

***iMeta* Conference 2024: Building an innovative scientific research ecosystem for microbiome and One Health**

The *iMeta* Conference 2024, held from October 11 to 13, 2024, at the Nanshan District People's Hospital in Shenzhen, China, attracted over 400 leading scientists, researchers, and industry professionals from around the world (File S1). Organized by the editorial team of *iMeta*, a top-tier interdisciplinary journal in biotechnology, microbiome, and bioinformatics, this conference has been emerging as a premier platform for cutting-edge research in these fields. The *iMeta* journal, led by Chief Editors Prof. Shuangjiang Liu and Prof. Jingyuan Fu, has an impressive impact factor of 23.8, within the top 0.5% of journals worldwide (107 out of 21,848), and 11th in mainland China. Additionally, *iMetaOmics*, a subjournal co-edited by Prof. Fangqing Zhao and Prof. Jun Yu, is projected to have an impact factor of over 10, positioning it as a high-level interdisciplinary journal that welcomes submissions [1].

Since its inception in 2022, the *iMeta* journal has launched a series of conferences aimed at advancing research, fostering international collaboration, and promoting the development of the field [2]. Following successful events in Qingdao and Beijing [3], the 2024 edition marks the third event in this series that was co-organized by the Southern University of Science and Technology (Department of Biochemistry and Key University Laboratory of Metabolism and Health of Guangdong), Xianghu Laboratory, TreatGut, and HaploX. The conference covered a wide range of key topics (Figure 1), including Cutting-Edge Technologies, Gut Microbiota, Omics, Medicine, One Health, International Projects, and Journal Forum. These sessions highlighted the interdisciplinary nature of modern life sciences, with presentations covering microbial ecology, advancements in sequencing technologies, genome editing, and the broader implications of these innovations on human, animal, and environmental health. With the theme of "Building an Innovative Research Ecosystem," the *iMeta* Conference 2024 provided an interdisciplinary forum where participants could share breakthroughs, explore collaborative opportunities, and discuss the future of biotechnology, microbiome, and bioinformatics research.

THE OPENING CEREMONY

The opening ceremony included addresses from prominent figures such as Tieying Hou, President of Nanshan District People's Hospital, Hua Yang, Executive Deputy Director of Xianghu Laboratory, and Shuang-Jiang Liu, Chief Editor of *iMeta*. They provided an overview of the major mission and development of Nanshan Hospital and Xianghu Laboratory and emphasized *iMeta*'s mission to "serve readers and authors." The hosts and organizers extended a warm welcome to all attendees and expressed their best wishes for the conference's success.

In addition, the ceremony featured five keynote speeches, covering diverse topics such as the screening of antibiotic alternatives based on gut microbiota responses, research on microecology and cancer, in situ analysis techniques for microbiota–host interfaces, reflections in microbiome research on Koch's postulates, and the study of chemical molecule-driven mechanisms in microbiota–host interactions. These talks not only reviewed the history of microbial research and revisited the foundational "Koch's postulates" but also highlighted how emerging technologies and interdisciplinary approaches are propelling advancements in microbiology.

Screening for antibiotic alternatives through the response of gut microbiota communities

Presented by Prof. Yulong Yin, Yuelushan Laboratory

Professor Yulong Yin delivered a report on swine ecology, focusing on four key areas: quorum sensing, approaches for screening antibiotic alternatives based on quorum sensing, methods for regulating quorum sensing and their effects, and the development of new antibiotic alternatives. He explained that high-density microbial communities in the gut secrete specific signaling molecules, allowing them to adapt to the complex gut environment

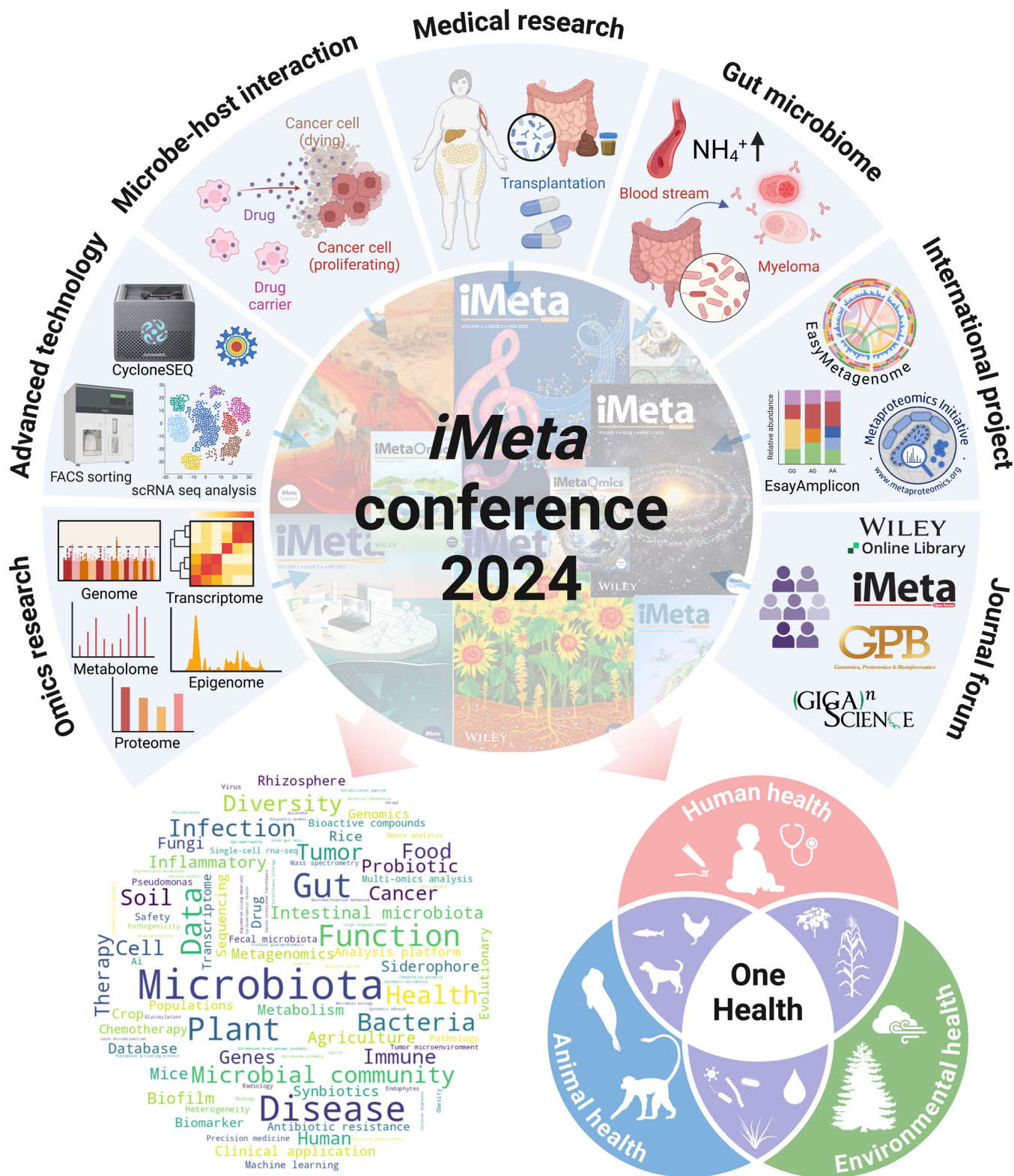


FIGURE 1 Overview of key themes and research areas presented at the *iMeta* Conference 2024. The figure captures the key themes discussed during the conference, including advanced technologies, microbe–host interactions, medical research, gut microbiome, international collaborative projects, and insights from the journal forum. A keyword cloud reflecting core research topics such as microbiota, health, microbial community, disease, and plant microbiome is included. *iMeta* is dedicated to building an innovative scientific research ecosystem for microbiome and One Health.

and fulfill physiological roles [4]. Alternatives to antibiotics, such as plant extracts, organic acids, and probiotics, can inhibit pathogen colonization, enhance epithelial barrier function, and promote nutrient absorption through quorum sensing. Prof. Yin also discussed how synthetic biology enables the engineering of probiotics that neutralize pathogen defense mechanisms through quorum sensing, thereby improving feed conversion efficiency. His talk provided a comprehensive overview of the theoretical mechanisms, practical applications, and product development in swine ecology, offering new directions for reducing disease and promoting animal growth.

Journey and insights in microecology and cancer research

Presented by Prof. Jun Yu, The Chinese University of Hong Kong

Professor Jun Yu explored the connection between microecology and colorectal cancer, focusing on two major areas: the role of gut microbiota in digestive tumor mechanisms and its application in diagnosing and treating digestive system cancers. She first discussed the relationships between gut microbiota and digestive tumors, examining the interactions between tumor-associated bacteria and the host [5]. In the second part of her presentation, Prof. Yu highlighted four key aspects: the interplays between gut microbiota and drugs, fecal microbial markers for diagnosing digestive tumors, the use of anticancer bacteria in prevention and treatment, and the influence of bacteria and their metabolites on tumor immunotherapy [6]. Throughout the presentation, she referenced relevant research cases, emphasizing the potential of these findings to advance clinical diagnosis, prevention, and treatment strategies for digestive system cancers.

In situ analysis techniques at the interface of microbiota–host interactions

Presented by Prof. Fangqing Zhao, Beijing Institutes of Life Sciences, Chinese Academy of Sciences

Professor Fangqing Zhao focused on technological advancements for studying the interactions between microbiota and hosts. His research addresses host gene expressions and regulatory patterns, as well as in situ analysis techniques for understanding the complex interactions within biological systems [7]. He introduced new real-time transcriptomic sequencing technology

based on programmable control, along with single-cell spatial omics technology. These technologies have significantly reduced batch effects, increased gene detection rates, improved resolution, and lowered analysis costs, paving the way for more precise studies of microbiota–host dynamics.

Koch's postulates: From microbes to microbiomes

Presented by Prof. Shuang-Jiang Liu, Institute of Microbiology, Chinese Academy of Sciences/Shandong University

Professor Shuang-Jiang Liu revisited the classical “Koch's postulates,” which serve as the gold standard for establishing causality between microbes and diseases. He explored the challenges of applying these postulates to microbiomes, especially regarding the isolation and cultivation of microbial strains and the issue of functional redundancy within microbial communities. Prof. Liu discussed key terminologies in microbiome research and reviewed the development of microbiology. He proposed a redefinition of Koch's postulates to address the complexities involved in studying microbiomes, highlighting the evolving nature of this foundational concept.

