



Journal of Epistemology and Metascience in Medicine and Biology

EDITORIAL

Vol. 1, No. 1 | October 2026

Epistemology and metascience in medicine and biology: purpose and challenges of a new journal

Epistemología y metaciencia en medicina y biología: propósito y desafíos de una nueva revista

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Suggested citation: Guevara-Tirado A. Epistemology and metascience in medicine and biology: purpose and challenges of a new journal. *Rev Epistemol Metacienc Med Biol.* 2026;1(1).

Abstract

Medicine and biology generate an expanding volume of evidence, yet growth in publication output does not necessarily produce an equivalent gain in knowledge reliability. Reproducibility, publication bias, analytical flexibility, reporting quality, academic incentives, and the responsible use of emerging technologies require scientific scrutiny of scientific practice itself. This journal is founded to integrate two complementary perspectives: epistemology, which examines how knowledge claims are justified and bounded, and metascience, which empirically studies how research is designed, conducted, communicated, and evaluated. Its purpose is to provide an international forum for original studies, reviews, methodological analyses, essays, and debates on evidence, causality, reproducibility, open science, integrity, statistics, diagnosis, and artificial intelligence. Its central ambition is straightforward: to help make biomedical science more transparent, critical, verifiable, and useful.

Keywords

metascience; epistemology; reproducibility; open science; research integrity; evidence-based medicine

Resumen

La medicina y la biología producen un volumen creciente de evidencia, pero el aumento de publicaciones no garantiza por sí mismo una mejora equivalente en la confiabilidad del conocimiento. La reproducibilidad, los sesgos de publicación, la flexibilidad analítica, la calidad del reporte, los incentivos académicos y el uso responsable de nuevas tecnologías exigen una evaluación científica de la propia práctica científica. Esta revista nace para integrar dos perspectivas complementarias: la epistemología, que examina cómo se justifican y delimitan las afirmaciones de conocimiento, y la metaciencia, que estudia empíricamente cómo se diseña, ejecuta, comunica y evalúa la investigación. Su propósito es ofrecer un espacio internacional para estudios originales, revisiones, análisis metodológicos, ensayos y debates sobre evidencia, causalidad, reproducibilidad, ciencia abierta, integridad, estadística, diagnóstico e inteligencia artificial. La aspiración central es sencilla: contribuir a que la ciencia biomédica sea más transparente, crítica, verificable y útil.

Palabras clave

metaciencia; epistemología; reproducibilidad; ciencia abierta; integridad científica; medicina basada en evidencia

A journal about how we know and how we investigate

Modern biomedical research has transformed disease prevention, diagnosis, and treatment. Yet scientific progress coexists with persistent problems in study design, analysis, interpretation, and communication. For decades, concerns have been raised that methodologically weak research can produce conclusions that appear convincing but prove fragile under independent verification ⁽¹⁾. Later, debate over the probability that some published findings are false or exaggerated brought to the forefront the influence of sample size, statistical power, multiple analyses, bias, and publication incentives ⁽²⁾. These observations do not invalidate science; rather, they show precisely why science needs mechanisms to examine and correct its own procedures.

Avoidable waste of scientific resources can arise before a study begins, during its conduct, or after results are obtained. Poorly prioritized questions, inadequately described methods, changed outcomes, incomplete reports, and weak contextualization of findings reduce the cumulative value of research ⁽³⁾⁽⁴⁾. In highly complex biomedical fields, even influential preclinical findings have raised concerns because of difficulties in reproduction, prompting calls for higher standards of design, documentation, and validation ⁽⁵⁾. The appropriate response is not to distrust all evidence, but to improve the architecture through which evidence is produced and evaluated.

Epistemology and metascience: two perspectives that should be in dialogue

Epistemology asks what it means to know, what justifies an inference, what distinguishes an association from a causal explanation, and under what conditions evidence should change a belief or decision. Metascience, in turn, makes many of these questions objects of empirical research: it studies publication patterns, reproducibility, replication, bias, statistical practices, peer review, incentives, transparency, and the circulation of knowledge. The terminology of reproducibility and replicability itself has been used differently across disciplines, making it necessary to define precisely which aspect of the process is being evaluated ⁽⁶⁾⁽⁷⁾.

Both traditions are strengthened when integrated. Conceptual reflection without empirical evidence risks drifting away from actual scientific practice; metascientific analysis without a clear epistemological foundation may measure phenomena without clarifying what they imply for the validity of knowledge. In medicine and biology, where decisions can directly affect patients, populations, and health policy, this integration is particularly important. A journal devoted to this intersection can provide a space to study not only what we know, but also how we come to believe that we know it.

Reproducibility, transparency, and incentives

Reproducibility does not depend on a single practice. It requires coherent decisions throughout the research cycle: well-formulated questions, clear protocols, justified sample sizes, transparent analyses, sufficient documentation, reasonable availability of data and code when possible, complete reporting, and a culture that values verification. Contemporary proposals for more reproducible science emphasize the need to act simultaneously on methods, training, incentives, and editorial standards ⁽⁸⁾. Likewise, transparency policies promoted by journals can change behavior when they are applied proportionately and with sensitivity to disciplinary differences ⁽⁹⁾.

