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Conference Report

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The Jinggangshan Declaration: A call to promote the integration of microecology and One Health to support the "Healthy China" strategy

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ABSTRACT

The Sixth Microecology and Health Academic Symposium of China Medicine Education Association (CMEA) was successfully held from July 3 to 6, 2025, in Ji'an, Jiangxi Province. With the theme of "Innovation, Leadership, Cooperation, and Development", the symposium focused on the interaction and control mechanisms of microecology and hosts, as well as their applications in promoting health and preventing diseases. The event aimed to promote basic research, clinical translation, and industrial integration in the field of microecology. The symposium was organized by the CMEA and its Microecology and Health Professional Committee, and attracted over 4000 experts, scholars, and young researchers from universities, research institutions, medical institutions, and enterprises, both online and offline. The conference featured in-depth discussions on topics such as the mechanisms of microbe-host interactions, the role of the microbiome in chronic disease prevention, and microbe-based intervention strategies. Attendees emphasized the pivotal role of microbe-host interactions in achieving personalized medicine and precision health. The conference highlighted the intricate network of microbe-host communication, which not only expands the boundaries of basic life science theory but also offers new insights into chronic disease prevention, nutritional interventions, and public health strategies. Lastly, Professor Chunling Xiao, the Chairman, delivered the *Jinggangshan Declaration*, urging the strengthening of interdisciplinary collaboration and the translation of microecological research results into practical applications to support the "Healthy China" initiative.

KEYWORDS: Microecology; One Health; Host-microbial interactions; Precision medicine; Chronic disease prevention and control; Healthy China

1. Introduction

Under the "Healthy China 2030" strategy, the microecology and health serve as a crucial bridge linking basic research and clinical practice, increasingly emerging as a hotspot in life sciences and medical research[1]. In recent years, with the development of high-throughput sequencing technology, metabolomics, and systems biology, researchers have gradually uncovered the

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complex interactive regulatory mechanisms between the human microecosystem and its host[2–9]. Microecology not only plays a crucial role in maintaining host physiological functions, regulating immune responses, and participating in metabolic processes but is also closely associated with the onset and progression of various chronic diseases[5–9].

From July 3 to 6, 2025, the Sixth Academic Symposium on Microbiome and Health, organized by China Medicine Education Association (CMEA), was grandly held in Ji'an, Jiangxi Province. The conference was jointly hosted by the CMEA and its Professional Committee on Microecology and Health, co-organized by Jinggangshan University, Zhongyuan International Doctors Group, Nanchang University, and the Jiangxi Provincial Microbiology Association, and co-sponsored by Wenzhou Medical University. The symposium was themed around "Innovation, Leadership, Collaboration, and Development", focusing on the interactive regulatory mechanisms between the microecology and the host, as well as their applications in health promotion and disease prevention and control. The aim was to advance basic research, clinical translation, and industrial integration in the field of microecology.

At the opening ceremony, Academician Zhengming Huang, Lifetime Honorary President of the CMEA, and Academician Chunling Xiao, the Chairman of the Microecology and Health Professional Committee, delivered speeches, expressing their commitment to jointly promoting the leapfrog development of the microbiology discipline. During the conference, over 4 000 experts, scholars, and young researchers from universities, research institutions, medical institutions, and enterprises across the country gathered online and offline to engage in in-depth discussions on cutting-edge topics such as the interaction mechanisms between the microecology and the host[10,11], the microbiome and chronic disease prevention and control[8,9], and microecological intervention strategies[12,13]. They emphasized the core role of microecological regulation in achieving personalized medicine and precision health.

The conference specifically pointed out that the multi-level molecular dialogue between the microecology and the host forms a dynamic equilibrium network. The revelation of this mechanism not only expands the boundaries of basic theories in life sciences but also provides new insights for chronic disease prevention and control, nutritional intervention, and public health strategies[8–11,14]. Through interdisciplinary discussions, the conference achieved seamless integration between basic research and industrial needs, establishing a solid foundation for deep collaboration between academia, research, and industry. Experts at the conference systematically reviewed the key roles of microecological factors in disease prevention and health promotion, proposing a series of actionable and scalable strategies and measures that chart new pathways and inject new momentum into Chinese microecology and health.