Chemical molecules driving gut microbiota research

Presented by Prof. Hongwei Liu, Institute of Microbiology, Chinese Academy of Sciences

Professor Hongwei Liu focused on the chemical molecule-driven mechanisms that shape interactions between microbiota and their hosts. He highlighted key challenges in gut microbiome research, such as identifying core functional strains, functional genes, metabolic pathways, and physiologically active substances. Prof. Liu reported on the effects of administering exogenous active molecules on gut bacterial growth, community structure, and host functions. For instance, compounds from *Ganoderma* (reishi mushroom) have been shown to promote the growth of *Parabacteroides distasonis*, which helps alleviate glucose and lipid metabolic disorders in the host. Prof. Liu also presented findings from metabolomic studies, which identified a novel secondary bile acid produced by *Christensenella minuta* that plays a role in improving host metabolism [8]. His talk demonstrated how a chemistry-based approach can open new avenues for understanding the microbiome and its implications for human health.

PLENARY PRESENTATIONS

This session featured eight speakers who presented on the intricate relationships between medicine, animals, plants, and microorganisms, as well as related advanced technologies. The medical field was represented by Prof. Hubing Shi from the West China School of Medicine at Sichuan University and Associate Professor Li Liang from the Southern University of Science and Technology. Prof. Shi presented on “Immune Surveillance and Evasion Mechanisms in Tumor Metastasis,” addressing three key questions: (1) Are CTCs subject to immune surveillance? (2) If so, which immune cells are responsible? (3) How do CTCs evade surveillance? He explored these questions using pancreatic cancer liver metastasis models, providing new insights into the immune system's role in tumor progression [9]. Associate Professor Li delivered a report on “Microbe-Host Interactions and Drug Development Using a Platform of Cultured Clinical Samples and Human Organoids.” He emphasized the growing significance of organoids as a host model for studying microbial infections and immunity mechanisms, highlighting their high potential for pharmaceutical research and drug development.

In the section of animal immune and plant biotechnology studies, Professor Wenkai Ren from South China Agricultural University and Professor Shuangxia Jin from Huazhong Agricultural University gave compelling presentations. Professor Ren discussed “Amino Acid Metabolism and Immune Cell Fate in Piglets,” showing that amino acid metabolism plays a vital role in the immune characteristics, disease resistance, and fate of immune cells. His research sheds light on metabolic pathway reshaping, signaling pathways, epigenetic changes, and posttranslational modifications, which are critical for reducing high mortality rates in piglets. On the plant side, Prof. Jin focused on the “Development of Gene Editing Tools for Cotton and Their Application in Molecular Breeding.” He presented a detailed overview of the diversity of genome editing technologies, such as the delivery system for CRISPR/Cas components into plant cells, CRISPR/Cas9, Cas12a, Cas12b, base editors (CBE, ABE), dCas9-TV transcription activation systems, and Cas13 knockdown systems. He highlighted the wide applications of these genome editing systems in cotton molecular breeding for improving yield, quality, and stress tolerance [10, 11].

Additionally, the session featured presentations by Prof. Diwei Zheng from the Institute of Process Engineering at the Chinese Academy of Sciences, Assistant Professor Robert Schlberg from Illumina, and Chief Technology Officer Bangzhou Zhang from TreatGut Biotechnology Co., Ltd. Prof. Zheng discussed advances in bacterial biomaterial technology, including the development

of engineered strains with specialized functions such as drug delivery, fluorescent imaging, and light-controlled drug synthesis [12]. Assistant Professor Schlberg presented on sequence-based solutions for identifying pathogens and antibiotic resistance, offering new tools for tackling antimicrobial resistance. Finally, CTO Bangzhou Zhang introduced a platform for microbiome medicine and translational research, which includes precise microbiota transplantation therapy platforms and live microbial drugs, providing promising new avenues for medical treatments.

CUTTING-EDGE TECHNOLOGY SESSION

The Cutting-Edge Technology Session featured 13 speakers who shared insights into the latest experimental, analytical, and sequencing technologies. Presentations centered around the development of innovative methods and tools, such as metaRUp for genome extraction of rare species, Tencent's medical AI model for assisted diagnosis, microbial analysis tools like metaProbiotics and MOBFinder [13], and Cyclo-SEQ nanopore sequencing technology. Topics covered systematic research on antibiotic resistance genes, analysis of gut microbial metabolism, studies on microbial interactions, single-cell transcriptomics, and the application of high-throughput data in environmental viromics and microecology. Professor Huizeng Sun from Zhejiang University delivered the keynote speech, systematically introducing advances in microbial single-cell transcription research, highlighting the principles of single-cell transcriptomics based on random primer microfluidics and microbial pan-genome mapping, with successful applications in the study of rumen microorganisms [14]. Professor Yan Ni from the National Clinical Research Center for Child Health offered an in-depth presentation on integrated analysis methods for gut microbiota and metabolism that have been recently introduced in the newest version MetOrigin 2.0 (<http://metorigin.met-bioinformatics.cn>), covering quick database search, covering correlation analysis, metabolic function analysis, origin analysis, gut microbial enzyme analysis, and microbe-metabolism mediation effect analysis. The session concluded with discussions on the growing need for more advanced and efficient methods to process and analyze target data in the context of high-throughput sequencing.

BIOTECHNOLOGY SESSION

The Biotechnology Session featured five presentations that emphasized cutting-edge technologies such as single-cell and spatial omics, single-bacterium RNA

sequencing, and in situ targeted isolation of functional microorganisms, alongside their practical applications. Professor Yongcheng Wang from Zhejiang University developed a new generation of high-throughput single-cell whole-transcriptome sequencing platform based on random primers [15]. This platform not only processes eukaryotic cells but also achieves single-cell transcriptome sequencing for bacteria and other microorganisms. It has produced excellent results even with less active frozen and FFPE (Formalin-Fixed Paraffin-Embedded) samples. Prof. Shengguo Zhao from the Chinese Academy of Agricultural Sciences introduced two innovative targeted isolation technologies for functional microorganisms using magnetic nanoparticles and microbeads. These methods significantly reduce the labor-intensive nature of traditional culturing techniques and offer advantages like high throughput, simplicity, and ease of anaerobic operation. These technologies present a breakthrough in isolating and cultivating gastrointestinal microorganisms. The session also highlighted the value of multi-omics technologies in analyzing complex samples, tackling challenges in cultivating difficult microorganisms, and contributing to human disease research and criminal investigations. For instance, case studies were presented on using multi-omics to study the gut microbiome's role in cardiovascular metabolic health, the molecular mechanisms underlying tumor metastasis, and advances in forensic soil microbiology. These presentations emphasized the critical role of emerging biotechnologies in addressing complex biological and forensic challenges.

MEDICAL SESSION

The Medical Session featured four presentations that explored themes such as “Quercetin Induces *Akkermansia* to Regulate Host Bile Acid Metabolism for Obesity Alleviation,” “Biological Research and Clinical Applications of Circulating Tumor Cells (CTCs),” and “Gut Microbiota and Autism” and comprehensively examined the connection between microorganisms and human physical and mental health. Jianquan He from TreatGut Biotechnology Co., Ltd. demonstrated the significant clinical benefits of precise microbiota transplantation. Professor Xinxia Wang from Zhejiang University presented findings on quercetin, a dietary flavonoid, which was shown to increase the abundance of *Akkermansia muciniphila* in the gut and enhance the production of indole-3-lactic acid (ILA). This leads to the regulation of m6A modification, promotion of bile acid synthesis, and activation of the FXR receptor, which collectively inhibit fat deposition and suggest new targets for obesity

treatment. Assistant Professor Xin Hong from the Southern University of Science and Technology discussed the use of single-cell sequencing technology for circulating tumor cells (CTCs), exploring the mechanisms of tumor metastasis and its potential clinical applications. Associate Researcher Mingbang Wang explained the microbiota-gut-brain axis and its implications for treating autism spectrum disorder (ASD), offering new hope for therapeutic interventions. These presentations underscored the therapeutic potential of modulating microorganisms through plant bioactive compounds or directly altering the gut microbiota, with precise microbiota transplantation poised to play a critical role in future treatments.

GUT MICROBIOTA SESSION

The Gut Microbiota Session highlighted a range of cutting-edge research, investigating how the gut microbiome influences disease mechanisms and exploring innovative therapeutic approaches (Figure 1). The presentations covered topics from basic research to clinical applications, focusing on the complex relationships between gut microbiota dysbiosis and disease progression, as well as intervention strategies. One groundbreaking study, led by Prof. Yi Duan's team and published in *Nature*, was the first to demonstrate that specific bacterial toxins produced by gut strains can induce liver cell death, worsening alcoholic hepatitis. The team developed bacteriophage-based targeted therapy, effectively alleviating the condition and opening new avenues for precision treatment. Furthermore, Professor Jin Wang's team successfully separated the M9 probiotics from the breast milk of healthy women living in the Inner Mongolia. The study found that breast milk probiotics M9 can improve food allergy disease by modulating intestinal flora structure and short-chain fatty acid levels [16]. The team developed novel strategies for the health management of individuals suffering from food allergies and food industries. Another significant study, reported by Associate Professor Xingxing Jian, used metagenomic sequencing to reveal the crucial role of gut microbiota in drug resistance among multiple myeloma (MM) patients [17]. The study found that “nitrogen-cycling gut microbes,” particularly *Citrobacter freundii*, were enriched in MM patients. These microbes increase blood ammonia levels and stabilize the NEK2 protein in MM cells, promoting drug resistance and tumor progression. This discovery provides fresh insights into how gut microbiota interactions drive drug resistance through metabolic pathways. These studies not only deepen our understanding of the intricate relationship between gut microbiota and health but also lay a crucial scientific foundation for the development of more precise, personalized treatment strategies.

ONE HEALTH SESSION

The One Health Session featured seven presentations that emphasized the interconnectedness of human, animal, and environmental health, highlighting the importance of interdisciplinary collaboration to tackle global health challenges (Figure 1). Professor Shaolin Wang underscored the consequences of antimicrobial overuse in livestock and poultry farming, explaining how these practices have turned farm environments into major reservoirs of resistance genes. These resistance genes, which may persist in the environment despite wastewater treatment and composting, contribute to the spread of resistant bacteria, posing a significant threat to human health and public safety. Studying the dynamics of the resistome in livestock environments is critical for controlling the development and transmission of antibiotic resistance. Associate Professor Guangyu Liu focused on the quality control mechanisms of bacterial membrane protein complexes. His research explored how orphan proteins that fail to properly integrate into complexes are identified and removed. In *Shigella*, it was found that the rhomboid protease GlpG, together with a newly identified protein, Rhom7, senses the stability of transmembrane regions and selectively cleaves unstable orphan proteins, thus preserving functional complexes. This mechanism may also have parallels in eukaryotes, offering new insights into cellular quality control systems. The session also addressed a wide range of topics, including microplastic pollution, the evolution of ancient fermentation microbes, microbial interactions with iron, and the mechanisms of traditional Chinese medicine formulations. These studies illustrated the intricate interactions between microbes, ecosystems, and public health, providing a scientific foundation for the development of effective pollution control measures and targeted therapeutic strategies in the future.

