BRIGHAM AND WOMEN'S HOSPITAL
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Department of Medicine
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Channing Microbiome Seminar

June 2 (Friday), 2017, 11am @ 5th floor conference room

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Microbial sphingolipids modulate host epithelium homeostasis and disease

Human physiology is significantly shaped by communications with microbial symbionts, although mechanistic understandings of the interactions are largely lacking. Our study has focused on investigating the roles of a class of abundant yet poorly understood microbiome associated-molecules, bacterially produced sphingolipids. While most bacteria do not produce sphingolipids, exceptional cases include bacteria in the Bacteroidetes phylum, such as Bacteroides fragilis. By using gnotobiotic mice that are mono-colonized with either the wild type (sphingolipid positive) or the mutant B. fragilis (sphingolipid negative) strain, we found that the presence of the wild type strain in the intestine significantly helps to strengthen intestinal barrier functions and inhibit host inflammatory responses to the microbiota. Ultimately, hosts associated with the wild type strain are more resistant to a chemically induced colitis challenge that targets the epithelium and the innate immunity. In addition, we also discovered that bacterial sphingolipid functions are critical in host early-life development and their roles are age-dependent. These observations, in combination with our previous findings that bacterial glycosphingolipids modulate host intestinal invariant natural killer T (iNKT) cell homeostasis and function, led us to propose that sphingolipids produced by the microbiome are essential symbiotic factors for host-microbiome interactions and are especially important for intestinal health and disease susceptibility.

Bio: Dr. Dingding An received her bachelor's degree from Tsinghua University, China, and her master's degree from Duke University. She pursued her Ph. D. study at Northwestern University and completed her postdoctoral training at Harvard Medical School.

Hosted by Yang-Yu Liu