

## Research on Stakeholder Rights and Interests in the Preprint Scholarly Communication System and Its Implications: Postprint

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### Abstract

**Objective** To investigate the respective rights and interests of stakeholders in the preprint academic communication system and provide recommendations for the development of China's preprint academic communication system. **Methods** Based on the rights policies of six preprint platforms (arXiv, bioRxiv, ChemRxiv, Research Square, SSRN, and F1000Research), relevant scientific journals, and funding agencies, we analyzed and sorted out the main rights of preprint authors, preprint platforms, preprint readers, scientific journals, and preprint funders, and proposed recommendations for developing China's preprint academic communication system. **Results** We identified seven rights held by preprint authors, four rights held by preprint platforms, four rights held by preprint readers, three rights held by scientific journals, and two rights held by preprint funders. **Conclusion** In developing China's preprint academic communication system, attention should be paid to the following four points: attaching great importance to the formulation and display of rights policies in the development of China's preprint platforms; promoting cooperation between scientific journals and preprint platforms on the basis of rationally dividing their rights and interests; strengthening the formulation and display of preprint rights policies by funders such as funding agencies; and enhancing Chinese researchers' awareness of norms regarding rights in preprint academic communication.

### Full Text

## Investigation and Enlightenment of Rights and Interests of Key Participants in the Preprint Scholarly Communication System

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**Abstract:**

[Objective] To study the respective rights and interests of key participants in the preprint scholarly communication system and propose suggestions for constructing China' s preprint scholarly communication system.

[Methods] Based on the rights and interests policies of six preprint platforms (arXiv, bioRxiv, ChemRxiv, Research Square, SSRN, and F1000Research), related scientific journals, and funding programs, this paper analyzes and identifies the main rights and interests of preprint authors, preprint platforms, preprint readers, scientific journals, and preprint funders, and proposes recommendations for building China' s preprint scholarly communication system.

[Results] The paper summarizes seven rights and interests of preprint authors, four rights and interests of preprint platforms, four rights and interests of preprint readers, three rights and interests of scientific journals, and two rights and interests of preprint funders.

[Conclusions] Four key points should be addressed in constructing China' s preprint scholarly communication system: attaching great importance to formulating and displaying rights and interests policies in building domestic preprint platforms; promoting cooperation between scientific journals and preprint platforms based on a reasonable division of their rights and interests; strengthening the formulation and display of preprint rights and interests policies by funding agencies; and enhancing Chinese researchers' awareness of rights and interests norms in preprint scholarly communication.

**Keywords:** Preprint Scholarly Communication; Key Participant; Rights and Interests Policy; Rights and Interests

**Classification Number:** G237.6

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## 1 Introduction

Since the emergence of arXiv in 1991, preprint scholarly communication based on preprint platforms has developed for over three decades. With the rise of open access and open science, particularly amid the COVID-19 pandemic in recent years, preprint scholarly communication has attracted considerable attention from the international scientific community due to its rapid dissemination and high degree of openness, gaining increasing recognition and adoption among researchers. Statistics show that during the early stages of the pandemic, nearly 40% of English-language COVID-19 papers were preprints [1], and the cumulative number of preprints on arXiv, the world' s largest preprint platform, exceeded 2 million by early 2022 [2]. In China, the construction of a high-end exchange platform for research papers and scientific information is also prioritizing the development of a preprint scholarly communication system.

The preprint scholarly communication system is an academic exchange system dominated by the scientific community, with key participants including preprint authors, preprint platforms, preprint readers, scientific journals, and preprint funders, each possessing different rights and interests. However, due to researchers' insufficient or lagging understanding of these rights and interests, various issues frequently arise, such as: whether submitting a paper to a preprint platform results in loss of copyright; whether a paper already posted as a preprint can still be submitted to a journal; how readers can use preprints or other platform-provided content without infringement; and what regulations must be followed when posting preprint papers derived from funded projects. These rights-related issues have become barriers for researchers participating in preprint scholarly communication, even hindering the speed and scale of its development.