OMICS SESSION

The Omics Session featured seven presentations that explored the wide-ranging applications and cutting-edge advancements in omics research. Topics covered plant multi-omics, microbial ecology, epigenetics, and innovative applications in both medicine and agriculture (Figure 1). One standout presentation was delivered by Associate Professor Moyang Liu, who discussed integrating artificial intelligence with phylogenetic analysis to investigate the evolutionary mechanisms of plant gene functions [18]. He emphasized that while high-throughput sequencing technologies have dramatically increased the amount of plant multi-omics data,

interpreting this data to understand gene function evolution remains a challenge. By integrating multi-scale data, this approach sets the stage for future agricultural and biotechnological innovations. Associate Professor Lei Dong introduced novel strategies for investigating microbial dark matter in extremely arid desert environments. Using innovative culture-omics and metagenomics techniques (such as CBM and SCP), the team successfully isolated and preserved a variety of microbial resources, including those with antibacterial and anti-tuberculosis properties. This research not only uncovered the rich microbial diversity in deserts but also highlighted their potential to produce natural pigments and biocontrol agents. Other presentations included Associate Professor Qiang Sun's work on the role of alternative splicing in cancer [19], Professor Weipeng Zhang's research on the diversity and functions of marine biofilms, and Associate Professor Yang Liu's exploration of bacterial epigenetic regulation. These studies illustrated the power of omics research in advancing our understanding of biological processes and developing new technologies. The session showcased the versatility of omics technologies, from basic research to practical applications, offering new perspectives and solutions in fields such as agriculture, ecology, and medicine.

INTERNATIONAL PROJECTS

The International Projects Session featured three keynote presentations, focusing on recent advancements in global scientific collaboration and technological innovation (Figure 1). Dr. Leyuan Li from the National Protein Science Center presented on the International Human Proteome Organization (IHPO) project and the International Metaproteomics Organization. These initiatives aim to foster global collaboration and resource sharing in proteomics research. Dr. Li emphasized the importance of multinational team efforts in scientific communication and standardizing research methodologies. As an official review writer, she encouraged scientists worldwide to engage more actively in international academic exchanges to accelerate advancements in the field of proteomics.

Dr. Yunyun Gao from the Institute of Genomics at the Chinese Academy of Agricultural Sciences provided an in-depth update on several international projects, including "EasyAmplicon," "EasyMetagenome," and the "Microbiome Protocols eBook (MPB)." These projects are designed to offer standardized tools and methods to researchers globally, improving the efficiency and reproducibility of microbiome studies. Dr. Gao called for the formation of a global alliance to establish and promote

omics technology guidelines, advocating for deeper international collaboration to enhance connectivity and knowledge sharing within the research community [20].

Dr. Shifu Chen, founder and CTO of HaploX Biotechnology, a company focused on sequencing and bioinformatics technologies. He introduced a new tool fastplong, which is specifically designed for ultra-fast preprocessing and quality control FASTQ data from long-read sequencing platforms, such as Nanopore, CyClone, and PacBio. This tool addresses quality challenges in long-read data processing, thereby enhancing the accuracy and efficiency of data analysis. The technology marks a significant step forward in precise genome assembly and functional analysis in genomics and metagenomics. This session showcased cutting-edge explorations and collaborations in proteomics, microbiomics, and sequencing technology. Through cross-border partnerships and technological innovations, researchers are working to provide more efficient tools and methods for advancing biological research and its applications.

EDITORIAL BOARD AND JOURNAL FORUM

The Editorial Board Meeting featured a special report by Executive Editor Yongxin Liu titled “Progress and Future Planning of the *iMeta* Series Journals.” The report provided a comprehensive review of the journal’s development since its launch 2 years ago, with an analysis of key metrics, including the number of published articles, citation counts, and the geographical distribution of authors. Prof. Liu also discussed future goals and strategies for the *iMeta* journals. Following the report, the Chief Editor Shuangjiang Liu presented appointment letters to the executive associate editors, young editors, and outstanding reviewers. Prof. Liu summarized the discussions among editorial board members, acknowledging the achievements in the journals’ growth, identifying challenges, and setting an annual goal to prioritize article quality while steadily expanding the journal’s scale and influence.

The Journal Forum featured five presentations, covering various aspects of journal publishing, submission guidelines, and editorial perspectives. Hongling Zhou, Editorial Director of *GigaScience*, provided an overview of the journal, which focuses on big data research in life sciences and medicine. Founded in 2012, *GigaScience* publishes a wide array of data-driven articles, from genomics to fields like imaging, neuroscience, and ecology. The journal also features methodological papers on data processing software, tools, and workflows, alongside research articles, reviews, and commentaries. Zhou highlighted submission standards and key points to consider when submitting papers.

Professor Yuxia Jiao, Executive Editor-in-Chief of the *Genomics, Proteomics & Bioinformatics* (GPB) journal, discussed its role as a leading open-access journal co-sponsored by the National Center for Bioinformation and the Chinese Society for Genetics. Published by Oxford University Press, GPB accepts high-quality manuscripts in omics, bioinformatics, and related fields. Jiao provided insights into submission guidelines and outlined GPB’s status as a key journal under China’s “Excellence Action Plan for Science and Technology Journals.”

Professor Lei Lei from Wiley Publishing Group presented on the publisher’s suite of academic journals, including *Advanced Science*. In her keynote, she posed a thought-provoking question: “Why do we publish papers?” More than three quarters of the attendees responded that their primary motivation was to share their ongoing work. This highlights how the desire to share knowledge remains a major driving force behind scientific research.

Professor Shuangxia Jin, Executive Editor-in-Chief of *Plant Biotechnology Journal*, Editorial Board Member of *Genome Biology*, and Associate Editor of *Crop Journal*, offered valuable insights for the development of newly launched journals, such as “How important to precisely define the scope of your journal? How to keep a balance between the quality and the quantity (the number of yearly publications) of the publications? Does the internationalization of the journal really matter?” Professor Jin believed that Chinese scientists and journals will play increasingly important roles and contribute greatly to the global life science society in the near future.

Prof. Yongxin Liu analyzed the characteristics of high-impact papers, categorizing them into three types: research articles, methods papers, and reviews. He explained that research articles must offer innovation and a new research paradigm, while methodological papers should emphasize versatility and undergo continual optimization through user feedback and testing. Review articles must comprehensively summarize past research while providing new insights and guiding future studies. The Journal Forum concluded with a “Dialogue with Editors” part, where participants engaged with journal editors to discuss challenges in journal development. China is poised to play a leading role in the future of academic publishing.

CONFERENCE ABSTRACT

The *iMeta* Conference 2024 featured a total of 62 research abstracts, spanning diverse and cutting-edge topics across microbiome, biotechnology, and bioinformatics (File S1). These abstracts covered a wide range of research areas, including the development of novel therapeutic platforms such as CAT-BLAST, which focuses on

precision targeting of cancer-associated fibroblasts, and ENSURE, an AI-assisted encyclopedia for suppressor tRNA therapeutics. The abstracts also explored themes such as microbial community dynamics, antimicrobial resource discovery, glycoproteomics in disease treatment, plant disease detection technologies, and gut microbiome studies in relation to cardiometabolic health. Additionally, the collection showcased advanced research on environmental microbiomes, multi-omics techniques, and the potential for gut microbiota interventions in diseases like ulcerative colitis. The breadth of topics and innovations highlighted the interdisciplinary approach of modern life sciences and the crucial role microbiome research plays in addressing global health and ecological challenges.

CONCLUSION

The *iMeta* Conference 2024 emphasized the critical role of interdisciplinary collaboration and global partnerships in advancing life sciences. The presentations and discussions shed light on the intricate connections between microorganisms, ecosystems, and human health, showcasing the transformative potential of emerging technologies in microbiota research, proteomics, and omics applications. With innovative strategies to combat antibiotic resistance, improve disease treatments, and support ecological conservation, the conference highlighted the ongoing requirement for knowledge sharing and technological progress to tackle future health and environmental challenges.

iMeta Conference 2024 not only laid a solid foundation for future scientific collaborations but also underscored China's growing leadership in pioneering biological research and fostering global scientific exchange. The conference reaffirmed the importance of such gatherings in shaping the future of life sciences and addressing critical global health issues.

AUTHOR CONTRIBUTIONS

Yao Wang, Huiyu Hou, Luo Hao, Jiani Xun, Chuang Ma, Haifei Yang, Defeng Bai, Salsabeel Yousuf, Hujie Lyu, Tianyuan Zhang, Xiulin Wan, Xiaofang Yao, and Tengfei Ma: Writing—original draft; visualization; data curation; investigation, project administration. **Chun-Lin Shi, Ren-You Gan, Fangqing Zhao, Jun Yu, Tong Chen, Xin Hong, Hua Yang, Bangzhou Zhang, Shifu Chen, Xiaodong Li, Yunyun Gao, Yong-Xin Liu:** Conceptualization, supervision, funding acquisition, project administration. All authors: Writing—review & editing.

ACKNOWLEDGMENTS

The authors would like to express our sincere gratitude to the organizers of the *iMeta* Conference 2024 for their

dedication and effort in bringing together a diverse group of researchers and professionals from around the world. Special thanks go to the keynote speakers, presenters, and session chairs for sharing their invaluable insights and knowledge, which enriched the discussions and contributed to the success of the event. The authors also wish to acknowledge the co-organizing institutions—Southern University of Science and Technology (Department of Biochemistry and Key University Laboratory of Metabolism and Health of Guangdong), Xianghu Laboratory, TreatGut, and HaploX—for their support and collaboration. The authors are also deeply grateful to the Nanshan District People's Hospital for hosting the event and to the dedicated volunteers and staff members whose hard work ensured the smooth operation of the conference. Finally, the authors thank all the attendees for their active participation and engagement, which made the *iMeta* Conference 2024 a truly collaborative and impactful experience. The authors look forward to continuing the dialogue and fostering future scientific advancements through this community. This study was financially supported by the National Natural Science Foundation of China (32470055, U23A20148), the China Postdoctoral Science Foundation (2024M753580), the Agricultural Science and Technology Innovation Program (CAAS-ZDRW202308), and the design and cultivation of the new breed in pigs with high-quality meat (2023ZD04046). The figures were created in BioRender <https://BioRender.com/k73b828>.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available in meeting website: <http://www.imeta.science/meeting/2024>. Supplementary materials (Supporting file, graphical abstract, slides, videos, Chinese translated version and update materials) may be found in the online DOI or *iMeta* Science <http://www.imeta.science/>.

