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Commentary

From Petri Dishes to Algorithms: The Role of AI in Modern Microbiology

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I read the editorial of *eMicrobe* with interest [1]. The launch of *eMicrobe* represents an important development in scientific publishing. To the best of my knowledge, it is the first journal with a major section explicitly dedicated to artificial intelligence (AI) in microbiology—a field that has long been central to the life sciences, but until now lacked a publishing venue focused on its computational transformation. For example, in one of the original articles published in the first issue of *eMicrobe*, Lee et al. made a critical comparison on the performance of a number of state-of-the-art chatbots in answering questions on a globally important fungus and a regionally important one [2].

Today, AI-powered models help improve infection diagnosis, predict antimicrobial resistance, suggest personalized antimicrobial therapies, and discover new antibiotics [3]. AI is also transforming genomics and proteomics, improving imaging-based diagnostics, enabling real-time monitoring through wearables and biosensors, and supporting digital health platforms for surveillance and clinical decision making [4]. Traditional microbiology and infectious disease journals have published AI-driven studies in recent years, yet none has positioned itself so explicitly at the disciplinary intersection of microbiology and AI. This makes *eMicrobe* both unique and timely.

As the Editor-in-Chief of *LifeAI*, a journal devoted to AI across the life sciences [5], I see *eMicrobe* not as a competitor but as a natural complement. While *LifeAI* focuses broadly on algorithmic development, methods, and cross-domain applications, *eMicrobe* will provide a home for AI research specifically addressing urgent microbial challenges—from antimicrobial resistance and microbial ecology to pandemic preparedness and host–pathogen interactions.

This complementarity also highlights a broader cultural shift. Modern microbiology is no longer confined to Petri dishes and chemical assays. Increasingly, the field thrives at the intersection of wet-lab experimentation and computational inference. Advances in protein structure prediction, microbiome analysis, systems immunology, and digital epidemiology illustrate how AI has become indispensable in bridging data-rich experimentation with mechanistic understanding.

Together, *LifeAI* and *eMicrobe* can help accelerate this transformation: one by fostering innovation in algorithms and integrative frameworks, the other by grounding those innovations in real-world microbial problems. Both journals share the same underlying vision: AI is not simply a technical add-on, but a central driver of discovery in 21st-century biology.

Conflicts of Interest

The author declares no conflict of interest.

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