Current research on rights and interests in preprint scholarly communication primarily comes from the library and information science community, the scientific community, and the publishing industry. Liu et al. used semi-structured interviews to investigate Chinese researchers' perceptions of and attitudes toward intellectual property systems in an open access environment, finding that potential plagiarism from preprint posting was a major concern and that researchers anticipated improvements to the intellectual property policy system [3]. McKenzie surveyed "how biologists debate licensing preprints," revealing that 29% of bioRxiv authors retained all rights to their preprints, prohibiting reuse without permission, due to concerns about subsequent journal publication and the quality of non-peer-reviewed papers [4]. The Committee on Publication Ethics (COPE) noted in its discussion document that preprints may face challenges such as plagiarism of intellectual achievements, conflicts between preprint licenses and journal copyright transfer agreements, and emphasized that the key to addressing these challenges is transparency—namely, formulating relevant policies and making them publicly available [5]. While these studies represent valuable explorations, systematic investigations of the rights and interests of participants across the entire preprint scholarly communication system remain lacking.

This paper systematically analyzes and identifies the main rights and interests of preprint authors, preprint platforms, preprint readers, scientific journals, and preprint funders from the perspective of system participants, and proposes recommendations for constructing China's preprint scholarly communication system. This work can help researchers enhance their understanding of participant rights and interests, thereby facilitating their participation in preprint scholarly communication, and serves as an important reference for building China's preprint scholarly communication system.

## 2 Research Approach and Methods

Several international preprint platforms pay close attention to potential rights issues, striving to standardize rights through policies that clearly define the

rights and interests of all parties and effectively protect them in practice, thereby ensuring effective platform operation. Based on this observation, this paper analyzes policy content related to the rights and interests of each participant, starting from publicly available policies of preprint platforms and incorporating policies from scientific journals and funding programs, to identify the main rights and interests of preprint authors, platforms, readers, journals, and funders. In this paper, “rights and interests” include both legitimate rights granted by policies and legitimate behaviors permitted by them.

Current international preprint platforms are primarily built by academic organizations, though in recent years, some well-known publishers have entered the preprint domain through investment or acquisition. Therefore, this study selected three academic organization-built platforms (arXiv, bioRxiv, ChemRxiv) and three publisher-invested or acquired platforms (Research Square—invested by Springer Nature [6], SSRN—acquired by Elsevier [7], and F1000Research—acquired by Taylor & Francis Group [8]). Notably, F1000Research differs significantly from the other five platforms: all papers submitted to F1000Research undergo formal peer review after publication, and only those that fail peer review (i.e., papers with no peer review reports after six months or only one report after nine months, where the author chooses to stop the peer review process after discussion with the F1000Research team) can be considered preprints [9].

These six preprint platforms all enjoy high visibility and substantial preprint volumes, with relatively mature and comprehensive rights and interests policies that provide detailed analytical materials. Additionally, these platforms serve different disciplinary fields with distinct features, facilitating comparative identification of platform-specific rights and interests norms.

### 3 Rights and Interests of Participants

#### 3.1 Preprint Authors

By posting papers on preprint platforms, authors enable their research findings to be disseminated more rapidly and broadly. Authors serve not only as producers within the preprint scholarly communication system but also as initiators of preprint scholarly communication activities.

Through analysis and synthesis of author rights across the six platforms, we identify seven main rights and interests, as outlined in Table 1, detailed as follows:

- (1) **Authors retain copyright of their papers.** arXiv explicitly states that “the original copyright holder retains ownership of the work after posting on arXiv” [10], with similar policies across other platforms. If a new version is subsequently posted, the new copyright covers only additions, changes, or other new content appearing in that version.
- (2) **Authors have the right to establish research priority.** Preprint posting automatically generates a publication date, and both the date and

content are openly accessible. Therefore, authors can establish priority for their scientific achievements through time-stamped preprint records. In contrast, traditional journal publication cycles are lengthy, and papers are typically not publicly available during peer review, which can significantly delay priority establishment [11].

