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VITAMIN D/VITAMIN D RECEPTOR REGULATION OF MICROBIOME IN INFLAMMATION AND OBESITY

Obesity occurs when there is an unfortunate combination of environment triggers, genetic susceptibility, and dysbiosis. A positive association between obesity and vitamin D deficiency have been found in human obesity for years, but determining cause and effect has been difficult. Majority of the biological function of vitamin D is regulated by vitamin D receptor (VDR). Our Nature Genetics paper has demonstrated that human VDR gene is a key host factor to shape gut microbiome. Further, we have demonstrated that intestinal epithelial VDR conditional knockout (VDR Δ IEC) leads to dysbiosis (imbalanced microbiome). However, the study on biological function of VDR in obesity-associated dysbiosis and inflammation is still limited. In the current study, we showed that conditional removal of VDR in the intestinal epithelium made mice more susceptible to obesity. There are decreased genus *Lactobacillus* and butyrate-producing bacteria in the VDR Δ IEC mice. Interestingly, the genus *Lactobacillus* was enriched on calorie-restricted low-fat diet. The butyrate-producing bacteria play an important role in blood glucose regulation and lipid metabolism. The dysbiosis observed in VDR Δ IEC mice is very similar as the bacterial profile in obesity. Dysbiosis controls metabolic endotoxemia during obesity and bacterial factors, such as lipopolysaccharide (LPS). Our data showed accumulated LPS in the blood of VDR Δ IEC mice. Increased inflammation and insulin intolerance were found in the VDR Δ IEC mice on high fat diet. Taken together, our study has demonstrated that VDR regulation of microbiome contributes to the development of obesity.

Biography

Jun Sun is an Associate Professor at the University of Illinois at Chicago. She is a fellow of American Gastroenterological Association. Her key achievements include characterization of vitamin D receptor regulation of microbiome in intestinal homeostasis and inflammation, identification of dysbiosis and intestinal dysfunction in ALS, and identification of bacteria in regulating intestinal stem cells. She has published over 120 scientific articles in peer-reviewed journals, including *Cell Stem Cells*, *Nature Genetics*, *Gut* and *JBC*. She is in the editorial board of 10 scientific journals. Her research is supported by the NIH, DOD and other awards.

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