Maintaining confidence in the reporting of scientific outputs

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Abstract

The timely and accurate dissemination of scientific discoveries is of utmost importance so that scientific knowledge can be advanced and applied to benefit the public. Scientists communicate amongst themselves at conferences, via journal articles, and, increasingly in the life sciences, in preprint manuscripts which have not been subject to peer review. Journalists translate new research into a language the public can understand, relying on both work presented in scientific forums and interviews with experts. Critically, scientists and journalists both share the ethical principle that publications should be rigorously sourced and fact-checked, with errors subject to publicized corrections. Here we respond to concerns raised about the impact of reporting on results that have not passed through peer review, calling for improved dialogue between

scientists and journalists to maintain public trust in research and arguing that imposing limits is against the public interest.

Text

Sheldon [1] argues that preprints, publicly available research articles that have not yet been peer reviewed, pose a threat to the integrity of science journalism because preprints pressure journalists to rush out pieces on unverified, sensational findings. Thus, preprints may increase the frequency of inaccurate stories, eroding public understanding of science.

We agree that scientists and journalists should communicate scientific findings in ways that maximize public understanding. Our disagreement is rooted in recognizing that the tension between supporting preprints and good journalism is a false dichotomy. Limiting what or when preprints are released could suppress science communication without providing any clear benefit to the public. Instead, we argue that when basic journalism principles are followed [8-11], reporting on preprints should carry no greater risk to public understanding of science than reporting on peer-reviewed articles.

To address fears about the quality of preprints, Sheldon [1] asks several questions for journalists and scientists to debate. One issue is whether preprint publishers should consider increasing pre-screening. We note that the largest life science preprint server, bioRxiv, which holds over 30,000 preprints enforces guidelines on what work does and does not meet requirements for publication. Only complete manuscripts are accepted, and every submission is subject to basic checks to prevent plagiarism or the publication of unscientific, offensive or dangerous material. A second issue is whether preprints should come with a warning. Again, this already happens on bioRxiv: preprints carry an explicit and highly visible notice that work has not been peer reviewed. These safeguards provide a basic level of confidence that preprints contain genuine scientific research while also advising the reader to read critically.

Threats to scientific reporting cannot be solved solely by peer review. Articles are assessed by several peer reviewers who often disagree on an article's content and quality, and do not necessarily represent the diversity of opinions from the wider scientific community. Further, the history of publishing has shown that peer review does not necessarily guarantee scientific integrity [15-17]. There are numerous cases of influential peer-reviewed articles that were later retracted [15], such as articles correlating vaccination and autism [3,4], reporting the cloning of human embryos [5,18], and attributing morphology of the human hand to Intelligent Design [6]. As pointed out by Sheldon [1], uncritical reporting based on peer-reviewed articles can spread misinformation and harm.

As a result, we caution against relying on peer review as strong evidence for scientific soundness, and urge application of due diligence in reporting on all research outputs [7].

Reporting on peer-reviewed articles and preprints alike requires critical reading and consultation with the authors of the research as well as unaffiliated experts. Following this approach, standards for the acquisition and reporting of newsworthy information are maintained [8-11].

We hope that journalists and researchers continue to work together to ensure accurate, informative and interesting reporting of scientific findings. In an example from physics, rumors of the discovery of the Higgs boson had been circulating before the research was published [12], yet reporters did an excellent job of treating rumors as unverified findings, only announcing a discovery once consensus had been reached in the scientific community.

Timely circulation of data and ideas can also have immediate impacts on improving the human condition. Preprints and open sharing of data can play a key role in this process. A recent example is the release of Ebola genome data by an international team including Dr. Pardis Sabeti's group during the recent West Africa outbreak [13]. The data were deposited immediately upon sequencing and helped save lives by quickly identifying the mechanism of disease transmission [14]. These advances would have been delayed had the data first been cleared by peer review.

In closing, we argue that critical evaluation of all research outputs and increased dialogue between reporters and scientists is crucial to maintain trust in research. In our opinions, the benefits of preprint outweigh concerns about confusion arising from journalists possibly reporting on erroneous preprints. Current guidelines on what constitutes a preprint and what constitutes appropriate rigor in science journalism have been sufficient to avoid this problem for decades of online preprint, and we expect this to continue to be the case. Finally, when work has public health implications, instead of placing a moratorium on the release of results as preprints, scientists actually have an ethical responsibility to make their findings know as soon as possible.

Conflicts of Interest

Steven J. Burgess, Edward Emmott and Zach Hensel are members of the ASAPBio Ambassador program to promote the use of preprints.

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