- (3) **Authors have the right to continue submitting to journals.** This refers to submitting papers already posted as preprints or their subsequent versions to scientific journals. Authors must ensure that agreements signed with journals regarding the published version (such as copyright transfer agreements with subscription journals or copyright license agreements with open access journals) do not conflict with rights exercisable under the license attached to the preprint version. Rare exceptions exist where authors cannot continue submission; for example, F1000Research only allows authors to submit papers that have not passed peer review (i.e., those retaining preprint status) to journals [9].
- (4) **Authors have the right to freely submit papers.** Submission is free, but authors must first register on the platform and make certain declarations and warranties, including but not limited to: (i) having the right to submit the paper, and for co-authored papers, obtaining consent from all co-authors; (ii) having the right to grant copyright licenses; (iii) having the right to use third-party materials with proper citation and without infringing others' intellectual property; and (iv) declaring competing interests, a requirement on most platforms, though authors may include such declarations in their papers if needed on platforms that do not mandate them.
- (5) **Authors have the right to select paper licenses.** When submitting a paper, authors must grant the platform a perpetual, non-exclusive, royalty-free license to publish, distribute, and store the paper. Each platform clearly specifies available license options. Generally, different versions of a paper may have different licenses, but once selected, a license cannot be revoked or changed.
- (6) **Authors have the right to freely revise preprints.** The typical practice is: for papers not yet publicly released on the platform, they can be reverted to an editable state for modification and resubmission; for publicly posted preprints, revisions must be made by creating a new version with a selected license, with the new revision linked to previous versions that remain publicly accessible. As shown in Table 1, SSRN is distinctive in that it only displays the latest revision publicly while allowing authors to view revision history [12].
- (7) **Authors have limited rights to withdraw preprints.** The typical practice is: for papers not yet publicly released, submission can be canceled; for publicly posted preprints, a new version marked "withdrawn" and not linked to the full text is created as the default display version, though

all previous versions including full texts remain accessible. Authors must explain the withdrawal reason, which may include inability to resolve issues through revision, but not subsequent journal publication. Platform approval is required for author-initiated withdrawals. Authors generally cannot delete publicly posted papers, with SSRN being an exception that allows authors to delete full texts while retaining abstracts or removing them from search engines or e-libraries [12].

### Table 1 Main Rights and Interests of Authors on Six Preprint Platforms

Note: “/” indicates that no relevant policy content was found.

### 3.2 Preprint Platforms

Preprint platforms receive and store preprints while providing open access services. As the publishing and storage medium for preprints, platforms maintain the closest connections with other participants and play a crucial bridging and linking role in preprint scholarly communication.

Analysis of platform rights across the six platforms reveals four main rights and interests, as outlined in Table 2, detailed as follows:

- (1) **Platforms have the right to review submitted paper content.** Papers uploaded to platforms typically undergo a basic review process before publication to pre-check for plagiarism, offensive, dangerous, illegal, confidential, unscientific, and/or inappropriate content. As shown in Table 2, only SSRN does not review paper content, instead reviewing only the completeness of submission items and the submitter’s eligibility. Platforms may reject papers that do not comply with platform content policies. Whether platforms accept papers previously posted on other preprint platforms or papers already accepted/published by journals depends on the specific platform.
- (2) **Platforms have the right to charge for preprint posting.** Most platforms provide free services. As shown in Table 2, only F1000Research charges for preprint posting; after a paper passes F1000Research’s pre-publication content review, the platform charges authors different article processing fees based on paper type [14].
- (3) **Platforms have the right to permanently archive and delete any preprint.** Papers posted on preprint platforms receive DOIs, become citable and indexable, and form part of the permanent scholarly record. Consequently, almost all platforms permanently preserve every paper and its versions. Therefore, preprint deletion occurs only in rare cases of major issues, including but not limited to: the submitter lacking legitimate rights to grant licenses, containing plagiarized material, describing unethical research, or posing national security risks.

