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## Update on the gut microbiome with focus on probiotics and prebiotics

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Gut microbiota is an important environmental factor regulating energy homeostasis and glucose metabolism in mice and humans. Among diverse factors such as, exposure to antibiotics, lifestyle, genetics etc., diet is the most important factor in shaping the gut microbiota composition and functions. Probiotics and prebiotics are the dietary components that restructure the gut microbiota and improve host metabolism. Traditionally, probiotics and prebiotics intake is associated with increase in bacterial species such as *Lactobacillus* and *Bifidobacterium*. However, with advances in microbiome research over the last decade, there are many reports indicating novel shifts in the gut microbiota that has led to newer candidate probiotic species. In addition, generating genetically modified probiotic species for targeted delivery of small peptides is also an interesting concept. Fermentation of prebiotics, non-digestible fiber components of diet, alters the gut microbiota and produces short chain fatty acids as their metabolites. SCFA not only serve as fuel for colonocytes, but also act as signaling molecules and regulate physiological functions at multiple tissue level. Using ex vivo intestinal crypt cultures, it is known that SCFA regulates functions of intestinal hormone producing cells (called enteroendocrine cells), which secrete several hormones involved in regulation of glucose homeostasis and appetite. It will be interesting to understand how dietary fiber fermentation regulates functions of enteroendocrine cells in vivo. Thus, using data from different projects I am involved with, I will provide an update on the novel concepts in gut microbiome in context of probiotic and prebiotics research.

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