Yao Wang¹ 

Huiyu Hou¹

Hao Luo¹

Jiani Xun¹

Chuang Ma²

Haifei Yang³

Defeng Bai¹

Salsabeel Yousuf¹

Hujie Lyu^{1,4}

Tianyuan Zhang¹


Xiulin Wan¹

Xiaofang Yao⁵

Tengfei Ma⁶

- Yuanping Zhou⁷
Zhihao Zhu⁷
Meiyin Zeng¹
Sanqi An⁸
Qing Bai⁹
Yao Bai¹⁰
Guodong Cao¹¹
Tingting Cao¹²
Yongkai Cao¹³
Chihmin Chang¹⁴
Lijia Chang¹⁵
Bo Chen¹⁶
Dai Chen¹⁷
Dijun Chen¹⁸
Hanqing Chen¹⁹
Jiali Chen²⁰
Jinfeng Chen²¹
Wei-Hua Chen²²
Xinhai Chen²³
Yue Chen²⁴
Zhangran Chen²⁵
Cheng Cheng²⁶
Quan Cheng²⁷
Xi-Jian Dai²⁸
Chaowen Deng²⁹
Feilong Deng³⁰
Jingwen Deng³¹
Chang-Sheng Dong³²
Lei Dong³³
Lianhui Duan³⁴
Yi Duan³⁵
Qingjie Fan³⁶
Chao Fang³⁷
Tingyu Fang³⁵
Wensheng Fang³⁸
Zhencheng Fang³⁹
Min Fu⁴⁰
Minjie Fu⁴¹
Cong Gao²⁴
Hao Gao⁴²
Weiwei Gao⁴³
Xinrui Gao⁴⁴
Yi-Zhou Gao⁴⁵
Yan Geng⁴⁶
Wenping Gong⁴⁷
Shaohua Gu⁴⁸
Xia Gu⁴⁹
Zhengquan Gu⁵⁰
Jian-Wei Guo⁵¹
Junjie Guo⁵²
Qiuyan Guo⁵³
Xiang Guo⁵⁴
Xiaoqian Guo⁵⁵
Dongfei Han⁵⁶
Ziyi Han⁵⁷
Yanan Hao^{58,59}
Jiale He⁶⁰
Jianquan He⁶¹
Jianyu He⁶²
Ruolin He⁴⁸
Guosen Hou⁴²
Bin Hu⁶³
Haibo Hu⁶³
Yi Hu⁶⁴
Yongfei Hu⁶⁵
Yucan Hu⁶⁶
Guanyin Huang³⁴
Haiyun Huang⁶⁷
Jiaomei Huang⁶⁸
Shenghui Huang⁶⁹
Baolei Jia²⁴
Xingxing Jian⁷⁰
Chao Jiang⁷¹
Kun Jiang⁷²
Lanyan Jiang⁶⁷
Shuaiming Jiang⁷³
Jian-Yu Jiao⁵²
Hao Jin⁷⁴
Jiajia Jin⁷⁵
Siyuan Kong⁷⁶
Xinxing Lai⁷⁷
Yuxin Leng⁷⁸
Bang Li⁷⁹
Bing Li⁸⁰
Fang Li⁸¹
Hao Li⁸²
Huanjie Li⁸³
Jing Li⁸⁴
Kai Li⁸⁵
Lanqi Li⁸⁶
Leyuan Li⁸¹
Minghan Li⁸⁷
Pengsong Li⁸⁸
Wei Li⁸⁴
Wei Li⁸⁹
Xianyu Li⁹⁰
Li Xuemeng⁷
Yafei Li⁹¹
Yuantaoli Li⁶¹
Zhi Li⁶⁰
Liqin Liang⁹²
Rong Liang⁹³
Zhuobin Liang⁹⁴
Qingya Liu⁹⁵
Dejian Liu⁹⁶
Huiheng Liu⁹⁷

- Jinchao Liu⁹⁸
 Li Liu⁹⁹
 Lihui Liu¹⁰⁰
 Moyang Liu¹⁰¹
 Ran Liu¹⁰²
 Shuai Liu¹⁰³
 Tianyang Liu¹⁰⁴
 Wei Liu¹⁰⁵
 Wenjuan Liu⁶³
 Xiaomin Liu¹⁰⁶
 Yang Liu¹⁰⁷
 Yichen Liu¹⁰⁸
 Yina Liu¹⁰⁹
 Yuan Liu¹¹⁰
 Zhe Liu¹¹¹
 Zhipeng Liu¹¹²
 Zhiquan Liu¹¹³
 Chunhao Long³⁴
 Yun Long¹¹¹
 Changying Lu¹¹⁴
 Chao Lu¹¹⁵
 Cheng Lu¹¹⁶
 Qi Lu¹¹⁷
 Yaning Luan¹¹⁸
 Peng Luo¹¹⁹
 Sheng Luo⁹⁸
 Ning Ma¹⁰³
 Xiao-Ya Ma¹²⁰
 Yan Ma¹²¹
 Wenjun Mao¹²²
 Yuanfa Meng¹²³
 Yan Ni¹²⁴
 Yawen Ni¹²⁵
 Kang Ning¹²⁶
 Dongze Niu¹²⁷
 Kai Peng¹²⁸
 Zhengwu Peng¹²⁹
 Xubo Qian¹³⁰
 Zhiguang Qiu¹³¹
 Hui Qu¹²³
 Zepeng Qu⁶⁶
 Yan Ren¹³²
 Zhigang Ren¹³³
 Youming Shen¹³⁴
 Lin Shi¹³⁵
 Linlin Shi¹¹⁴
 Wenxuan Shi¹³⁶
 Yongpeng Shi³⁵
 Tianyuan Song¹³⁷
 Xiaohui Song⁹⁹
 Xiaoming Song¹³⁸
 Xiaowei Song¹³⁹
 Qi Su¹⁴⁰
- Yufan Su¹⁴¹
 Lifang Sun¹⁴²
 Qiang Sun¹⁴³
 Tiefeng Sun¹⁴⁴
 Yunke Sun⁶⁰
 Hua Tang¹⁴⁵
 Wenjing Tang¹⁴⁶
 Tao Yu¹⁴⁷
 Simon Tian¹⁴⁸
 Shuo Wang¹⁴⁹
 Bowen Wang¹⁵⁰
 Cheng Wang²⁴
 Wang Jin¹⁵¹
 Leli Wang¹⁵²
 Liangliang Wang¹⁵³
 Lixiao Wang¹⁵⁴
 Mingbang Wang¹⁵⁵
 Ming-Ke Wang¹⁵⁶
 Pingyi Wang¹⁵⁷
 Shaolin Wang¹⁵⁸
 Shaopu Wang¹⁵⁹
 Xinxia Wang¹⁶⁰
 Xueqiang Wang¹⁶¹
 Mi Wei¹³⁶
 Yan Wei¹⁶²
 Yanxia Wei¹⁶³
 Yongjun Wei¹⁶⁴
 Chaoliang Wen¹⁰³
 Xin Wen¹⁶⁵
 Linkun Wu¹⁶⁶
 Shengru Wu¹⁶⁷
 Yuting Wu⁶¹
 Shuting Xia¹⁰⁹
 Xiaodong Xia¹⁶⁸
 Yu Xia⁶⁰
 Xionggen Xiang⁴³
 Chuanxing Xiao⁶¹
 Weihua Xiao¹⁶⁹
 Yingping Xiao¹⁷⁰
 Ruohan Xie¹³⁶
 Rui Xing¹⁷¹
 Hui Xu¹⁷²
 Wei Xu⁶¹
 Zhimin Xu¹⁵²
 Hongliang Xue¹⁷³
 Chao Yan⁷⁶
 Qiu-Long Yan^{174,175}
 Shaofei Yan¹⁰
 Xiuchuan Yan¹⁷⁶
 Mengli Yang¹⁷⁷
 Yufan Yang³⁴
 Zhipeng Yang¹⁷⁸
 Ziyuan Yang¹⁷⁹