- (4) **Platforms hold copyright over their legitimately generated content.** Platform-generated content refers to content created by the platform through its own processing methods based on user-submitted content with user permission, such as metadata and statistical metrics. According to copyright law, “generally, the copyright holder of a work is its creator” [15]. Unless platforms explicitly waive copyright, copyright over legitimately generated content belongs to the platform. Different platforms have varying degrees of open use for their generated content; for example, arXiv allows metadata use under CC0 1.0 (waiving copyright and placing it in the global public domain), SSRN only allows non-commercial citation of metrics, and Research Square prohibits any use of its content.

**Table 2 Main Rights and Interests of Platforms on Six Preprint Platforms**

*Note: “/” indicates that no relevant policy content was found.*

### 3.3 Preprint Readers

Readers access newly posted preprints through preprint platforms, gaining inspiration to advance their own research. Readers can also provide feedback to authors according to platform commenting rules, helping authors improve their papers. Readers serve as consumers and disseminators in the preprint scholarly communication system, and their benefits demonstrate the advantages of preprint scholarly communication.

Analysis of reader rights across the six platforms reveals four main rights and interests, as outlined in Table 3, detailed as follows:

- (1) **Readers have the right to search, browse, and download preprints.** Registration is typically not required and services are usually free. However, exceptions exist: on SSRN, papers uploaded by individual authors are freely downloadable, while those uploaded by publishers or institutions require payment according to the publisher’s or institution’s pricing.
- (2) **Readers have the right to reuse preprint content according to preprint licenses.** CC BY is the most commonly used license, allowing reusers to distribute, remix, adapt, and build upon the material in any medium or format, provided attribution is given to the creator, and permitting commercial use [16].
- (3) **Readers can comment on preprints under platform-permitted conditions and hold copyright over creative comment content.** Registration is required for commenting. Some platforms, such as bioRxiv, review comment content according to platform policies; others, like ChemRxiv, explicitly state they “are not responsible for the misuse or misappropriation of any content or information” [17]; and some, like F1000Research,

impose certain identity requirements on commenters to ensure professionalism and academic quality. Notably, when comments are sufficiently creative, this creative content generates new copyright. If authors wish to use this content to revise their papers, they must contact the commenter for permission.

- (4) **Readers have the right to access content via API.** Readers can obtain metadata, metrics, and/or full-text information through platform-provided APIs. When using APIs, readers must first review platform API usage policies; for example, arXiv requires acknowledgment statements on products related to its API, Research Square only allows API use after obtaining an access token, and bioRxiv and ChemRxiv provide APIs to facilitate text mining. Notably, when acquiring or using content via API, readers must obtain appropriate permissions from content copyright holders to avoid infringement.

### Table 3 Main Rights and Interests of Readers on Six Preprint Platforms

*Note: “/” indicates that no relevant policy content was found.*

#### 3.4 Scientific Journals

As the influence of preprint scholarly communication expands, most scientific journals now permit preprint posting before publication, and various interconnected services between preprint platforms and journals have emerged. For example, Springer Nature and Research Square collaborated to launch In Review, a journal-integrated preprint service that allows authors to select “Join In Review” directly from participating journals’ submission systems, automatically posting their papers online as preprints with DOIs while making peer review status transparent [18]; bioRxiv and ChemRxiv also offer services to transfer preprint papers directly to partner journals, helping authors save time on resubmission.

