



Perspective

Building internationally competitive journals for science data sharing: The evolution of three biomedical English academic journals launched in China

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ABSTRACT

Academic journals serve as the platform of scientific collaboration. As China's contribution to world-class science is advancing at a remarkable pace, cultivating world-class English-language journals has become a national imperative issue. Taking Academician George F. Gao and the three flagship journals he founded or led—*Protein & Cell* (2010), *China CDC Weekly* (2019), and *hLife* (2023)—as examples, herein we trace the evolutionary trajectory of English-language periodicals in China, dissecting their evolving missions, internationalization strategies and contributions to biosafety and ethical governance to provide a reproducible roadmap for currently-emerging journals. Through analyses of the case of clustered regularly interspaced short palindromic repeats (CRISPR) gene-editing ethics controversy, pandemic-data-sharing protocols, and international cooperation frameworks, we highlight that journals are pivotal arenas where domestic and global scientific discourses on critical biosafety and public health issues are made. Building internationally competitive journals for science data sharing scientific governance will serve as a critical foundation for China's ambitions to become a scientific power and for its deeper engagement in global science and technology governance.

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Academic journals are the primary venues for disseminating scientific knowledge, fostering community-wide communication and collaboration, and catalyzing the generation and exchange of novel ideas. Before 1978, there were only 952 scientific journals in China. However, rapid advances in science and technology have propelled academic publishing into an era of exponential expansion, and the number of scientific journals has increased to 5,071 in China by the end of 2021 [1]. This exponential growth highlights journals' pivotal role in establishing scientific authority and accelerating innovation. China's emergence as a scientific powerhouse is reflected in its ambitious drive to cultivate world-class academic journals, as exemplified by the initiatives of Academician George F. Gao [1–3], particularly those advancing biomedical, especially biosafety knowledge and public health strategies.

1. Historical context and early developments

The birth of academic journals can be traced back more than 360 years to the United Kingdom and France, where the launch of *Philosophical Transactions* and *Nouvelles Découvertes sur Toutes les*

Parties de la Médecine, coupled with the rise of scientific societies, marked the foundation of modern science communication [1]. Scholarly consensus regards Wuyi Huijiang (1792), a medical journal edited by Dalie Tang, as the first scientific periodical of China, inaugurating the nation's enduring involvement in academic publishing [1]. Although modern science and technology of China initially lagged those of the West, a landmark was achieved when Shou Xu—widely regarded as the chief architect of late-Qing Dynasty science and technology—published China's first article in *Nature* by the help of John Fryer who wrote to the famous physics scientist Prof. John Tyndall in UK about what he saw and heard in China about the sound principle of musical instruments, in which Shou Xu challenged and refined the renowned Bernoulli Principle [4].

In the early twentieth century, a cohort of ambitious Chinese students at Cornell University founded the Science Society of China in 1915, the country's first non-governmental academic organization. This landmark initiative fostered a new ethos of scientific inquiry and underpinned the launch of the journal “*Ke Xue*” (“*Science*”), which endeavored to deliver the latest discoveries and methodologies to Chinese readers, thereby elevating national scientific literacy and critical thinking [5]. However, the journal “*Ke Xue*” was published in Chinese, and therefore the insightful discoveries and theories from Chinese people cannot be readily read by the people outside of China. The story of Shou Xu's publication also told us that to disseminate the

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knowledge and progress of science and technology, the foundation of English language journals was currently necessary to establish the connection between China and the world, based on scholarly communication philosophy and awareness of indigenous discourse power.

2. The rise of Chinese academic journals in the modern era

Over the past four decades, rapid economic and social development in China has created fertile ground for the exponential expansion of Chinese scientific research and journals. As Professor Zuoyan Zhu, former Editor-in-Chief of both *Science China* and *Science Bulletin*, aptly remarked, “Let Chinese academic journals grow together with scientific research in China” [6]. Beyond merely recording and disseminating research outputs, these journals must champion stringent standards of scientific integrity and ethical practice. Upholding such rigor ensures that published research is both robust and influential, thereby fostering trust within the scientific community and bolstering the credibility of Chinese scholarship worldwide.

Amidst the surging tide of academic-journal expansion, George F. Gao, the renowned microbiologist and immunologist, has emerged as a leading figure. Academician George F. Gao is actively involved in academic publishing affairs both domestically and internationally and has played a significant role in global and national health governance, contributing to the implementation of several public health policies [7–9]. He serves as an editorial board member for multiple journals and has been elected to the advisory committee of the journal *Cell*. Currently, he is the editor-in-chief of the Chinese and English versions of *Science Bulletin*. In 2010, Gao and his close friend Academician Zihao Rao launched *Protein & Cell*, a journal covering a broad spectrum of protein- and cell-related research [10–15]. And later he has successfully founded *China CDC Weekly* (2019) and *hLife* (2023), profoundly shaping the landscape of both domestic and international journals. Furthermore, during major public health emergencies such as the 2014 West Africa Ebola outbreak, the H7N9 avian influenza virus, and the COVID-19 pandemic, he provided crucial scientific foundation and leadership for the formulation of national-level prevention and control strategies as well as the establishment of international cooperation mechanisms [7–9]. And these journals have also greatly promoted international communications and timely-sharing of the achievements and progresses in researches on emerging and re-emerging infectious diseases such as COVID-19, through the publication of relevant papers.