- Guixiang Yao⁷⁵
 Yanlai Yao²⁴
 Xianfu Yi¹⁸⁰
 Chong Yin¹⁸¹
 Mingliang Yin¹⁸²
 Shicheng Yu¹⁸³
 Ying Yu⁴⁴
 Yongyao Yu¹⁸⁴
 Fusong Yuan¹⁸⁵
 Shao-Lun Zhai¹⁸⁶
 Bo Zhang¹⁷
 Chen Zhang⁶⁸
 Fang Zhang¹⁸⁷
 Feng-Li Zhang¹⁸⁸
 Hengguo Zhang⁷⁹
 Jinping Zhang¹⁸⁹
 Junya Zhang¹⁹⁰
 Kun Zhang⁶⁶
 Li Zhang¹⁹¹
 Lin Zhang¹⁹²
 Lingxuan Zhang⁹¹
 Meng Zhang⁷⁴
 Qian Zhang¹⁹³
 Runan Zhang⁶³
 Tongtong Zhang¹⁹⁴
 Tongxue Zhang⁷⁵
 Weipeng Zhang¹⁹⁵ 
 Yong Zhang¹⁹⁶ 
 Yuchao Zhang¹⁹⁷
 Yujun Zhang¹⁸⁴
 Zeng Zhang⁷³
 Zhengxiao Zhang¹⁹⁸
 Zhi-Feng Zhang¹⁹⁹
 Boxi Zhao³⁴
 Yanyan Zhao¹⁰³
 Yibing Zhao²⁰⁰
 Ziwei Zhao²⁰¹
 Diwei Zheng²⁰²
 Ying Zheng⁸⁴
 Wenqiang Zhi²⁰³
 Jixin Zhong²⁰⁴
 Xiangjian Zhong⁶³
 Wei Zhou²⁰⁵
 Xin Zhou²⁰⁶ 
 Zhemin Zhou¹⁰⁹ 
 Zhichao Zhou²⁰⁷
 Congmin Zhu²⁰⁸
 Feiying Zhu²⁰⁹ 
 Xiaodie Zhu²¹⁰
 Yutian Zou²¹¹ 
 Hongling Zhou²¹²
 Lei Lei²¹³
 Yanliang Bi²¹⁴ 
- Hubing Shi²¹⁵
 Hui-Zeng Sun²¹⁶
 Shuangxia Jin²¹⁷ 
 Wenkai Ren²¹⁸ 
 Lei Dai⁶⁶ 
 Xin Wang²¹⁹
 Canhui Lan^{219,220}
 Hongwei Liu²⁰⁶
 Shuang-Jiang Liu⁷² 
 Yulong Yin¹⁵²
 Chun-Lin Shi²²¹
 Ren-You Gan²²²
 Fangqing Zhao²²³
 Jun Yu²²⁴ 
 Tong Chen⁵³
 Xin Hong³⁴
 Hua Yang²⁴
 Bangzhou Zhang⁶¹
 Shifu Chen^{115,225} 
 Xiaodong Li⁶⁷
 Yunyun Gao¹ 
 Yong-Xin Liu¹ 
- ¹Genome Analysis Laboratory of the Ministry of Agriculture and Rural Affairs, Agricultural Genomics Institute at Shenzhen, Chinese Academy of Agricultural Sciences, Shenzhen, China
²School of Horticulture, Anhui Agricultural University, Hefei, China
³College of Life Sciences, Qingdao Agricultural University, Qingdao, China
⁴Department of Life Sciences, Imperial College of London, London, UK
⁵Key Laboratory of Agro-Ecological Processes in Subtropical Region, Institute of Subtropical Agriculture, Chinese Academy of Sciences, Changsha, China
⁶State Key Laboratory of Herbage Improvement and Grassland Agro-Ecosystems, Centre for Grassland Microbiome, College of Pastoral Agriculture Science and Technology, Lanzhou University, Lanzhou, China
⁷Zhanjiang Key Laboratory of Human Microecology and Clinical Translation Research, the Marine Biomedical Research Institute, College of Basic Medicine, Guangdong Medical University, Zhanjiang, China
⁸Guangxi Key Laboratory of AIDS Prevention and Treatment, Guangxi Medical University, Nanning, Guangxi, China
⁹Center for Advanced Interdisciplinary Science and Biomedicine of IHM, Division of Life Sciences and Medicine, University of Science and Technology of China, Hefei, China

- ¹⁰China National Centre for Food Safety Risk Assessment, Beijing, China
- ¹¹The First Affiliated Hospital of Anhui Medical University, Anhui Medical University, Hefei, China
- ¹²Bamboo Industry Institute, Zhejiang A&F University, Hangzhou, China
- ¹³Department of Neurology, Institute of Translational Medicine, The First Affiliated Hospital of Shenzhen University, Shenzhen, China
- ¹⁴Guangdong Magigene Biotechnology Co., Ltd., China
- ¹⁵Basic Medicine Research Innovation Center for Cardiometabolic Diseases, Ministry of Education, Southwest Medical University, Luzhou, China
- ¹⁶Centre for Lipid Research & Chongqing Key Laboratory of Metabolism on Lipid and Glucose, Key Laboratory of Molecular Biology for Infectious Diseases (Ministry of Education), Institute for Viral Hepatitis, Department of Infectious Diseases, the Second Affiliated Hospital, Chongqing Medical University, Chongqing, China
- ¹⁷NovelBio Bio-Pharm Technology Co., Ltd., Shanghai, China
- ¹⁸Department of Gastroenterology, Nanjing Drum Tower Hospital, State Key Laboratory of Pharmaceutical Biotechnology, School of Life Sciences, Nanjing University, Nanjing, China
- ¹⁹Department of Nutrition and Food Hygiene, School of Public Health, Capital Medical University, Beijing, China
- ²⁰Department of Food Science and Engineering, College of Life Science and Technology, Jinan University, Guangzhou, China
- ²¹Clinical Systems Biology Key Laboratories of Henan, the First Affiliated Hospital of Zhengzhou University, Zhengzhou, China
- ²²College of Life Science and Technology, Huazhong University of Science and Technology, Wuhan, China
- ²³Institute of Infectious Diseases, Shenzhen Bay Laboratory, Shenzhen, China
- ²⁴Xianghu Laboratory, Hangzhou, China
- ²⁵Shenzhen Wedge Microbiology Research Co., Ltd., Shenzhen, China
- ²⁶Chengdu Institute of Biology, Chinese Academy of Sciences, Chengdu, China
- ²⁷Department of Neurosurgery, National Clinical Research Center for Geriatric Disorders, Xiangya Hospital, Central South University, Changsha, China
- ²⁸Department of Radiology, The Second Affiliated Hospital, Jiangxi Medical College, Nanchang University/Jiangxi Provincial Key Laboratory of Intelligent Medical Imaging, Nanchang, China
- ²⁹Department of Infectious Diseases and Microbiology, The University of Hong Kong – Shenzhen Hospital, Shenzhen, China
- ³⁰College of Animal Science and Technology, Foshan University, FoShan, China
- ³¹Guangdong Provincial Hospital of Chinese Medicine, Guangzhou, China
- ³²Cancer Institute of Traditional Chinese Medicine/Department of Oncology, Longhua Hospital, Shanghai University of Traditional Chinese Medicine, Shanghai, China
- ³³State Key Laboratory of Biocontrol, Guangdong Provincial Key Laboratory of Plant Stress Biology and Southern Marine Science and Engineering Guangdong Laboratory (Zhuhai), School of Life Sciences, Sun Yat-Sen University, Guangzhou, China
- ³⁴Department of Biochemistry, School of Medicine, Key University Laboratory of Metabolism and Health of Guangdong, Guangdong Provincial Key Laboratory of Cell Microenvironment and Disease Research, University of Science and Technology, Shenzhen, China
- ³⁵Department of Infectious Diseases, The First Affiliated Hospital of USTC, Division of Life Sciences and Medicine, University of Science and Technology of China, Hefei, China
- ³⁶Department of Immunology, College of Basic Medical Sciences, Jinzhou Medical University, Jinzhou, China
- ³⁷BGI Research, Beijing, China
- ³⁸State Key Laboratory of Integrated Management of Plant Diseases and Insect Pests, Institute of Plant Protection, Chinese Academy of Agricultural Sciences, Beijing, China
- ³⁹Department of Laboratory Medicine, Zhujiang Hospital, Southern Medical University, Guangzhou, China
- ⁴⁰Anhui Province Key Laboratory of Integrated Pest Management on Crops, College of Plant Protection, Anhui Agricultural University, Hefei, China
- ⁴¹School of Biological Sciences, Seoul National University, Seoul, Korea
- ⁴²College of Computer Science and Technology, Qingdao University, Qingdao, China
- ⁴³Institute of Weishi Biotechnology Research, Changsha, China
- ⁴⁴Shenzhen Key Laboratory of Metabolic Health, Center for Energy Metabolism and Reproduction, Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences, Shenzhen, China
- ⁴⁵The Center for Microbes, Development and Health, Shanghai Institute of Immunity and Infection, Chinese Academy of Sciences, Shanghai, China
- ⁴⁶School of Life Sciences and Health Engineering, Jiangnan University, Wuxi, China
- ⁴⁷Beijing Key Laboratory of New Techniques of Tuberculosis Diagnosis and Treatment, Senior Department of Tuberculosis,

- The Eighth Medical Center of PLA General Hospital, Beijing, China
- ⁴⁸Center for Quantitative Biology, Academy for Advanced Interdisciplinary Studies, Peking University, Beijing, China
- ⁴⁹College of Environmental Science and Engineering, Donghua University, Shanghai, China
- ⁵⁰Institute of Tibetan Plateau Research, Chinese Academy of Sciences, Beijing, China
- ⁵¹College of Agronomy and Life Sciences/Yunnan Urban Agricultural Engineering and Technological Research Center, Kunming University, Kunming, China
- ⁵²State Key Laboratory of Biocontrol, Guangdong Provincial Key Laboratory of Plant Stress Biology, School of Agriculture and Biotechnology, Shenzhen Campus of Sun Yat-sen University, Sun Yat-sen University, Shenzhen, China
- ⁵³State Key Laboratory for Quality Ensurance and Sustainable Use of Dao-di Herbs, National Resource Center for Chinese Materia Medica, China Academy of Chinese Medical Sciences, Beijing, China
- ⁵⁴Institute of Tropical Medicine, Department of Pathogen Biology, School of Public Health, Southern Medical University, Guangdong Provincial Key Laboratory of Tropical Disease Research, Key Laboratory of Prevention and Control for Emerging Infectious Diseases of Guangdong Higher Institutes, Key Laboratory of Infectious Diseases Research in South China, Ministry of Education, Guangzhou, China
- ⁵⁵School of Public Health, Southern Medical University, Guangzhou, China
- ⁵⁶School of Environmental Science and Engineering, Suzhou University of Science and Technology, Suzhou, China
- ⁵⁷Nurturing Center of Jiangsu Province for State Laboratory of AI Imaging & Interventional Radiology, Department of Radiology, Zhongda Hospital, Medical School, Southeast University, Nanjing, China
- ⁵⁸Institute of Brain Science and Brain-inspired Research, Shandong First Medical University & Shandong Academy of Medical Sciences, Jinan, China
- ⁵⁹Shandong Institute of Brain Science and Brain-inspired Research, Jinan, China
- ⁶⁰School of Environmental Science and Engineering, Southern University of Science and Technology, Shenzhen, China
- ⁶¹Xiamen Treatgut Biotechnology Co., Ltd, Xiamen, China
- ⁶²Marine Science and Technical College, Zhejiang Ocean University, Zhoushan, China
- ⁶³Jiangxi Province Key Laboratory of Pharmacology of Traditional Chinese Medicine, National Engineering Research Center for Modernization of Traditional Chinese Medicine-Hakka Medical Resources Branch, School of Pharmacy, Gannan Medical University, Ganzhou, China
- ⁶⁴Department of Gastroenterology, The First Affiliated Hospital, Jiangxi Medical College, Nanchang University, Nanchang, China
- ⁶⁵State Key Laboratory of Animal Nutrition and Feeding, College of Animal Science and Technology, China Agricultural University, Beijing, China
- ⁶⁶CAS Key Laboratory of Quantitative Engineering Biology, Shenzhen Institute of Synthetic Biology, Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, Shenzhen, China
- ⁶⁷Department of Neonatology, Nanshan District People's Hospital, Shenzhen, China
- ⁶⁸School of Marine Biology and Fisheries, Hainan University, Hakou, China
- ⁶⁹Department of Molecular Biotechnology and Health Sciences, University of Torino, Turin, Italy
- ⁷⁰Bioinformatics Center, National Clinical Research Center for Geriatric Diseases, Xiangya Hospital, Central South University, Changsha, China
- ⁷¹MOE Key Laboratory of Biosystems Homeostasis & Protection, and Zhejiang Provincial Key Laboratory of Cancer Molecular Cell Biology, Life Sciences Institute, Zhejiang University, Hangzhou, China
- ⁷²State Key Laboratory of Microbial Technology, Shandong University, Qingdao, China
- ⁷³School of Food Science and Engineering, Key Laboratory of Food Nutrition and Functional Food of Hainan Province, Hainan University, Haikou, China
- ⁷⁴Key Laboratory of Dairy Biotechnology and Engineering, Ministry of Education, Inner Mongolia Agricultural University, Hohhot, China
- ⁷⁵State Key Laboratory for Innovation and Transformation of Luobing Theory/Key Laboratory of Cardiovascular Remodeling and Function Research, Chinese Ministry of Education, Chinese National Health Commission and Chinese Academy of Medical Sciences/Department of Cardiology, Qilu Hospital of Shandong University, Jinan, China
- ⁷⁶Shenzhen Branch, Guangdong Laboratory of Lingnan Modern Agriculture, Key Laboratory of Livestock and Poultry Multi-omics of MARA, Agricultural Genomics Institute at Shenzhen, Chinese Academy of Agricultural Sciences, Shenzhen, China
- ⁷⁷Dongzhimen Hospital, Beijing University of Chinese Medicine, Beijing, China
- ⁷⁸Intensive Care Unit, Peking University Third Hospital, Beijing, China

