, particularly because, unlike media announcements, preprint drafts make no special effort to “translate” the work for a lay audience. Journals have the potential advantage of producing the definitive, peer-reviewed version of a manuscript that, despite having lost some novelty, will have generated enough attention in the field to garner a high number of citations.

In summary, although preprint servers are appealing because they offer a rapid pipeline for new information in the research community, journals still represent the bastion of scientific quality because of their peer review and editorial processes. Although current participation in preprint servers from biologists is low, there is a clear trend toward adopting the practice. In the past year the approximate number of preprints submitted each month to bioRxiv doubled from 500 to 1000.\(^6\) If consensus is amicably reached among scientists, funding sources, and publishers, preprint servers can become a complementary mechanism that supports, rather than bypasses, the traditional peer-review process. Preprint servers are new for many of us and will continue to be an ongoing topic of discussion. As always, we welcome feedback from ASBMR members regarding our policy decision.

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