The landscape of Chinese academic publishing has been further enriched by the launch of different prestigious journals in different disciplines. It is crucial to acknowledge the collective contributions of numerous distinguished Chinese scholars in shaping this dynamic ecosystem. For instance, in 2012, Professor Yu-Mei Wen, a pioneering female scientist, co-founded *Emerging Microbes & Infections* with Professor Hans-Dieter Klenk. This journal rapidly ascended as a pivotal international platform in microbial infection research, significantly elevating China’s contribution in the field. This was followed by the launch of *National Science Review* in 2014, under the visionary leadership of Professor Chunli Bai, which is dedicated to publishing top-tier original scientific achievements globally, thus becoming a key platform in advancing scientific frontiers of the world. More recently, *Biosafety and Health* (2019) and *The Innovation* (2020) were also launched, collectively playing a pivotal role in advancing and shaping global scientific discourse.

It is explicitly appropriate to recognize the broader constellation of distinguished Chinese academicians and scientific pioneers, whose collective efforts across diverse disciplines have been instrumental in building a world-class academic journal ecosystem. Their profound influence is reflected in China’s expanding role in global scientific cooperation and science diplomacy. The patterns of journal development, internationalization strategies, and experiences in ethical gover-

nance revealed through these selected cases hold universal implications and provide strategic insights for understanding and guiding the construction of China’s entire English-language academic journal ecosystem. These three journals—*Protein & Cell*, *China CDC Weekly*, and *hLife*—were chosen for in-depth investigation because they represent typical models of Chinese English-language journals across different critical fields—such as biomedical science, public health practice, biosafety and translational medicine—and at various stages of development. Moreover, their close association with an internationally influential academic leader enhances the traceability and representativeness of the research pathway, offering a concrete blueprint for other emerging journals.

3. Striving for exploration and dissemination of scientific knowledge

In 2015, *Protein & Cell* published a study titled “CRISPR/Cas9-Mediated Gene Editing in Human Triploid Zygotes” [16]. This research sparked extensive academic and societal debate globally due to its exploration of the ethical boundaries of human germline gene editing. Although the study underwent rigorous ethical review prior to publication and complied with the relevant Chinese laws and regulations, such groundbreaking attracted international controversial attention. However, with the steadfast support of Rao Yi and George F. Gao, *Protein & Cell* decisively published this study. This decision not only demonstrated the journal’s academic courage and independent judgment in confronting scientific frontiers and bioethical challenges, but also underscored the importance of fostering and enhancing diverse international scientific communication platform in ensuring the global dissemination of critical scientific achievements—particularly in areas highly sensitive to biosafety and ethical considerations. The publication process not only demonstrates the world-class innovative capabilities of Chinese researchers in the frontier biotechnological field of gene editing, but also, through *Protein & Cell*’s rigorous ethical review and responsible publication of the study, profoundly underscores the indispensable role of ethical norms and biosafety considerations in bioscientific exploration, thereby advancing global dialogue and governance practices in the relevant fields.

In 2011, George F. Gao moved from the Institute of Microbiology, Chinese Academy of Sciences (CAS), to the Chinese Center for Disease Control and Prevention (China CDC), serving first as Deputy Director and then as Director-General from 2017 onward. As a leader of China CDC, he is a multitasking person who can manage complicated scientific projects, team dynamics, public relations, administration, and politics all at the same time [12,17,18]. Beyond spearheading epidemic prevention and control, he launched the national public-health bulletin *China CDC Weekly* in 2019—an initiative hailed as a landmark of his tenure [3]. Modeled on the U.S. CDC’s *Morbidity and Mortality Weekly Report*, the journal publishes basic and applied research on disease control and public health from around the world, providing a platform for rapid information-sharing and China–U.S. cooperation [19–21] while fostering broader international collaboration. The timely and authoritative disease intelligence disseminated through *China CDC Weekly* serves as critical evidence for public health decision-making and strengthens the scientific foundation of biosafety practices [22–26]. Its rapid alerts on infectious disease outbreaks, risk assessments, and issuance of prevention and control measures are directly relevant to the biosafety response capabilities at both national and global levels. This journal has become a vital resource for researchers and public health professionals worldwide, highlighting the importance of timely and accurate scientific communication in addressing global health challenges. The *China CDC Weekly* has witnessed a gradual growth in its influence, with its ranking among global public health-related journals and its academic penetration worldwide

Table 1
Key features and international impact of three flagship English journals.