- ⁷⁹College & Hospital of Stomatology, Anhui Medical University, Key Laboratory of Oral Diseases Research of Anhui Province, Hefei, China
- ⁸⁰Key Laboratory of Microorganism Application and Risk Control, Ministry of Ecology and Environment, Tsinghua Shenzhen International Graduate School, Tsinghua University, Shenzhen, China
- ⁸¹State Key Laboratory of Medical Proteomics, Beijing Proteome Research Center, National Center for Protein Sciences (Beijing), Beijing Institute of Lifeomics, Beijing, China
- ⁸²Jiangsu Provincial Key Lab for Solid Organic Waste Utilization, Key Lab of Organic-based Fertilizers of China, Jiangsu Collaborative Innovation Center for Solid Organic Wastes, Educational Ministry Engineering Center of Resource-saving fertilizers, Nanjing Agricultural University, Nanjing, China
- ⁸³Cheeloo College of Medicine, Shandong University, Jinan, China
- ⁸⁴Zhejiang A&F University, Hangzhou, China
- ⁸⁵Department of Surgical Oncology and General Surgery, The First Hospital of China Medical University, Shenyang, China
- ⁸⁶Department of Nutrition and Food Hygiene, School of Population Medicine and Public Health, Chinese Academy of Medical Sciences & Peking Union Medical College, Beijing, China
- ⁸⁷College of Veterinary Medicine, Jilin Agricultural University, Changchun, China
- ⁸⁸Beijing Key Lab for Source Control Technology of Water Pollution/Engineering Research Center for Water Pollution Source Control & Eco-remediation, College of Environmental Science and Engineering, Beijing Forestry University, Beijing, China
- ⁸⁹AxbioBiotechnology (Shenzhen) Co., Ltd., Shenzhen, China
- ⁹⁰Experimental Research Center, China Academy of Chinese Medical Sciences, Beijing, China
- ⁹¹Institute of Quality Standard and Monitoring Technology for Agro-products of Guangdong Academy of Agricultural Sciences, Guangzhou, China
- ⁹²School of Biomedical Sciences and Engineering, South China University of Technology, Guangzhou International Campus, Guangzhou, China
- ⁹³Department of Digestive Oncology, Guangxi Medical University Cancer Hospital, Nanning, China
- ⁹⁴Institute of Molecular Physiology, Shenzhen Bay Laboratory, Shenzhen, China
- ⁹⁵Department of Biotherapy, Cancer Center and State Key Laboratory of Biotherapy, West China Hospital, Sichuan University, Chengdu, China
- ⁹⁶State Key Laboratory of Microbial Resources, Institute of Microbiology, Chinese Academy of Sciences, Beijing, China
- ⁹⁷Zhongshan Hospital Xiamen University, Xiamen, China
- ⁹⁸Chi-Biotech Co. Ltd., Shenzhen, China
- ⁹⁹Chinese Center for Disease Control and Prevention, Beijing, China
- ¹⁰⁰Guangdong Pharmaceutical University, Guangzhou, China
- ¹⁰¹School of Agriculture and Biology, Shanghai Jiao Tong University, Shanghai, China
- ¹⁰²School of Public Health, Guangdong Pharmaceutical University, Guangzhou, China
- ¹⁰³College of Animal Science and Technology, China Agricultural University, Beijing, China
- ¹⁰⁴College of Life Sciences, Shandong Agricultural University, Tai'an, China
- ¹⁰⁵School of Plant Protection, Anhui Agricultural University, Hefei, China
- ¹⁰⁶BGI Research, Wuhan, China
- ¹⁰⁷Medical Research Center, Southern University of Science and Technology Hospital, Shenzhen, China
- ¹⁰⁸Institute of Vertebrate Paleontology and Paleoanthropology, Chinese Academy of Sciences, Beijing, China
- ¹⁰⁹Cancer Institute, Suzhou Medical College, Soochow University, Suzhou, China
- ¹¹⁰Institute of Farmland Irrigation of Chinese Academy of Agricultural Sciences, Xinxiang, China
- ¹¹¹Institute for Hepatology, National Clinical Research Center for Infectious Disease, Shenzhen Third People's Hospital/The Second Affiliated Hospital, School of Medicine, Southern University of Science and Technology, Shenzhen, China
- ¹¹²Biotree Metabolomics Technology Research Center, Shanghai, China
- ¹¹³School of engineering, Hangzhou Normal University, Hangzhou, China
- ¹¹⁴Suzhou Academy of Agricultural Sciences/Institute of Agricultural Sciences in Taihu Lake District, Suzhou, China
- ¹¹⁵HaploX Biotechnology, Shenzhen, China
- ¹¹⁶Medical Research Institute, Guangdong Provincial People's Hospital (Guangdong Academy of Medical Sciences), Southern Medical University, Guangzhou, China
- ¹¹⁷Children's Hospital of Chongqing Medical University, Chongqing, China
- ¹¹⁸The Key Laboratory for Silviculture and Conservation of Ministry of Education, College of Forestry, Beijing Forestry University, Beijing, China

- ¹¹⁹Department of Oncology, Zhujiang Hospital of Southern Medical University, Guangzhou, China
- ¹²⁰Center for Energy Metabolism and Reproduction, Institute of Biomedicine and Biotechnology, Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences/Department of Cardiology, Shenzhen Guangming District People's Hospital, Shenzhen, China
- ¹²¹Research Center for High Altitude Medicine, Qinghai University, Xining, China
- ¹²²The Affiliated Wuxi People's Hospital of Nanjing Medical University, Wuxi People's Hospital, Wuxi Medical Center, Nanjing Medical University, Wuxi, China
- ¹²³Institute of Grassland Research of Chinese Academy of Agricultural Sciences, Hohhot, China
- ¹²⁴Children's Hospital, Zhejiang University School of Medicine, National Clinical Research Center for Child Health, Zhejiang University, Hangzhou, China
- ¹²⁵Peking Union Medical College, Chinese Academy of Medical Sciences/Changping Laboratory/National Center for Respiratory Medicine, State Key Laboratory of Respiratory Health and Multimorbidity, National Clinical Research Center for Respiratory Diseases, China-Japan Friendship Hospital, Beijing, China
- ¹²⁶Huazhong University of Science and Technology, Wuhan, China
- ¹²⁷National-Local Joint Engineering Research Center of Biomass Refining and High-Quality Utilization, Institute of Urban and Rural Mining, Changzhou University, Changzhou, China
- ¹²⁸Jiangsu Co-Innovation Center for Prevention and Control of Important Animal Infectious Diseases and Zoonoses, College of Veterinary Medicine, Yangzhou University, Yangzhou, China
- ¹²⁹Department of Psychiatry, Xijing Hospital, Xian, China
- ¹³⁰Department of Pediatrics, Affiliated Jinhua Hospital, Zhejiang University School of Medicine, Jinhua, China
- ¹³¹Eco-environment and Resource Efficiency Research Laboratory, School of Environment and Energy, Shenzhen Graduate School, Peking University, Shenzhen, China
- ¹³²School of Life Science and Technology, Inner Mongolia University of Science and Technology, Baotou, China
- ¹³³Department of Infectious Diseases, State Key Laboratory of Antiviral Drugs, Pingyuan Laboratory, the First Affiliated Hospital of Zhengzhou University, Zhengzhou, China
- ¹³⁴Research, Institute of Pomology, Chinese Academy of Agricultural Sciences, Xingcheng, China
- ¹³⁵Shaanxi Normal University, Xi'an, China
- ¹³⁶School of Agriculture and Biotechnology, Shenzhen Campus of Sun Yat-sen University, Shenzhen, China
- ¹³⁷School of Food Science and Biotechnology, Zhejiang Gongshang University, Hangzhou, China
- ¹³⁸School of Life Sciences, North China University of Science and Technology, Tangshan, China
- ¹³⁹College of Software Engineering, Chengdu University of Information Technology, Chengdu, China
- ¹⁴⁰Department of Medicine and Therapeutics, The Chinese University of Hong Kong, Hong Kong SAR, China
- ¹⁴¹College of Food Science and Engineering, Inner Mongolia Agricultural University, Hohhot, China
- ¹⁴²Shenzhen Children's Hospital, Shenzhen, China
- ¹⁴³Center for RNA Medicine, the Fourth Affiliated Hospital of School of Medicine, and International School of Medicine, International Institutes of Medicine, Zhejiang University, Yiwu, China
- ¹⁴⁴Shandong Academy of Chinese Medicine, Jinan, China
- ¹⁴⁵School of Basic Medical Sciences, Southwest Medical University, Luzhou, China
- ¹⁴⁶Neurology Department, Chinese PLA General Hospital, Beijing, China
- ¹⁴⁷Center for Pan-third Pole Environment, Lanzhou University, Lanzhou, China
- ¹⁴⁸College of Life Sciences, Southern University of Science and Technology, Shenzhen, China
- ¹⁴⁹School of Environment and Ecology, Jiangnan University, Wuxi, China
- ¹⁵⁰School of Food and Health, Beijing Technology and Business University, Beijing, China
- ¹⁵¹Department of Nutrition and Food Hygiene, School of Public Health, Southeast University, Nanjing, Jiangsu, China
- ¹⁵²Yuelushan laboratory, Changsha, China
- ¹⁵³The Laboratory of Microbiome and Microecological Technology, Institute of Microbiology, Chinese Academy of Sciences, Beijing, China
- ¹⁵⁴School of Life Sciences, Zhengzhou University, Zhengzhou, China
- ¹⁵⁵Department of Neonatology, Longgang Maternity and Child Institute of Shantou University Medical College (Longgang District Maternity & Child Healthcare Hospital of Shenzhen City), Shenzhen, China
- ¹⁵⁶Naval Medical Center of PLA, Naval Medical University, Shanghai, China
- ¹⁵⁷Engineering Research Center of Tibetan Medicine Detection Technology, Ministry of Education,

