

ABSTRACT

PRESENTER: Prof. Liping Zhao

COMPANY: Rutgers University

JOB TITLE: Eveleigh-Fenton Chair of Applied Microbiology

Podium Title: *Dietary Fibers and the Foundation Guild of Gut Microbiota for Human Metabolic Health*

Abstract

Dietary fibers have been shown to be effective in prevention and alleviation of many chronic diseases, but the molecular mechanisms remain elusive. Short chain fatty acids (SCFAs) from bacterial fermentation of dietary fibers play many essential roles in human nutrition, immunity and metabolism. Our ancestors had much higher intake of dietary fibers than us today. Reduced intake of dietary fibers and diminished abundance/diversity of SCFA-producing bacteria may underlie many chronic diseases such as type 2 diabetes and colon cancer. In patients with type 2 diabetes, increased intake of diverse dietary fibers selectively promoted a group of acetic and butyric acid producers, that stimulated insulin secretion via more production of GLP-1 in the gut. More importantly, they inhibited pathogenic and detrimental bacteria, which may promote inflammation and suppress GLP-1 production, possibly by acidifying the gut environment, producing antimicrobials and occupying available niches etc. Thus, in addition to providing SCFAs to directly benefit the hosts, this group of SCFA producers plays important ecological functions for keeping pathogens at bay in the gut microbiota. Akin to tall trees in a closed forest, they work as the “foundation guild” for structuring and stabilizing the healthy gut microbiota. This group of functionally important gut bacteria may become a new target of personalized nutrition for health recovery and maintenance.



Liping Zhao is currently the Eveleigh-Fenton Chair of Applied Microbiology at Rutgers University and Distinguished Professor of Microbiology at Shanghai Jiao Tong University. He is a fellow of American Academy of Microbiology. He is a senior fellow of Canadian Institute for Advanced Research (CIFAR). He serves on Scientific Advisory Board for the Center for Microbiome Research and Education of American Gastroenterology Association (AGA).

His team has pioneered the approach of applying metagenomics-metabolomics integrated tools and dietary intervention for systems understanding and predictive manipulation of gut microbiota to improve human metabolic health. Following the logic of Koch's postulates, Liping identified the first

“obesity pathogen”: an endotoxin-producing opportunistic pathogen isolated from an obese human gut which can induce obesity in germfree mice. Their clinical trials published in Science and EBioMedicine showed that dietary modulation of gut microbiota can significantly alleviate metabolic diseases including a genetic form of obesity in children and type 2 diabetes in adults. The Science magazine featured a story on how he combines traditional Chinese medicine and gut microbiota study to understand and fight obesity (Science 336: 1248, <http://science.sciencemag.org/content/336/6086/1248>)