Analysis of scientific journals’ rights reveals three main rights and interests:

- (1) **Journals have the right to set preprint submission norms.** Journals prohibit duplicate submission but state they will consider complete papers previously posted as preprints, typically requiring authors to at least: (i) disclose the preprint’ s location at submission; and (ii) link the preprint to the formally published version (usually via DOI) once published [19].
- (2) **Journals have the right to require copyright transfer or licensing.** Journals may require authors to transfer paper copyright to the journal or obtain publication licenses through mechanisms like CC licenses. For example, the Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals suggest that journals should clearly specify the copyright type for published papers, and if

the journal holds copyright, should detail its stance on copyright transfer for various content types, including audio, video, research protocols, and datasets [20].

- (3) **Journals cooperating with preprint platforms have the right to 优先发现高质量稿源 (priority access to high-quality manuscripts).** For example, bioRxiv supports authors in freely transferring preprints and their metadata to partner journals through its B2J service [21]; ChemRxiv supports authors in freely submitting reviewed and successfully posted preprints to partner journals through its Direct Journal Transfer service [22]. This enables journals to more conveniently and rapidly identify high-quality manuscript sources.

### 3.5 Preprint Funders

An increasing number of funders encourage authors to post funded results on specific preprint platforms, such as the UK Medical Research Council and the French National Centre for Scientific Research; some even make this mandatory, such as the Michael J. Fox Foundation for Parkinson’s Research and the COVID-19 Science Rapid Funding Initiative [23].

Analysis of preprint funders’ rights reveals two main rights and interests:

- (1) **Funders have the right to require authors to acknowledge funding when posting preprint papers.** Funders typically do not hold copyright in funded preprint papers; for example, cOAlition S explicitly states that “authors or their institutions retain copyright in their publications” [24]. However, authors must acknowledge funders when posting funded preprint papers, such as the U.S. National Institutes of Health (NIH) requirement that funded researchers “acknowledge NIH support/funding” [25].
- (2) **Funders have the right to set preprint posting norms.** Some funders explicitly specify requirements for preprint posting platforms or licenses. Table 4 lists relevant regulations from several major foundations.

**Table 4 Preprint Posting Conditions of Major Funding Organizations**

Funder	Preprint Posting Platform	Preprint License
Wellcome Trust	Recognized platforms supporting immediate posting of complete manuscripts [26]	CC BY [26]
Michael J. Fox Foundation for Parkinson’s Research	Open access preprint repositories with free, immediate reader rights [27]	CC BY or CC BY-NC [28]

Funder	Preprint Posting Platform	Preprint License
Alex' s Lemonade Stand Founda- tion	bioRxiv, medRxiv, or similar preprint sharing service platforms [28]	CC BY 4.0 [29]
Bill & Melinda Gates Founda- tion	-	CC BY 4.0 [29]
cOAlition S	Open access journals, open access platforms, open access repositories without embargoes [24]	“For any compliant route, the public must be granted a worldwide, royalty-free, non-exclusive, irrevocable license to share and adapt the paper for any purpose. cOAlition S recommends CC licenses and requires CC BY 4.0 by default. CC BY-SA and CC0 are acceptable alternatives. CC BY-ND may only be assigned when authors explicitly apply to the funder, justify their application, and receive approval.” [30]

*Note: “/” indicates that no relevant policy content was found.*

#### 4 Recommendations for Building China' s Preprint Scholarly Communication System

Clarifying rights and interests is fundamental and critical to protecting the rights of all parties. Protecting these rights not only helps mobilize participant enthusiasm but also promotes the standardized operation of the entire preprint scholarly communication system. This paper proposes four recommendations for building China' s preprint scholarly communication system:

- (1) **Attach great importance to formulating and displaying rights and interests policies in constructing domestic preprint platforms.** As the hub of preprint scholarly communication, preprint plat-

forms must pay close attention to clarifying the rights, responsibilities, and interests of all parties, standardize participants' scholarly communication behaviors, and further emphasize the formulation and display of relevant rights and interests policies to protect all parties.

