NUS National University of Singapore

Infectious Diseases Translational Research Programme
Yong Loo Lin School of Medicine

Seminar Series

Molecular battling between encapsulated bacteria and resident macrophage in the liver

Professor Jing-Ren Zhang

Center for Infectious Disease Research
Department of Basic Medical Sciences
School of Medicine
Tsinghua University

Date/Day: 11 September 2023 / Monday
Time: 12:00-1:00 PM
Venue: MD4 Seminar Room, Level 2

Chairperson: Dr Chris Sham

All are welcome!

Abstract:

The outermost capsule structures of pathogenic bacteria are a well-known virulence factor, but it remains largely unknown how the capsules mechanistically enhance bacterial virulence under in vivo infection conditions. Our recent studies have shown that the capsules primarily target the liver to enhance bacterial survival at the onset of blood-borne infections. In mouse sepsis model, the capsules enable virulent bacteria to circumvent the recognition of liver resident macrophage Kupffer cells (KCs) in a capsular serotype-dependent manner. In contrast to effective capture of acapsular bacteria by KCs, the encapsulated bacteria are partially (low-virulence types) or completely (high-virulence types) "untouchable" for KCs. Finally, effective vaccination enables the liver to capture normally uncatchable bacteria. These studies have discovered the molecular interplay between the capsules and liver macrophages as a master controller of the fate and virulence of encapsulated bacteria, and suggest that the interplay is targetable for therapeutic control of septic infections.

Biography

Dr. Jing-Ren Zhang is Professor of Microbiology at Tsinghua University School of Medicine, Beijing, China. He received his Ph.D. in microbiology and molecular genetics in the University of Texas Medical School – Houston. After a postdoctoral training in the St. Jude Children's Research Hospital, Dr. Zhang started his independent research career as an assistant professor in Albany Medical College in 2000. In 2010, he moved to Tsinghua University, and has since established a spectrum of medical and graduate courses in medical microbiology, as well as a research center for infectious disease.

The main focus of Dr. Zhang's laboratory is on bacterial pathogens. He has made seminal contributions to the understanding and intervention of human infectious diseases, with over 70 peer-reviewed publications, and a list of patents and awards. His laboratory has recently discovered the liver as the major battle ground between encapsulated bacteria and host immunity during blood infections. These discoveries will have profound implications on the basic understanding and control of invasive bacterial diseases.