After meticulous preparation by the organizing, hosting, and co-hosting organizations, the conference concluded successfully. At the closing ceremony, Professor Chunling Xiao, the conference's chairman, solemnly issued the *Jinggangshan Declaration*[15], which urges strengthening interdisciplinary collaboration to safeguard human health through microecological science and technology innovation. This marked a milestone achievement for the conference across academic, industrial, and policy dimensions.

2. The importance of microecology basic research

As an emerging interdisciplinary field, the importance of microecology is increasingly recognized. The human microecological system is composed of trillions of microorganisms, which play an irreplaceable role in maintaining immune balance, nutrient metabolism, and drug metabolism[16]. Microecological imbalance is closely associated with the onset and progression of various diseases, such as intestinal microecological imbalance leading to inflammatory bowel disease and metabolic syndrome[17–21]. Therefore, in-depth research into microecology is of great significance for elucidating the mechanisms underlying disease onset and progression, as well as for developing new diagnostic and therapeutic technologies



Figure 1. Participants in the Sixth Microecology and Health Academic Seminar of the CMEA, Ji'an, Jiangxi Province.

and methods. Additionally, microecology is not limited to the human body but is widely distributed in plants, animals, and the environment, forming complex ecosystems. The stability of these ecosystems directly impacts biodiversity, ecological balance, and the sustainable development of human society[22–24]. Under the Healthy China strategy, strengthening microbiology research and application is of great significance for preventing and controlling infectious diseases and improving the health of the population.

At this conference, several experts discussed the latest advances in microecology basic research, emphasizing the application of multi-omics technologies in microecological research and the complex relationship between the microecology and host health[7,18,21]. The experts pointed out that by integrating multi-omics technologies, we can gain a more comprehensive understanding of the structure and function of microecosystem, as well as their interactions with host health[2–4]. These studies not only help reveal the relationship between microecology and health, but also provide a theoretical foundation for developing new therapeutic strategies.

3. Trends in the development of frontier technologies in microecology

With the continuous advancement of science and technology, research methods and technical approaches in microecology are also evolving. The integration of multi-omics technologies, such as genomics, metabolomics, and proteomics, combined with artificial intelligence and big data analysis, provides powerful tools for deeply elucidating the interactive regulatory mechanisms between the microecology and the host[25–28]. The application of these technologies enables researchers to comprehensively understand the structure and function of microecosystems, as well as their relationship with host health, from both macro and micro perspectives. Additionally, the emergence of new technologies such as single-cell sequencing, gene editing, and microecology engineering has brought new opportunities and challenges to microbiology research[29,30]. The application of these new technologies will help develop more precise microbial regulation strategies, providing new insights and methods for disease prevention and treatment.

At the young scholars' academic exchange session of this conference, several young researchers shared their innovative achievements in the study of cutting-edge microecological technologies, showcasing the enthusiasm and innovative vitality of young researchers in the field of microecological research[31,32]. Experts pointed out that single-cell sequencing technology can reveal the gene expression and functional state of individual microbial cells, providing a new perspective for understanding the complexity of microecosystems[29]. Gene editing technology provides powerful tools for studying microbial functions and regulatory mechanisms, aiding in the development of new therapeutic strategies[30]. Microbiome engineering can achieve precise regulation of microecosystems by designing and constructing microbial communities[30]. The combined application of these technologies will bring new breakthroughs to microecology research.

4. The prospects for the development and application of probiotics

Probiotics, as an important means of microecological intervention, have garnered significant attention in recent years[10,30]. The development of personalized probiotics, tailored to an individual's microecological characteristics and health needs, involves creating customized probiotic formulations to achieve precise nutritional intervention and disease prevention. This represents a key direction for future probiotic research[33,34]. Additionally, screening and identifying probiotics with special functions from nature, such as those with immune-modulating, antioxidant, anti-inflammatory, lipid-lowering, and weight-loss properties[35–39], and developing new functional probiotic products are also key drivers for the development of the probiotics industry. As probiotics research continues to advance, their application prospects in preventing and treating chronic diseases, enhancing immunity, and improving gut health will become even more promising[8,9,17,18]. Concurrently, strengthening research on probiotic production processes, quality control, and safety evaluation to enhance the stability and efficacy of probiotic products, and promoting the large-scale and standardized development of the probiotic industry, holds significant importance for meeting market demand and fostering industry growth.