	<i>Protein & Cell</i>	<i>China CDC Weekly</i>	<i>hLife</i>
Launch	2010	2019	2023
Host & editor-in-chief	Co-founded by G.F. Gao & Z. Rao	China CDC (G.F. Gao)	Inst. Microbiol., CAS (G.F. Gao, C. Dong, J. Hoffmann)
Aim & scope	Frontiers in protein & cell biology	Disease-control & public-health intelligence	Health-science discoveries clinical translation
International impact	IF: 21.1 (2022); biosafety ethics-review protocol	IF: 4.7 (2022); global biosafety surveillance and emergency response	Spark international collaboration and accelerate scientific advances
Key success factors	The ability to stand firm on principles and publish data in an unbiased manner when controversies arise.	Timely, accurate reporting on public health surveillance, epidemiological investigations, and emergency responses, plus insights sharing and evidence-based guidelines for public health practice.	Reporting and highlighting original and high-impact discoveries in health sciences, linking basic research to transformative medicine that could improve human health.

based on a steady upward trajectory, being comparable to the U.S. MMWR journal.

In 2023, together with CAS Academician Chen Dong and 2011 Nobel Laureate Jules A. Hoffmann, he proposed and launched the new journal *hLife* [21]. This journal aims to showcase original, high-impact health-science discoveries that bridge basic research and clinical applications to improve human health, while also offering unique historical perspectives on pivotal scientific advances [21,27–29]. By uniting leading scientists worldwide, *hLife* cultivates a collaborative ecosystem where breakthroughs swiftly move from bench to bedside, translating discovery into tangible societal benefit [30,31], particularly in developing novel countermeasures against emerging biological threats and enhancing the global biosafety landscape. The missions of these three journals, along with their efforts and achievements in serving as platforms for disseminating global pandemic data and fostering international collaboration, collectively outline the positive trajectory of Chinese academic journals in enhancing their global influence (Table 1).

4. Shaping national and global scientific discourse

Academic journals are more than repositories of knowledge—they are platforms that shape national and global scientific discourse. High-level English-language science and technology journals play a crucial role in driving scientific and technological innovation and ensuring global biosafety. They chronicle and disseminate outstanding research, showcasing scientific strength and amplifying international voice. The rise of the academic journals of China has thus marched in step with her scientific advance. As Yan et al. emphasized in their interview with Academician George F. Gao, high-quality science and technology journals are indispensable for meeting strategic research needs of China [2]. Journals such as *Protein & Cell*, *Science Bulletin*, *China CDC Weekly*, *hLife*, *Biosafety and Health*, *Cell Research*, *National Science Review*, and *The Innovation* etc., exemplify the nation's drive to establish a globally prominent publishing ecosystem.

The underlying principles of the establishing and operating these periodicals can be extended to diverse disciplines such as engineering technology and materials science. Such platforms are crucial for researchers to make their voices heard. Moreover, the internationalization of humanities and social science journals—fields rife with cross-cultural discursive tensions—serves as a key avenue for global engagement of developing countries, supporting to foster the multidisciplinary and coordinated development of world-class scientific journals.

Looking ahead, academic journals will continue to evolve. Digital platforms and the open-access movement are democratizing the flow of scientific knowledge. The iterative evolution of digital platforms and the deepening open-access movement have created important opportunities for the internationalization of new journals but also introduced new challenges that require coordinated and forward-looking responses. In particular, the expansion of digital publishing

has brought heightened concerns regarding copyright protection, data security, and the potential misuse of research outputs. Establishing transparent licensing policies and robust data governance frameworks—aligned with international standards yet compatible with domestic regulations—will be essential for sustaining global trust. At the same time, artificial intelligence (AI) is reshaping editorial workflows, from manuscript screening to integrity checks. The use of AI should follow a human-centered and accountable approach, supported by standardized governance mechanisms. It will strengthen capacity-building to enhance the digital and AI literacy of editorial teams.

George F. Gao's journey offers a blueprint for keeping journals at the cutting edge of global science. While many journals from China are still in nascent stages compared to long-standing Western counterparts, facing gaps in historical heritage and global influence, they are also contributing an increasing amount of strength to global scientific development. These journals are vital not only for fueling innovation and elevating China's scientific stature but also for strengthening global health security and biosafety governance. By spanning disciplines and borders, they contribute to a more pluralistic, interconnected global science system [17], tirelessly striving for discovery and responsible dissemination.

Conflicts of interest statement

The authors declare that there are no conflicts of interest.

Author contributions

Huisheng Wang: Writing – review & editing, Writing – original draft, Supervision, Resources, Investigation, Formal analysis. **Hao Cheng:** Writing – review & editing, Supervision.

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