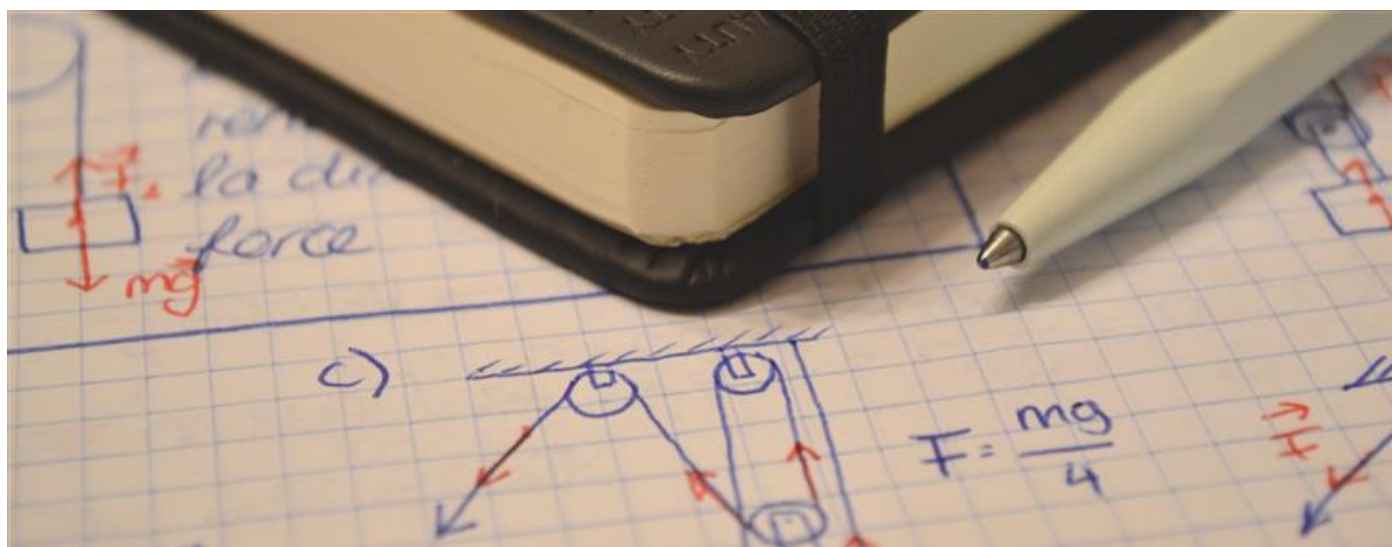


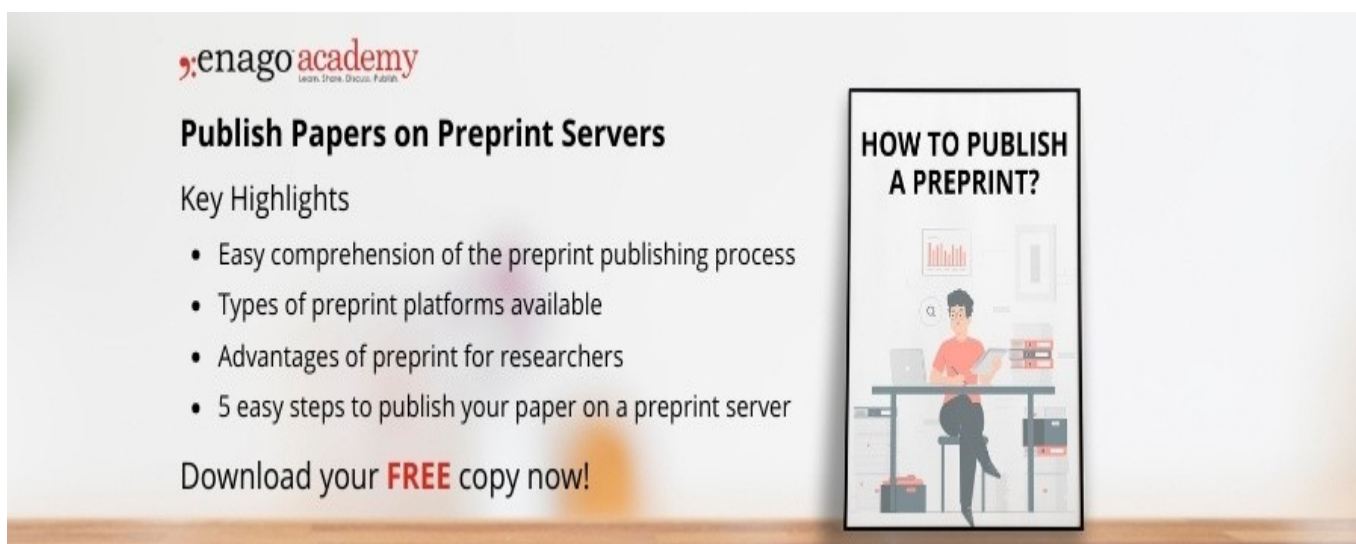
Preprints: Does Publishing Research Early Have a Downside?