- School of Medicine,
Xizang Minzu University, Xianyang, China
- ¹⁵⁸College of Veterinary Medicine,
China Agricultural University, Beijing, China
- ¹⁵⁹Department of Pediatrics, Key Laboratory of Birth
Defects and Related Diseases of Women and Children
(Sichuan University), Ministry of Education, West China
Second University Hospital,
Sichuan University, Chengdu, China
- ¹⁶⁰College of Animal Sciences,
Zhejiang University, Hangzhou, China
- ¹⁶¹Yazhouwan National Laboratory, Sanya, China
- ¹⁶²Key Laboratory of Medical Electrophysiology, Ministry
of Education & Medical Electrophysiological Key
Laboratory of Sichuan Province, (Collaborative Innovation
Center for Prevention of Cardiovascular Diseases), Institute
of Cardiovascular Research,
Southwest Medical University, Luzhou, China
- ¹⁶³Jiangsu Key Laboratory of Immunity and Metabolism,
Jiangsu International Laboratory of Immunity and
Metabolism, Department of Pathogenic
Biology and Immunology,
Xuzhou Medical University, Xuzhou, China
- ¹⁶⁴School of Pharmaceutical Sciences,
Zhengzhou University, Zhengzhou, China
- ¹⁶⁵College of Animal Science,
South China Agricultural University, Guangzhou, China
- ¹⁶⁶College of JunCao Science and Ecology,
Fujian Agriculture and Forestry University, Fuzhou, China
- ¹⁶⁷College of Animal Science and Technology,
Northwest A&F University, Xianyang, China
- ¹⁶⁸State Key Laboratory of Marine Food Processing and
Safety Control, National Engineering Research Center of
Seafood, School of Food Science and Technology,
Dalian Polytechnic University, Dalian, China
- ¹⁶⁹Department of Pathology, Beilun People's Hospital, Beilun
Branch of the First Affiliated Hospital, College of Medicine,
Zhejiang University, Ningbo, China
- ¹⁷⁰Zhejiang Academy of Agricultural Sciences,
Hangzhou, China
- ¹⁷¹Northwest Institute of Plateau Biology,
Chinese Academy of Sciences, Xining, Qinghai, China
- ¹⁷²School of Public Health,
Guangdong Medical University, Dongguan, China
- ¹⁷³School of Public Health, The First Affiliated Hospital,
Guangzhou Medical University, Guangzhou, China
- ¹⁷⁴Department of Microbiology,
College of Basic Medical Sciences,
Dalian Medical University, Dalian, China
- ¹⁷⁵Puensum Genetech Institute, Wuhan, China
- ¹⁷⁶Intestinal Microenvironment
Treatment Center, Shenzhen Hospital,
Beijing University of Chinese Medicine, Shenzhen, China
- ¹⁷⁷Institute of Horticulture,
Henan Academy of Agricultural Sciences,
Zhengzhou, China
- ¹⁷⁸Department of Animal Nutrition and Feed Science,
College of Animal Science and Technology,
Huazhong Agricultural University, Wuhan, China
- ¹⁷⁹Department of Emergency, Jishuitan Hospital,
Capital Medical University, Beijing, China
- ¹⁸⁰Department of Bioinformatics,
School of Basic Medical Sciences,
Tianjin Medical University, Tianjin, China
- ¹⁸¹Department of Clinical Laboratory, Department of
Rehabilitation Medicine,
Affiliated Hospital of North Sichuan Medical College,
Nanchong, China
- ¹⁸²College of Forestry and Landscape Architecture,
South China Agricultural University, Guangzhou, China
- ¹⁸³Guangzhou National Laboratory, Guangzhou, China
- ¹⁸⁴College of Fisheries,
Huazhong Agriculture University, Wuhan, China
- ¹⁸⁵Peking University School and Hospital of Stomatology,
Beijing, China
- ¹⁸⁶Institute of Animal Health, Guangdong Academy of
Agricultural Sciences, Guangdong Province Key
Laboratory of Livestock Disease Prevention,
Scientific Observation and Experiment Station of Veterinary
Drugs and Diagnostic Techniques of Guangdong Province,
Ministry of Agriculture and Rural Affairs, Guangzhou, China
- ¹⁸⁷Center of Wastewater Resource Recovery, College of
Resources and Environment,
Fujian Agriculture and Forestry University, Fuzhou, China
- ¹⁸⁸Department of Aquaculture,
Zhejiang Ocean University, Zhoushan, China
- ¹⁸⁹Shanghai Jiao Tong University Affiliated Sixth People's
Hospital, Shanghai, China
- ¹⁹⁰Research Center for Eco-Environmental Sciences,
Chinese Academy of Sciences, Beijing, China
- ¹⁹¹Department of Dermatology, Shanghai Key Laboratory
of Medical Mycology, Changzheng Hospital,
Naval Medical University, Shanghai, China
- ¹⁹²Hubei Shizhen Laboratory,
School of Basic Medical Sciences,
Hubei University of Chinese Medicine, Wuhan, China
- ¹⁹³Department of Pharmacy,
The Affiliated Bozhou Hospital of Anhui Medical
University, Bozhou, China
- ¹⁹⁴Obesity and Metabolism Medicine-Engineering
Integration Laboratory, Department of General Surgery,
The Third People's Hospital of Chengdu, Chengdu, China
- ¹⁹⁵MOE Key Laboratory of Evolution & Marine
Biodiversity and Institute of
Evolution & Marine Biodiversity,
Ocean University of China, Qingdao, China

- ¹⁹⁶Department of Nephrology, Institutes for Systems Genetics, West China Hospital, Sichuan University, Chengdu, China
- ¹⁹⁷Institute of Health Sciences, Shanghai Institutes for Biological Sciences, Chinese Academy of Sciences, University of Chinese Academy of Sciences, Shanghai, China
- ¹⁹⁸College of Ocean Food and Biological Engineering, Jimei University, Xiamen, China
- ¹⁹⁹Institute for Advanced Study, Shenzhen University, Shenzhen, China
- ²⁰⁰The National Key Engineering Laboratory of Crop Stress Resistance Breeding, The School of Life Sciences, Anhui Agricultural University, China Center for Crop Pest Detection and Control, Anhui Agricultural University, Hefei, China
- ²⁰¹College of Resources, Hunan Agricultural University, Changsha, China
- ²⁰²State Key Laboratory of Biochemical Engineering, Institute of Process Engineering, Chinese Academy of Sciences, Beijing, China
- ²⁰³The Fifth Clinical Medical College, Shanxi Medical University, Taiyuan, China
- ²⁰⁴Department of Rheumatology and Immunology, Tongji Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, China
- ²⁰⁵Department of Nephrology, Children's Hospital, Zhejiang University School of Medicine, National Clinical Research Center for Child Health, National Children's Regional Medical Center, Hangzhou, China
- ²⁰⁶State Key Laboratory of Mycology, Institute of Microbiology, Chinese Academy of Sciences, Beijing, China
- ²⁰⁷Archaeal Biology Center, Shenzhen Key Laboratory of Marine Microbiome Engineering, Institute for Advanced Study, Shenzhen University/Synthetic Biology Research Center, Institute for Advanced Study, Shenzhen University, Shenzhen, China
- ²⁰⁸School of Biomedical Engineering, Capital Medical University, Beijing, China
- ²⁰⁹Hunan Academy of Agricultural Sciences, Changsha, China
- ²¹⁰Xiamen Chengge Biotechnology Co., Ltd, Xiamen, China
- ²¹¹State Key Laboratory of Oncology in South China, Guangdong Provincial Clinical Research Center for Cancer, Sun Yat-sen University Cancer Center, Guangzhou, China
- ²¹²GigaScience Press, BGI Shenzhen Co. Ltd., BGI Center, Shenzhen, China
- ²¹³John Wiley & Sons, Inc., Beijing, China
- ²¹⁴Institute of Feed Research, Chinese Academy of Agricultural Sciences, Beijing, China
- ²¹⁵Institute of Breast Health Medicine, State Key Laboratory of Biotherapy, West China Hospital, Sichuan University and Collaborative Innovation Center, Chengdu, China
- ²¹⁶Institute of Dairy Science, College of Animal Sciences, Zhejiang University, Hangzhou, China
- ²¹⁷Hubei Hongshan Laboratory, National Key Laboratory of Crop Genetic Improvement, Huazhong Agricultural University, Wuhan, China
- ²¹⁸State Key Laboratory of Swine and Poultry Breeding Industry, College of Animal Science, South China Agricultural University, Guangzhou, China
- ²¹⁹R-Institute Co. Ltd., Beijing, China
- ²²⁰School of Life Science and Technology, Wuhan Polytechnic University, Wuhan, China
- ²²¹ANGENOVO, Oslo, Norway
- ²²²Department of Food Science and Nutrition, Faculty of Science, The Hong Kong Polytechnic University, Hong Kong SAR, China
- ²²³Institute of Zoology, Chinese Academy of Sciences, Beijing, China
- ²²⁴Institute of Digestive Disease and Department of Medicine and Therapeutics, State Key Laboratory of Digestive Disease, Li Ka Shing Institute of Health Sciences, The Chinese University of Hong Kong, Hong Kong SAR, China
- ²²⁵Faculty of Data Science, City University of Macau, Macau, China

Correspondence

Chun-Lin Shi, ANGENOVO, Oslo, Norway.

