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Genes to Cells

Commentary

Researchers support preprints and open access publishing, but with reservations:

A questionnaire survey of MBSJ members

Short title: Preprints and open access publishing

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Abstract

Since the 1990s, journals have become increasingly online and open access. In fact, about 50% of articles published in 2021 were open access. The use of preprints (i.e., non-peer-reviewed articles) has also increased. However, there is limited awareness of these concepts among academics. Therefore, we conducted a questionnaire-based survey among members of the Molecular Biology Society of Japan.

The survey was conducted between September 2022 and October 2022, with 633 respondents, 500 of whom (79.0%) were faculty members. In total, 478 (76.6%) respondents had published articles as open access, and 571 (91.5%) wanted to publish their articles in open access. Although 540 (86.5%) respondents knew about preprints, only 183 (33.9%) had posted preprints before. In the open-ended section of the questionnaire survey, several comments were made about the cost burdens associated with open access and the difficulty of how academic preprints are handled.

Although open access is widespread, and recognition of preprints is increasing, some issues remain that need to be addressed. Academic and institutional support, and transformative agreement may help reduce cost burden. Guidelines for handling preprints in academia are also important for responding to changes in the research environment.

Main Text

The number of papers published through open access continues to increase worldwide [1], and approximately 50% of articles included in the Web of Science Core Collection were publicly available in 2021 [2]. While open access improves access to scholarly articles, researchers are required to pay an average article processing charge (APC) of roughly \$2,000 for open access journals, and \$3,000 for hybrid journals [3]. A survey of a medical school in the United States (U.S.) suggested that APC is a burden on researchers [4]. This problem could be considered similar among Japanese researchers, and a technical report published in the National Institute of Science and Technology Policy suggested it [5], but quantitative results should be accumulated.

Preprints, along with open access, is another trend that has spread to various research fields in recent years. Preprints are not peer-reviewed, but are useful for quickly sharing research results and facilitating discussion in the professional community. Since 2010, more than 30 new preprint servers have been launched, and there are now more than 50 in operation [6]. While preprints were increasingly being posted and used, their social impact was also problematic during the coronavirus 2019 disease (COVID-19) era [7]. In addition, researchers' perceptions and awareness of the

preprints after being exposed to such social changes are not clear.

On the basis of these backgrounds, we conducted a questionnaire survey using data from the Molecular Biology Society of Japan (MBSJ).

Survey at the Molecular Biology Society of Japan

The survey was conducted between September 14, 2022, and October 5, 2022.

The potential participants were the members of the MBSJ (n = 11,792 as of November 2022). An email inviting responses to the survey was sent to the MBSJ's mailing list.

The information was also posted on the society's Facebook page. The survey was conducted with the informed consent of the respondents.

The questionnaire consisted of 22 items, including respondents' background, perceptions and awareness of open access and preprints, and a related open-ended section. The responses were descriptively analyzed using Microsoft Excel for Microsoft 365 MSO (Microsoft, Redmond, WA, USA).

During the survey period, 633 respondents (445 men, 186 women, two others) answered the survey. Of these, 615 (97.2%) were affiliated with a university or research institution, and 500 (79.0%) were faculty members. The detailed background information of the participants are presented in **Table 1**.

In total, 457 respondents (76.6%) had published peer-reviewed articles in open access. In addition, 571 respondents (91.5%) were willing to make their papers publicly available (**Table 2**).

Focusing on preprints, 540 (86.5%) respondents were familiar with the term, and 425 (78.7%) had referred to information contained in preprints (**Table 3**). However, only 111 (20.6%) participants knew about the Jxiv, a recently launched national preprint server in Japan (**Table 4**).

Although 206 (38.1%) respondents had felt the need to cite preprints, only 76 (14.1%) had cited them. Additionally, in a questionnaire asking whether the respondents had read peer-reviewed articles that cited preprints, 216 (40.0%) did not know, since they had never been aware of whether the cited references were contained in preprints or not (**Table 4**).

Of the respondents who knew the term preprint, 183 (33.9%) had posted it. While about half of the respondents wanted to post preprints in the future, 240 (44.4%) did not (**Table 5**). However, more than 75% of respondents ($n = 421$; 78.0%) believed that preprints will be used more in molecular biology in the upcoming years (**Table 5**).

Discussion and Conclusion

More than 90% of respondents would like to publish scholarly articles in open access, while more than 10% fewer had actually published before. This difference may be because 21% of the respondents are not faculty members, but the issue of cost burdens should not be ignored. Indeed, in the open-ended section of the questionnaire, several respondents mentioned the high cost of APC and the pressures it places on research funding. Financial support for publication costs by institutions is also desired **(Supplemental Tables S1 and S2)**.

In addition to the academic society and institutional support, transformative agreements, also known as transformational open access agreement, may help reduce the cost burden of researchers. Transformative agreements are a scheme that cover a series of agreements, ranging from traditional subscription licenses with additional discounts on APC, to agreements allowing unrestricted open access publishing [8]. Several transformative agreement projects are also underway in Japan in 2022 [9, 10].