At the academic exchange session on the development of the microecology industry during this conference, several experts engaged in in-depth discussions on the development and application of probiotics and put forward many constructive opinions[10,40]. The experts pointed out that the research and development of personalized probiotics needs to comprehensively consider individual microecological characteristics, health status, and lifestyle factors to achieve precise intervention. The development of novel functional probiotics requires the integration of modern biotechnology to screen for microorganisms with special functions from nature, followed by functional validation and safety assessments. Additionally, production processes and quality control of probiotic products are critical factors influencing their market competitiveness. Optimizing production processes can enhance probiotic survival rates and stability, thereby improving product efficacy.

5. Strategies for microecological intervention in disease management

Microecology is closely associated with the onset and progression of various chronic diseases[8,9], making the exploration of new chronic disease prevention and control strategies based on microecological regulation of significant importance. Research indicates that microecological intervention can serve as a non-pharmacological treatment modality, offering advantages such as safety, efficacy, and the absence of side effects, positioning it as one of the key future directions in disease treatment. Additionally, microecology plays a crucial role in the prevention and control of infectious diseases[11,12]. Studying the mechanisms of microecology in infectious diseases and developing microecology-based infectious disease prevention and control technologies, such as microecological vaccines and microecological immune modulators[41], is of great significance for preventing and controlling the spread of

infectious diseases. Additionally, exploring the relationship between microecology and drug metabolism, drug efficacy, and drug side effects, and developing personalized drug treatment plans based on the microecology to enhance drug efficacy and reduce side effects, is another important area of microecological research[42].

At this conference, several experts engaged in in-depth discussions on strategies for microecology-based disease intervention, emphasizing the important role of microecological intervention in the prevention and control of chronic diseases. The experts pointed out that by regulating the intestinal microbiome, symptoms of chronic diseases such as inflammatory bowel disease, obesity, and diabetes can be improved[5,6,19,20]. Microecological intervention can also enhance the body's immunity and improve resistance to infectious diseases[12,37]. Additionally, the relationship between microecology and drug metabolism has garnered significant attention. Research indicates that gut microbiota can influence drug metabolism and efficacy, making the development of personalized drug therapy regimens based on microecology of great clinical significance[42].

6. The importance of microecology talent development and science popularization education

The development of the microecological field requires the support of a large number of professional talents. Therefore, strengthening the construction of the microecology discipline education system and cultivating professional microecological talents are the foundation for promoting the development of the microecological field. Taking the compilation of the undergraduate textbook "Medical Microecology" as an opportunity, we should improve the educational system for the microecology discipline, strengthen the cultivation of specialized microecological talent, and inject new vitality and momentum into the development of microecological field. Additionally, by organizing young scholars' forums, academic exchange activities, and other initiatives, we can stimulate the innovative vitality of young scholars and cultivate a group of young microecological talent with international perspectives and innovative capabilities, which holds significant importance for advancing the development of the microecology discipline. Furthermore, enhancing the public's understanding of microbiology and health, and promoting the popularization and dissemination of microbiological knowledge, are also important avenues for advancing the application and development of microbiological technology. Taking the Kangbai Microbiology Science Popularization Education Base as the core, conducting microbiology science popularization education activities for the public, and bringing microbiology knowledge from the laboratory into people's homes, plays a crucial role in enhancing public health awareness and promoting the formation of healthy lifestyles.

At this conference, several experts and scholars emphasized the importance of microecological talent cultivation and science popularization education, demonstrating the key role of microecology education in advancing the discipline. The experts pointed out that the improvement of the microecology education system should begin with undergraduate education, through the development of high-quality textbooks and courses to cultivate students' foundational knowledge and skills in microecology. Additionally, hosting young scholars' forums and academic exchange activities can stimulate the innovative vitality of young scholars and cultivate a group of young microbiology talents with international perspectives and innovative capabilities. Furthermore, microecology science popularization education is also an important pathway for promoting the application and development of microecological technology. By conducting science popularization education activities targeting the public, it is possible to enhance the public's understanding of the relationship between microecology and health, thereby promoting the formation of healthy lifestyles.