- (2) **Promote cooperation between scientific journals and preprint platforms based on a reasonable division of their rights and interests.** Preprint platforms rapidly establish research priority but cannot guarantee paper quality, while scientific journals ensure quality through peer review but have lengthy publication cycles. The two parties have complementary advantages and can collaboratively explore new models of paper posting and review. Furthermore, cooperation facilitates journals' priority access to high-quality manuscripts and provides preprint platform users with more convenient submission services. A clear and reasonable division of rights and interests is a necessary foundation for exploring cooperation models, maintaining long-term collaboration, and achieving mutual benefits.
- (3) **Strengthen the formulation and display of preprint rights and interests policies by funding agencies.** Although an increasing number of funders encourage and recognize preprint-based results, our investigation found that related supporting preprint rights and interests policies remain imperfect, with issues of insufficient detail or poor visibility.
- (4) **Enhance Chinese researchers' awareness of rights and interests norms in preprint scholarly communication.** It is necessary to strengthen the promotion and popularization of rights and interests norms within China's research community, guide researchers in protecting their own rights while respecting others' rights.

## 5 Conclusion

Based on the rights and interests policies of six preprint platforms (arXiv, etc.), related scientific journals, and funding programs, this paper systematically analyzed and identified the main rights and interests of participants in the preprint scholarly communication system, including seven rights of preprint authors, four rights of preprint platforms, four rights of preprint readers, three rights of scientific journals, and two rights of preprint funders, and proposed four recommendations for building China's preprint scholarly communication system. However, this study has limitations: it represents only a starting point for research on current participant rights and interests. As the preprint scholarly communication system continues to evolve, the rights and interests identified in this study may change, requiring continuous tracking and updating of relevant content.

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## References

- [1] Fraser N, Brierley L, Dey G, et al. The evolving role of preprints in the dissemination of COVID-19 research and their impact on the science communication landscape[J]. *PLoS Biology*, 2021, 19(4): e3000959.
- [2] arXiv hits 2M submissions[EB/OL]. (2022-01-04). [2022-10-24]. <https://news.cornell.edu/stories/2022/01/arxiv-hits-2m-submissions>.
- [3] 刘钟美, 张新鹤. 开放获取环境下我国科研人员对知识产权制度的认知与态度 [J]. *图书情报工作*, 2016, 60(16): 50-60+49.
- [4] Mckenzie L. Biologists debate how to license preprints[J]. *Nature*, 2017.
- [5] COPE. Preprints Discussion Documents[EB/OL]. (2018-03). [2022-03-08]. [https://publicationethics.org/files/u7140/COPE\\_{Preprints}\\_{Mar18}.pdf](https://publicationethics.org/files/u7140/COPE_{Preprints}_{Mar18}.pdf).
- [6] *Research Square Preprints*[EB/OL]. [2022-03-30]. <https://www.researchsquare.com/researchers/preprints>.
- [7] *SSRN—the leading social science and humanities repository and online community—joins Elsevier*[EB/OL]. [2022-03-30]. <https://www.elsevier.com/connect/ssrn-the-leading-social-science-and-humanities-repository-and-online-community-joins-elsevier>.
- [8] *F1000Research*[EB/OL]. [2022-03-30]. <https://f1000research.com/>.
- [9] *F1000RESEARCH. FAQs*[EB/OL]. [2022-03-25]. <https://f1000research.com/faqs#>.
- [10] *ARXIV. arXiv License Information*[EB/OL]. (2022-02-09). [2022-02-20]. <https://arxiv.org/help/license>.
- [11] Bourne PE, Polka JK, Vale RD, et al. Ten simple rules to consider regarding preprint submission[J]. *PLoS Comput Biol*, 2017, 13(5): e1005473.
- [12] *ELSEVIER. How do I revise a submission?*[EB/OL]. [2022-03-24]. <https://service.elsevier.com/app/answers/detail/a{id}/35046/supporthub/ssrn/kw/Revise/>.
- [13] *ELSEVIER. How do I delete my paper?*[EB/OL]. [2022-03-24]. <https://service.elsevier.com/app/answers/delete>.
- [14] *F1000RESEARCH. Article Processing Charges*[EB/OL]. [2022-03-25]. <https://f1000research.com/for-authors/article-processing-charges>.
- [15] *WIPO. 了解版权及相关权* [EB/OL]. (2016). [2022-03-29]. [https://tind.wipo.int/record/36445/files/wipo\\_{pub](https://tind.wipo.int/record/36445/files/wipo_{pub)
- [16] *About CC Licenses*[EB/OL]. [2022-03-29]. <https://creativecommons.org/about/cclicenses/>.
- [17] *CHEMRXIV. Terms of Use*[EB/OL]. [2022-03-19]. <https://chemrxiv.org/engage/chemrxiv/legal-information?show=terms-of-use>.
- [18] *RESEARCH SQUARE. In Review: A free journal-integrated preprint service*[EB/OL]. [2022-03-20]. <https://www.researchsquare.com/researchers/in-review#what-checks-will-my-manuscript>.
- [19] *List of academic publishers by preprint policy*[EB/OL]. [2022-04-11]. [https://en.wikipedia.org/wiki/List\\_of\\_academic\\_publishers\\_by\\_preprint\\_policy](https://en.wikipedia.org/wiki/List_of_academic_publishers_by_preprint_policy).
- [20] *Recommendations for the Conduct, Reporting, Editing, and Publication*

