

Probiotic lactic acid bacteria inhibit inflammation and infection via autophagy pathways

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Abstract

Probiotics are beneficial bacteria with the power of supporting or favoring life on the host. Probiotics have been used in the treatment of various diseases, including inflammatory bowel disease, infectious diseases and cancer. However, the role of probiotics in the modulation of autophagy signaling pathways to effectively reduce inflammation and infection is unknown. Vitamin D is an important factor in regulating inflammation and immune responses via action of its receptor, vitamin D receptor (VDR). We have demonstrated that VDR status regulates the composition and functions of microbiota in the intestine. Low expression of VDR and dysfunction of vitamin D/VDR signaling leads to dysfunction in autophagic responses. In this presentation, we will discuss our recent progress in studying interactions among probiotics and vitamin D receptor in health and colitis. In vitro, we found that various probiotics lactic acid bacteria (LAB) strains and their conditional culture media increased transcriptional levels of VDR and VDR target genes (e.g. cathelicidin, ATG16L1). Probiotic treatment could also increase the expression level of VDR protein. The enhanced expression of VDR is associated with increased autophagy proteins, such as LC3B and Beclin1. In vivo, LAB strains showed the capacity to increase the intestinal VDR and autophagy proteins LC3B and Beclin1. Furthermore, LAB conditional medium treatment prior to Salmonella infection dramatically increased VDR and ATG16L1 and inhibited inflammation. Understanding how probiotics enhance the VDR/autophagy signaling

and inhibit inflammation will allow probiotics to be used effectively, resulting in innovative approaches to the prevention and treatment of chronic inflammation and infection.

Biography:

Jun Sun is a tenured Associate Professor at the University of Illinois at Chicago. She is an elected fellow of American Gastroenterological Association. Her key achievements include 1) characterization of vitamin D receptor regulation of microbiome in intestinal homeostasis and inflammation, 2) identification of dysbiosis and intestinal dysfunction in ALS and 3) identification of Salmonella in regulating intestinal stem cells. She has published over 150 scientific articles in peer-reviewed journals, including Gut, Cell Stem Cells, Nature Genetics, JBC. She is in the editorial board of 10 scientific journals. Her research is supported by the NIH, DOD and other awards.