Department of Biomedical Engineering
The Chinese University of Hong Kong

Chiral Antimicrobial Materials



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Date : 16 November 2026 (Monday)
Time : 5:30 pm
Venue : Room 1122, William M W Mong Engineering Building, CUHK

Abstract

Antimicrobial resistance is a major global public health challenge, demanding strategies that effectively eliminate resistant pathogens while limiting the emergence and spread of resistance. Chiral polymers offer a promising approach by enabling selective interactions with microbial targets. This seminar will present Prof. Wang's research on chiral antimicrobial polymers and nanoparticles, highlighting how molecular recognition can guide the design of materials for infection treatment and prevention.

The first part will focus on nanoparticles bearing D-amino acid side chains and their recognition of the bacterial membrane protein PBP4. These interactions enable targeted antimicrobial delivery and the elimination of intracellular drug-resistant bacteria and biofilms. Applications include nanocarriers for tuberculosis treatment and carrier-free nanotherapeutics for resistant bacterial infections, offering opportunities to improve treatment efficacy and reduce antibiotic use.

The second part will introduce chiral polymers derived from L-cyclic terpenoids and their corresponding functional surfaces. Mechanistic studies reveal interactions with fungal membrane proteins, providing a basis for broad-spectrum resistance to bacterial and fungal adhesion. These findings support the development of durable, additive-free antimicrobial materials, with potential applications in preventing catheter-associated infections in intensive care units.

Together, these studies connect chirality-dependent molecular recognition with antimicrobial activity and antifouling performance, providing a foundation for translating chiral polymers into biomedical materials and industrial products.

Biography

Prof. Xing Wang is Vice Dean for Research and International Affairs at the College of Life Science and Technology, Beijing University of Chemical Technology. He received his PhD from Jilin University in 2006 and conducted postdoctoral research at the University of Münster, Germany, before joining BUCT in 2011. His research focuses on biomedical materials for antimicrobial applications, hemostasis and drug delivery. He pioneered a chiral recognition strategy for combating microbial resistance and developed chiral antimicrobial polymers targeting bacterial and fungal membrane proteins. He has led 26 research projects and published over 90 SCI-indexed papers in journals including Angewandte Chemie International Edition, Advanced Materials, Bioactive Materials and ACS Nano, with an h-index of 42. He holds 23 granted invention patents, three of which have been transferred to industry. He also serves as Deputy Secretary-General of the Antibacterial Industry Association, Vice Chairman of the Zhongguancun Antibacterial Industry Alliance, and a Chinese expert on ISO/TC 330, "Biocidal and Antibacterial Surfaces".

***** ALL ARE WELCOME *****

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