of Scholarly Work in Medical Journals[EB/OL]. (2021-12). [2022-04-07].  
<https://www.icmje.org/icmje-recommendations.pdf>.

[21] BIORXIV. Submission Guide[EB/OL]. [2022-03-28]. <https://www.biorxiv.org/submit-a-manuscript>.

[22] CHEMRXIV. ChemRxiv Direct Journal Transfer[EB/OL]. [202-03-28].  
<https://chemrxiv.org/engage/chemrxiv/submission-information?show=direct-journal-transfer>.

[23] Funder policies[EB/OL]. [2022-04-13]. <https://asapbio.org/funder-policies>.

[24] Plan S Principles[EB/OL]. [2022-04-14]. [https://www.coalition-s.org/plan\\_s/principles/](https://www.coalition-s.org/plan_s/principles/).

[25] NIH Grants Policy Statement Chapter 8.2.1[EB/OL]. [2022-07-18].

[{in}{data}{publication}{and}](https://grants.nih.gov/grants/policy/nihgps/HTML5/section_8/8.2.1__rights)

[26] Wellcome updates open access policy to align with cOAlition S[EB/OL].

[2022-08-10]. <https://wellcome.org/news/wellcome-updates-open-access-policy-align-coalition-s>.

[27] THE MICHAEL J. FOX FOUNDATION OPEN ACCESS PUBLICATION POLICY[EB/OL]. [2022-08-10]. <https://www.michaeljfox.org/sites/default/files/media/document/MJFF%20>

[28] ALEX S LEMONADE STAND FOUNDATION RESOURCE SHARING POLICY[EB/OL]. [2022-08-10]. <https://www.alexslimonade.org/sites/default/files/images/2020/alsf{resource>

[29] Bill & Melinda Gates Foundation Open Access Policy[EB/OL]. [2022-08-10].

<https://www.gatesfoundation.org/about/policies-and-resources/open-access-policy>.

[30] FAQ -Rights & licences[EB/OL]. [2022-04-14]. <https://www.coalition-s.org/faq-theme/rights-licences/>.

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#### Author Contributions:

Zhu Jiali: Designed the research plan, implemented the research process, wrote the paper, and revised the paper.

Zhang Zhixiong: Proposed the research direction and framework, guided research implementation, revised the paper, and finalized the manuscript.

Note: Figure translations are in progress. See original paper for figures.

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