Data and material openness should not be confused with an automatic obligation to disclose sensitive or legally restricted information. The goal is for research outputs to be as findable, accessible, interoperable, and reusable as ethics, privacy, and regulation permit. The FAIR principles provide a widely used framework for organizing this goal ⁽¹⁰⁾, while the UNESCO Recommendation on Open Science broadens the discussion to infrastructure, equity, access to knowledge, and social participation ⁽¹¹⁾. This journal will promote openness as a means to improve the verifiability and usefulness of knowledge, not as a bureaucratic requirement detached from context.

Reporting quality and critical appraisal of evidence

Research cannot be properly evaluated if its report omits essential information. Reporting guidelines have shown that minimum standards can be established for different study designs. CONSORT for randomized trials and PRISMA for systematic reviews are examples of initiatives that seek to make explicit the information needed to interpret and reproduce research ⁽¹²⁾⁽¹³⁾. The journal will encourage the use of relevant guidelines, while avoiding their conversion into mechanical checklists: formal compliance is no substitute for methodological reasoning or scientific clarity.

We are also interested in what the scientific system tends to make invisible. Preference for positive results can distort the literature and reduce the visibility of null or contradictory findings ⁽¹⁴⁾. Accordingly, the relevance of a manuscript will not be judged by whether it confirms a hypothesis, but by the importance of the question, the appropriateness of the design, the transparency of the analysis, and the soundness of the interpretation. Replications, negative results, methodological studies, and analyses of scientific practices can contribute as much cumulative value as novel findings.

Artificial intelligence: opportunity, object of study, and editorial challenge

The expansion of generative artificial intelligence is changing how researchers search the literature, program, analyze information, draft texts, and evaluate manuscripts. These tools can increase productivity and reduce technical barriers, but they also introduce risks related to plausible errors, fabricated references, uncritical automation, opacity, and attribution of responsibility. Scientific discussion has emphasized the need to establish research and governance priorities so that these technologies can be integrated without weakening the reliability of the scientific process ⁽¹⁵⁾.

For this journal, artificial intelligence will be both a tool that should be used transparently and a phenomenon open to metascientific study. Topics of interest include the reproducibility of AI-assisted analyses, the effect of generative models on scientific writing, the detection and propagation of errors, automated evidence assessment, algorithmic bias, and authorial responsibility. Authorship will continue to belong exclusively to people who can take responsibility for the final content.

An editorial agenda for medicine and biology

The Journal of Epistemology and Metascience in Medicine and Biology will welcome contributions that critically examine the production, validation, interpretation, and communication of biomedical knowledge. Priority areas include causality; reproducibility and replication; publication and reporting bias; research integrity; peer review; bibliometrics and responsible research assessment; open science; statistical methods; diagnostic validity; clinical and preclinical research; observational evidence; evidence synthesis; artificial intelligence applied to research; philosophy of medicine and biology; and studies of the incentives that shape scientific activity.

Editorial principles

- 1. Rigor before spectacle.** Priority will be given to alignment among the question, design, analysis, and conclusions, not to the apparent magnitude or novelty of the result.
- 2. Proportionate transparency.** Protocols, materials, data, code, and complete declarations will be encouraged when their dissemination is ethically, legally, and technically feasible.
- 3. Value of criticism and correction.** Replications, comments, null results, and evidence reviews will be treated as normal components of scientific progress.
- 4. Methodological pluralism.** Quantitative, qualitative, conceptual, and computational approaches will be evaluated according to standards appropriate to their questions.
- 5. Responsibility in the use of AI.** Support from generative tools should be disclosed when relevant; no tool replaces the author's intellectual responsibility.
- 6. International openness.** The journal will seek to reduce participation barriers and include perspectives from different regions, disciplines, and career stages.

An invitation to study science scientifically

Science improves when its claims can be examined, discussed, replicated, and, when necessary, corrected. Metascience should not be understood as a hostile external audit of research, but as an extension of the scientific ideal to its own methods, institutions, and products. Several proposals for increasing the truthfulness of the literature agree that sustainable change requires interventions in both individual practices and systems of incentives and evaluation ⁽¹⁶⁾.

This journal begins with a conviction: in medicine and biology, producing more knowledge is not enough; what matters is producing knowledge that can be understood, scrutinized, and used responsibly. We invite researchers, clinicians, biologists, statisticians, methodologists, philosophers of science, editors, and students to take part in this task. The goal is not to establish a methodological orthodoxy, but to build a space where assumptions can be made explicit, evidence can be debated rigorously, and science itself can become, when necessary, an object of research.

Statements

Funding: Self-funded.

Conflicts of interest: The author is Editor-in-Chief of the Journal of Epistemology and Metascience in Medicine and Biology. This manuscript is the journal's inaugural editorial.

Author contributions: The author performed the conceptualization, critical review, and approval of the final content.

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