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In biology, a debate has erupted over using preprints to share your research article early online, before undergoing a formal peer review at a journal. The preprint is posted on a self-archiving platform such as BioRxiv, which is free to everyone. As a form of early publishing, the preprint pioneer ArXiv has been in use by physicists since the 1990s. Traditional publishing and its tedious peer review process now frustrate both scientists and their funders. Preprints offer speedier, open reporting, which can [accelerate scientific progress](#). It can also hit back at so-called predatory publishers and the pricey subscriptions of traditional publishing.



Preprint Revolution Hits Biology

The debate in biology will not be resolved overnight. Unlike physics, where publishing your paper as a preprint is the norm, biologists are only now really considering preprint archives. This comes from wishing to be more fair, open, and transparent with peers and the public. There is also an element of competition, too. Preprints might help you lay claim to a discovery and help others read, use, and cite your results sooner. It also shows funders that your research is mostly done and [almost-publication ready](#).

Preprints: Too Good to Be True?

An article by Wired gives a good account of the preprint revolution facing biology. However, it skims the potential downsides to posting scientific papers online before peer review. The [value of peer review](#) is generally not an issue: most scientists do want it, as does the public. The problem is that the cycle of peer review is under heavy strain and in the hands of big [subscription publishing houses](#). Surely, any new innovation entails risk and uncertainty. Using preprint archives is no different. However, ignoring its potential concerns is naïve at best, and irresponsible at worst.

Eight Pitfalls of Preprints

There are eight downsides to posting articles to BioRxiv (or any similar platform, like ASAPBio).

1) The journal may not recognize your preprint as the rightful claim to a discovery, such as a cure for an illness or new genetic technique. Publication in a prestigious journal still [carries a lot of weight](#). This matters especially for career advancement, and so it affects early stage researchers the most.

2) Journals could opt to reject a preprint manuscript outright. An example is the *New England Journal of Medicine*, which offers open access to its articles. By contrast, other

journals, like *PLoS Genetics*, may hunt for impactful papers on BioRxiv to publish. Not publishing in a reputable peer-reviewed journal is a dead-end unless academia's evaluation culture is displaced.

3) There needs to be the development of apps that let people comment on, or like/dislike, a preprint. This, like other social media tools, can easily result in nefarious ends. It may also hinder the modesty and quality of science if getting attention and “buzz” becomes a research goal. Allowing commenting by anyone in the professional evaluation of science invites trolling. This could further marginalize minorities and women doing science.

4) The preprint may end up losing accuracy to speed. A preprint has this inherent trade-off, in that putting your work out there first is easier but rushing it likely sacrifices its accuracy. Peer review, as done via traditional publishing, provides a strong incentive to be as accurate as possible. However, open access repositories, like ArXiv, may include quality control in the form of expert moderators.

5) Nothing stops journals in traditional publishing from co-opting the preprint model. The high-profile publisher, Cell Press, has effectively done this. It has an online [platform called “Sneak Peak”](#), for accepted manuscripts available to anyone who registers. Many journals have an “Online Early” section—though not always open—where published papers appear in a volume/issue. In both cases, only the time to an editorial decision matters.

6) By using the preprint option, biologists are effectively endorsing the sharing of findings and data not yet peer-reviewed. The mainstream media and private sector could mistakenly jump on this, and thus mislead the public. Certainly, open access repositories need to have some quality control measures in place. Yet others worship speed and decentralization more.

7) Bad science could flood open access repositories. This would dilute the already rapidly growing body of scientific literature. However, the preprint archives could enable fruitful discussion and feedback from unsolicited peer reviews. The preprint author could then make changes to improve the paper before submission to a journal. Quality control of preprints could also winnow out the very bad science.

8) Some fields are struggling with reproducibility failures. For example, in psychology, the results of only 40% of its published studies could be replicated independently, but this “Reproducibility Project” has been [fiercely critiqued](#). Other fields, like ecology, study complex and innately variable systems, which makes reproducibility difficult across all places and times. Inaccuracies in preprints are more likely to compound this problem than relieve it.

Breaking the Cartel

The impact of traditional scientific publishing should not be underestimated. Commercial subscription publishing now controls biology, making large profits from pricey subscriptions to universities. By contrast, in physics output is controlled by scientific

societies. This makes open access repositories easier to implement. Wrestling back control from the likes of Springer Nature, Wiley-Blackwell, and Elsevier won't be easy.

Slow Science

What if [scientists slowed down](#) and took their time? This [movement has a manifesto](#), but many forces are against it. Slower, deliberate careful research would tackle the above dilution problem and mitigate reproducibility failures. It would also lessen the volume of research appearing in both preprint form and traditional publishing, and reduce the pressure and [stress faced by nearly all scientists](#).

Future of Biology Preprints

So far, geneticists and neuroscientists seem to have embraced the preprint option via BioRxiv. Other fields, like ecology and evolution, may take longer to adopt this challenge to traditional publishing and peer review. Nonetheless, the success and operation of ArXiv show that open science has a prosperous future. For biologists to realize something similar, however, they must [tackle predatory publishing](#) while also avoiding these preprint pitfalls. A key way forward is to settle upon a single online archive. Here, all the preprint versions would follow the same quality standards and rules, and be easily found and freely available.

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