



Channing Microbiome Seminar

May 17 (Friday), 2024, 9AM (ET)

MCP 5th-floor large conference room & Zoom:

<https://us02web.zoom.us/j/81070959105?pwd=RFJNd3dSZmR6dXJZNjJiYVVVzQ3NEQT09>

Meeting ID: 810 7095 9105; Passcode: 984617



Jianhua Guo

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Visualizing the invisible: Non-antibiotic drugs contribute to antibiotic resistance

Although non-antibiotic pharmaceuticals are widely used by society with 95% of the drugs market share, little is known about whether non-antibiotic pharmaceuticals cause or accelerate the dissemination of antibiotic resistance. We have been focusing on exploring the interactions between non-antibiotic pharmaceuticals and the transmission of antibiotic resistance. Multiple bacterial models (including mutation, evolution, and horizontal gene transfer) in conjunction with animal gut microbiota assays were established to investigate antibiotic-like effects of commonly-used non-antibiotic drugs (e.g. antidepressants, anti-inflammatories and lipid-lowering drugs) on the emergence and spread of antibiotic resistance. We found that these non-antibiotic pharmaceuticals not only induce the emergence of antibiotic resistance through mutation, but also promote the dissemination of antibiotic resistance via horizontal gene transfer. Several common mechanisms, including over-generation of reactive oxygen species, cell membrane variation, and stress level elevation, are playing key roles. Considering the high-consumption and wide-detection of non-antibiotic pharmaceuticals, these findings emphasize concerns of non-antibiotic pharmaceuticals for the emergence and spread of antibiotic resistance.

Bio: Professor Jianhua Guo is the Deputy Director- Research of the Australian Centre for Water and Environmental Biotechnology at The University of Queensland, Australia. Dr Guo and his team found that non-antibiotic pharmaceuticals not only induce the evolution of multi-drug resistant bacteria via genetic mutation, but also promote the spread of antibiotic resistance through horizontal gene transfer. He has to date published over 250 peer-reviewed papers since 2007. He was listed as Clarivate Highly Cited Researcher for 2023. His research output and achievements have been recognized through national and international awards or fellowship, including 2017 Australian Research Council Future Fellowship. He is an Editor of the Journal of Hazardous Materials and an Associate Editor of Water Research.

Hosted by Yang-Yu Liu