In terms of preprints, more than 75% of respondents projected that their use in the molecular biology field will increase in the coming years. However, only about 30% of respondents had posted preprints, and 40% were not aware of being cited in peer-reviewed articles. In order to critically review scholarly articles, a sufficient practice to thoroughly check citations is important. The comments in the open-ended section also

indicated that there is wide variation in respondents' perceptions of preprints. Several researchers were not sure about the merit and/or demerit to post preprints, and others concerned the unauthorized and unconfirmed information/data in preprints. The obvious merits of depositing preprints in servers would be that it allows investigators to quickly share their research results, establish priority, and deepen the impact of their findings by making them available to the public. The demerits of depositing preprints in servers include the fear of scooping and the lack of assurance of the reliability of the experimental results [11]. Preprints are citable, but for these reasons as well, there remain difficulties in their handling (**Supplemental Tables S1 (e.g., #29-#44, #52-#58) and S2**). These may also have an impact on the evaluation of performance of the researcher.

In conclusion, in order to take advantage of benefits such as publication speed, we should prioritize claims and potential to increase the citation of peer-reviewed articles [12]. It would be meaningful to deepen our understanding and discussion of preprints among faculty members and students. It is also important to develop guidelines for handling preprints in academia. This could have a positive impact on dealing with preprints in press releases and media outlets.

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Tables:**Table 1.** Background information of respondents

Age category, years	n (%)
20–29	110 (17.4%)
30–39	111 (17.5%)
40–49	180 (28.4%)
50–59	163 (25.8%)
60+	69 (10.9%)
Gender	
Men	445 (70.3%)
Women	186 (29.4%)
Others	2 (0.3%)
Affiliation¹	
University or research institute	615 (97.2%)
Company or others	18 (2.8%)
Current position	
Faculty member	500 (79.0%)
Students, company employee	133 (21.0%)
Academic research activities involving the publication of papers, conference presentations, etc.	
Yes	624 (98.6%)
No	9 (1.4%)
Publication experience in peer-reviewed journals	
Yes	557 (89.3%)
No	67 (10.7%)

¹Students (including working graduate students) select "University or research institution". n = 633

Table 2. Experience and willingness to publish in open access

Have you ever published a peer-reviewed article in open access?	n (%)
Yes	478 (76.6%)
No	146 (23.4%)
Would you be willing to publish your peer-reviewed article in open access?	
Yes	571 (91.5%)
No	53 (8.5%)

n = 624 (participants who do academic research activities involving the publication of papers, conference presentations, etc.)

Table 3. Recognition and referred experience of preprints

Do you know the word "preprint", which means a non-peer reviewed article? Preprint servers operated as a platform for publishing preprints include arXiv, bioRxiv, ChemRxiv, medRxiv, Preprints, Research Square, SSRN, and others.	n (%)
Yes	540 (86.5%)
No	84 (13.5%)
If the answer to the above question is “Yes” – Have you ever referred to information in the “preprints”? Please note that this includes general information gathering, and does not matter whether the information is used in research or cited in peer-reviewed articles.	
Yes	425 (78.7%)
No	115 (21.3%)
Please select from the following the preprint server on which the referred preprint was published. ¹	
arXiv	53 (12.5%)
bioRxiv	414 (97.4%)
ChemRxiv	14 (3.3%)
medRxiv	95 (22.4%)
Preprints	13 (3.1%)
Research Square	52 (12.2%)
SSRN	21 (4.9%)
Others	12 (2.8%)

¹Multiple selections allowed. n = 624 (participants who do academic research activities involving the publication of papers, conference presentations, etc.)

Table 4. Experience related to citing preprints

Have you ever realized the need to cite preprint information in your own articles?	n (%)
Yes	206 (38.1%)
No	334 (61.9%)
Have you ever cited preprint information in your own articles?	
Yes	76 (14.1%)
No	464 (85.9%)
Have you ever read a peer-reviewed article that cited preprint information?	
Yes	229 (42.4%)
No	95 (17.6%)
I don't know because I've never been aware of whether the references are preprints or not.	216 (40.0%)
In March 2022, the Japan Science and Technology Agency (JST) began operating the Jxiv preprint server. Did you know this?	
Yes	111 (20.6%)
No	429 (79.4%)

n = 540 (participants who knew preprint)

Table 5. Preprint posting experience and preferences

Have you ever posted a preprint?	n (%)
Yes	183 (33.9%)
No	357 (66.1%)
Would you be willing to post a preprint in the future?	
Yes	300 (55.6%)
No	240 (44.4%)
If the answer to the above question is “No” – Please select the most applicable reason why you do not want the preprints to be made public. [†]	
There is no suitable preprint server for my research field	1 (0.4%)
I don't feel the necessity to publish the preprints	61 (25.4%)
It's not about achievement	28 (11.7%)
I would like to submit article to a peer-reviewed journal first	61 (25.4%)
The journal I want to submit to doesn't allow preprints	3 (1.3%)
There are no norms and conventions in the research field or community	3 (1.3%)
There's no peer review	21 (8.8%)
It could be a duplicate submission	7 (2.9%)
There is a possibility of plagiarism and scooping	55 (22.9%)
If the above reasons are solved, would you be willing to publish your paper in preprint? [†]	
Yes	91 (37.9%)
No	149 (62.1%)
Do you think the use of preprints will advance in the field of molecular biology in the future?	
Yes	421 (78.0%)
No	119 (22.0%)

n = 540 (participants who knew preprint)

[†]n = 240 (participants who will not post a preprint in the future)

Supporting Information

Supplemental Table S1. English summary of open-ended comments

Supplemental Table S2. Original language version of open-ended comments