



OPEN ACCESS

EDITED AND REVIEWED BY
Gianni Ciofani,
Italian Institute of Technology (IIT), Italy

*CORRESPONDENCE

Yuning Wang,
✉ yuningwang@sjtu.edu.cn
Xiaodan Huang,
✉ x.huang@uq.edu.au
Kun Qian,
✉ k.qian@sjtu.edu.cn

RECEIVED 22 August 2023
ACCEPTED 25 August 2023
PUBLISHED 04 September 2023

CITATION

Wang Y, Huang X and Qian K (2023),
Editorial: Multi-omics research as
biomedical interfaces with the
engineering and informatics
for healthcare.
Front. Bioeng. Biotechnol. 11:1281462.
doi: 10.3389/fbioe.2023.1281462

COPYRIGHT

© 2023 Wang, Huang and Qian. This is an
open-access article distributed under the
terms of the [Creative Commons
Attribution License \(CC BY\)](https://creativecommons.org/licenses/by/4.0/). The use,
distribution or reproduction in other
forums is permitted, provided the original
author(s) and the copyright owner(s) are
credited and that the original publication
in this journal is cited, in accordance with
accepted academic practice. No use,
distribution or reproduction is permitted
which does not comply with these terms.

Editorial: Multi-omics research as biomedical interfaces with the engineering and informatics for healthcare

Yuning Wang^{1*}, Xiaodan Huang^{2*} and Kun Qian^{1*}

¹State Key Laboratory for Oncogenes and Related Genes, School of Biomedical Engineering and Institute of Medical Robotics, Shanghai Jiao Tong University, Shanghai, China, ²Australian Institute for Bioengineering and Nanotechnology, The University of Queensland, Brisbane, QLD, Australia

KEYWORDS

multi-omics, bioinformatics, diagnostics, sensors, devices, nano-omics

Editorial on the Research Topic

Multi-omics research as biomedical interfaces with the engineering and informatics for healthcare

In the era of personalized medicine, precise and timely diagnosis of chronic and serious diseases is crucial to enhance survival rates, which is beneficial for human healthcare. However, most of the current technologies have limitations in clinical diagnostics and management. With the development of multi-omics analysis, transcriptomics, proteomics, and metabolomics have gradually been used to discover important biological molecules and explore their potential correlations with diseases. Therefore, this Research Topic aims to present typical findings in advanced technologies for disease management. In this Research Topic, we have collected five articles, including three articles on proteomics or metabolomics analysis for disease diagnosis and two articles on novel innovations for treatment.

For multi-omics analysis for disease diagnosis, metabolomics directly reflects the physiological and pathological processes. [Fan et al.](#) conducted a metabolomics platform to identify diagnostic biomarkers for the early stage of acute aortic dissection with acute lung injury, aiming to address the perturbed pathways underlying disease progression and pathophysiological mechanisms. [Ding et al.](#) developed nano-material-based chips for high-performance metabolic analysis by direct metabolic fingerprinting of urine towards kidney stone diagnostics. Proteomic analysis as a promising strategy has been used to obtain a global view of complex issues. [Lu et al.](#) launched a temporal quantitative proteomics approach combined with real-time live-cell imaging to discover the molecular changes in virus-host interactions at different hours post-infection. The systematic proteomic analysis provided potential therapeutic biomarkers and biomedical applications for viral treatments.

For novel innovations for disease management, [Yang et al.](#) conducted a randomized controlled study to explore the safety and efficacy of remote ischemic conditioning in adult patients with Moyamoya disease who were undergoing revascularization therapy. The study provided a potential treatment method for Moyamoya disease. In another research, [Wang et al.](#) developed a method for rapid and accurate human leukocyte antigen typing technology and a supporting algorithm based on the high-resolution mass analysis function of MS and some short fragment PCR amplification target products as typing tags with precise prime. This method addressed the problem of ambiguity in the nucleotide sequence signal overlay generated by the

gold standard using polymerase chain reaction sequence-based typing, with advantages in terms of cost and efficiency over existing methods.

In short, the Research Topic shows several representative types of research on advanced strategies for disease diagnosis and management. With the continuous development of technology and difficult issues in urgent need of being solved, more research will promote the progress of this field in the future. We gratefully appreciate the support from the whole Frontiers editorial team and the reviewers. We would like to thank all authors who made great contributions to this Research Topic.

Author contributions

YW: Writing–original draft. XH: Writing–review and editing. KQ: Writing–review and editing.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.