Email: shichunlin@imeta.science

Ren-You Gan, Department of Food Science and Nutrition, Faculty of Science, The Hong Kong Polytechnic University, Hong Kong SAR, China.

Email: renyou.gan@poly.edu.hk

Fangqing Zhao, Institute of Zoology, Chinese Academy of Sciences, Beijing, China.

Email: zhfq@ioz.ac.cn

Jun Yu, Institute of Digestive Disease and Department of Medicine and Therapeutics, State Key Laboratory of Digestive Disease, Li Ka Shing Institute of Health Sciences, The Chinese University of Hong Kong, Hong Kong SAR, China.

Email: junyu@cuhk.edu.hk

Tong Chen, State Key Laboratory for Quality Ensurance and Sustainable Use of Dao-di Herbs, National Resource Center for Chinese Materia Medica, China Academy of Chinese Medical Sciences, Beijing, China.

Email: chentong_biology@163.com

Xin Hong, Department of Biochemistry, School of Medicine, Key University Laboratory of Metabolism and Health of Guangdong, Guangdong Provincial Key Laboratory of Cell Microenvironment and Disease Research, Southern University of Science and Technology, Shenzhen, China.
Email: hongx@sustech.edu.cn

Hua Yang, Xianghu Laboratory, Xiaoshan District, Hangzhou, China.
Email: yanghua@xhlab.ac.cn

Bangzhou Zhang, Xiamen Treatgut Biotechnology Co., Ltd., Xiamen, China.
Email: geebzbz@163.com

Shifu Chen, HaploX Biotechnology, Shenzhen, China.
Email: chen@haplox.com

Xiaodong Li, Department of Neonatology, Nanshan District People's Hospital, Shenzhen, China.
Email: doclixiaodong@126.com

Yunyun Gao and Yong-Xin Liu, Genome Analysis Laboratory of the Ministry of Agriculture and Rural Affairs, Agricultural Genomics Institute at Shenzhen, Chinese Academy of Agricultural Sciences, Shenzhen, China.
Email: gaoyunyun@caas.cn and liyongxin@caas.cn

Yao Wang, Huiyu Hou, Hao Luo, Jiani Xun, Chuang Ma, Haifei Yang, Defeng Bai, Salsabeel Yousuf, Hujie Lyu, Tianyuan Zhang, Xiulin Wan, Xiaofang Yao, and Tengfei Ma contributed equally to this study.

ORCID

Yao Wang  <https://orcid.org/0000-0001-6824-8852>
Weipeng Zhang  <http://orcid.org/0000-0002-1231-8927>
Yong Zhang  <http://orcid.org/0000-0003-0513-8941>
Xin Zhou  <http://orcid.org/0000-0003-3143-2079>
Zheming Zhou  <http://orcid.org/0000-0001-9783-0366>
Feiyang Zhu  <http://orcid.org/0000-0003-2747-2836>
Yutian Zou  <http://orcid.org/0000-0002-5205-9923>
Yanliang Bi  <http://orcid.org/0000-0001-8183-8208>
Shuangxia Jin  <http://orcid.org/0000-0002-1495-9154>
Wenkai Ren  <http://orcid.org/0000-0002-8145-8907>
Lei Dai  <http://orcid.org/0000-0002-5598-5308>
Shuang-Jiang Liu  <http://orcid.org/0000-0002-7585-310X>
Jun Yu  <http://orcid.org/0000-0001-5008-2153>
Shifu Chen  <https://orcid.org/0000-0001-5799-653X>
Yunyun Gao  <https://orcid.org/0000-0003-3389-9385>
Yong-Xin Liu  <http://orcid.org/0000-0003-1832-9835>

REFERENCES

- Shi, Chun-Lin, Tong Chen, Canhui Lan, Ren-You Gan, Jun Yu, Fangqing Zhao, and Yong-Xin Liu. 2024. "iMetaOmics: Advancing Human and Environmental Health Through Integrated Meta-Omics." *iMetaOmics* 1: e21. <https://doi.org/10.1002/imo2.21>
- Liu, Yong-Xin, Tong Chen, Danyi Li, Jingyuan Fu, and Shuang-Jiang Liu. 2022. "iMeta: Integrated Meta-Omics for Biology and Environments." *iMeta* 1: e15. <https://doi.org/10.1002/imt2.15>
- Li, Danyi, and CHINAGUT 2023 Organizing Committee. 2023. "Conference Report: CHINAGUT 2023." *iMeta* 2: e153. <https://doi.org/10.1002/imt2.153>
- Fan, Lijuan, Yaoyao Xia, Youxia Wang, Dandan Han, Yanli Liu, Jiahuan Li, Jie Fu, et al. 2023. "Gut Microbiota Bridges Dietary Nutrients and Host Immunity." *Science China Life Sciences* 66: 2466–514. <https://doi.org/10.1007/s11427-023-2346-1>
- Wong, Chi Chun, and Jun Yu. 2023. "Gut Microbiota in Colorectal Cancer Development and Therapy." *Nature Reviews Clinical Oncology* 20: 429–52. <https://doi.org/10.1038/s41571-023-00766-x>
- Wu, William K. K., and Jun Yu. 2024. "Microbiota-Based Biomarkers and Therapeutics for Cancer Management." *Nature Reviews Gastroenterology and Hepatology* 21: 72–3. <https://doi.org/10.1038/s41575-023-00879-9>
- Xiao, Liwen, and Fangqing Zhao. 2023. "Microbial Transmission, Colonisation and Succession: From Pregnancy to Infancy." *Gut* 72: 772–86. <https://doi.org/10.1136/gutjnl-2022-328970>
- Liu, Chang, Meng-Xuan Du, Li-Sheng Xie, Wen-Zhao Wang, Bao-Song Chen, Chu-Yu Yun, Xin-Wei Sun, et al. 2024. "Gut Commensal *Christensenella Minuta* Modulates Host Metabolism via Acylated Secondary Bile Acids." *Nature Microbiology* 9: 434–50. <https://doi.org/10.1038/s41564-023-01570-0>
- Chen, Meixu, Tianyue Xu, Linlin Song, Ting Sun, Zihan Xu, Yujie Zhao, Peixin Du, et al. 2024. "Nanotechnology Based Gas Delivery System: A 'Green' Strategy for Cancer Diagnosis and Treatment." *Theranostics* 14: 5461–91. <https://doi.org/10.7150/thno.98884>
- Li, Bo, Hangping Rui, Yajun Li, Qiongqiong Wang, Muna Alariqi, Lei Qin, Lin Sun, et al. 2019. "Robust CRISPR/Cpf1 (Cas12a)-Mediated Genome Editing in Allotetraploid Cotton (*Gossypium hirsutum*)." *Plant Biotechnology Journal* 17: 1862–4. <https://doi.org/10.1111/pbi.13147>
- Wang, Fuqiu, Sijia Liang, Guanying Wang, Tianyu Hu, Chunyang Fu, Qiongqiong Wang, Zhongping Xu, et al. 2024. "CRISPR-Cas9-Mediated Construction of a Cotton CDPK Mutant Library for Identification of Insect-Resistance Genes." *Plant Communications* 5: 101047. <https://doi.org/10.1016/j.xplc.2024.101047>
- Zhai, Lin, Laiying Fu, Wei Wei, and Diwei Zheng. 2024. "Advances of Bacterial Biomaterials for Disease Therapy." *ACS Synthetic Biology* 13: 1400–11. <https://doi.org/10.1021/acssynbio.4c00022>
- Feng, Tao, Shufang Wu, Hongwei Zhou, and Zhencheng Fang. 2024. "MOBFinder: A Tool for Mobilization Typing of Plasmid Metagenomic Fragments Based on a Language Model." *GigaScience* 13: giae047. <https://doi.org/10.1093/gigascience/giae047>
- Jia, Minghui, Senlin Zhu, Ming-Yuan Xue, Hongyi Chen, Jinghong Xu, Mengdi Song, Yifan Tang, et al. 2024. "Single-Cell Transcriptomics Across 2,534 Microbial Species Reveals Functional Heterogeneity in the Rumen Microbiome." *Nature*

- Microbiology* 9: 1884–98. <https://doi.org/10.1038/s41564-024-01723-9>
15. Xu, Ziyue, Yuting Wang, Kuanwei Sheng, Raoul Rosenthal, Nan Liu, Xiaoting Hua, Tianyu Zhang, et al. 2023. “Droplet-Based High-Throughput Single Microbe RNA Sequencing by Smrandom-Seq.” *Nature Communications* 14: 5130. <https://doi.org/10.1038/s41467-023-40137-9>
 16. Shi, Jialu, Youfa Wang, Lei Cheng, Jin Wang, and Vijaya Raghavan. 2024. “Gut Microbiome Modulation by Probiotics, Prebiotics, Synbiotics and Postbiotics: A Novel Strategy in Food Allergy Prevention and Treatment.” *Critical Reviews in Food Science and Nutrition* 64: 5984–6000. <https://doi.org/10.1080/10408398.2022.2160962>
 17. Zhu, Yinghong, Xingxing Jian, Shuping Chen, Gang An, Duanfeng Jiang, Qin Yang, Jingyu Zhang, et al. 2024. “Targeting Gut Microbial Nitrogen Recycling and Cellular Uptake of Ammonium to Improve Bortezomib Resistance in Multiple Myeloma.” *Cell Metabolism* 36: 159–75.e8. <https://doi.org/10.1016/j.cmet.2023.11.019>
 18. Qu, Li, Moyang Liu, Lingli Zheng, Xu Wang, and Hongwei Xue. 2023. “Data-Independent Acquisition-Based Global Phosphoproteomics Reveal the Diverse Roles of Casein Kinase 1 in Plant Development.” *Science Bulletin* 68: 2077–93. <https://doi.org/10.1016/j.scib.2023.08.017>
 19. Zuo, Erwei, Yi-Jun Cai, Kui Li, Yu Wei, Bang-An Wang, Yidi Sun, Zhen Liu, et al. 2017. “One-Step Generation of Complete Gene Knockout Mice and Monkeys by CRISPR/Cas9-Mediated Gene Editing With Multiple sgRNAs.” *Cell Research* 27: 933–45. <https://doi.org/10.1038/cr.2017.81>
 20. Gao, Yunyun, Danyi Li, and Yong-Xin Liu. 2023. “Microbiome Research Outlook: Past, Present, and Future.” *Protein & Cell* 14: 709–12. <https://doi.org/10.1093/procel/pwad031>

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

The online version contains supplementary files available. iMeta Conference 2024 Agenda.