7. Opportunities and challenges in the development of the microecology industry

As an emerging industry, the field of microecology holds vast development prospects and significant market potential, serving as one of the key growth drivers for national economic development. Strengthening collaboration among academia, research institutions, industry, and application in the field of microecology, promoting the transformation and application of microecological technologies, and fostering the rapid development of the microecological industry to establish a complete industrial chain of microecology are of great significance for meeting market demands and driving economic growth. Additionally, integrating microecological research into interdisciplinary fields[43], launching an environmental-animal-human microecology program, addressing national engineering and technological challenges such as "new drug development", "bio-manufacturing" and supporting national scientific and technological self-reliance are also important tasks for the development of the microecological field. Furthermore, establishing Chinese standards, constructing the world's first "One Health" evaluation system of microecology covering antibiotic-resistant bacteria transmission and ecological toxicity early warning[44], establishing a dynamic database of environmental and human microbiota, empowering public health decision-making, and leading international standard-setting are of great significance for enhancing Chinese international influence and voice in the field of microecological research and promoting the international development of the microecological industry.

At this conference, several experts engaged in discussions on the opportunities and challenges facing the development of the microecological industry and put forward numerous constructive suggestions. Experts pointed out that the development of the microecological industry requires strengthened collaboration between academia, industry, research, and application. By establishing collaborative platforms, the conversion and application of microecological technologies can be promoted. Additionally, addressing national engineering and technological challenges, such as "new drug development" and "bio-manufacturing" is also important tasks for the development of the microecological industry. Furthermore, establishing Chinese standards and constructing a "One Health" evaluation system of microecology will help enhance Chinese international influence and voice in the field of microecological research, driving the internationalization of microecological industry[43].

8. The integration of microecology and the One Health

Combining microecological research with One Health, and studying the role of microecology in human health, animal health, and environmental health from a holistic perspective encompassing humans, animals, and the environment, represents an important future direction for the development of microecology[45]. One Health emphasizes the interconnectedness and mutual influence between human health, animal health, and environmental health. As a key link between human, animal, and environmental health, the microecology is central to achieving One Health objectives[44]. Strengthening interdisciplinary collaboration among medicine, veterinary medicine, environmental science, agricultural science, and other fields, establishing cross-disciplinary research platforms, and conducting joint research projects to address major scientific challenges in microecology and One Health domains are of great significance for advancing the development of microecology and One Health initiatives. Additionally, actively participating in international cooperation and exchanges in the field of microecology and One Health, sharing Chinese experience and wisdom, and promoting the global development of microecology and One Health are responsibilities we should undertake.

At this conference, several experts and scholars emphasized the integration of microecology and One Health, showcasing the application prospects of interdisciplinary research in the field of microecology[43,46]. Experts pointed out that the implementation of One Health requires collaboration and innovative cooperation across multiple disciplines. By establishing interdisciplinary research platforms, we can facilitate communication and collaboration among different disciplines to jointly address major scientific challenges in the fields of microecology and One Health. Furthermore, international cooperation and exchange are also important avenues for advancing One Health approach. By sharing Chinese experiences and insights, we can provide valuable references for the global development of microecology and One Health.

9. Conclusions

As an emerging interdisciplinary field, microecology plays an indispensable role in the Healthy China strategy, human health maintenance, and the ecological balance among humans and plants and animals. Incorporating microecology as an independent discipline into medical education curricula is a crucial measure to enhance public health levels and advance the development of life sciences. We anticipate that the implementation of the *Jinggangshan Declaration* will contribute to cultivating more outstanding medical talent and advancing the Healthy China initiative.

Conflict of interest statement

The authors declare that there is no conflict of interest.

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Data availability statement

The data supporting the findings of this study are available from the corresponding author upon request.

Authors' contributions

Xiao CL and Li SY planned the structure of the article and took the lead in writing the manuscript. Huang ZM supervised the writing. Wei H, Luo J, Liu HT, Liu XY, Yuan JL, Ling ZX and Zhu BL contributed contents and provided critical feedback. All authors read and approved the final manuscript.

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