Gastric bypass surgery alters gut microbiota profile along the intestine

10 July 2012

Research to be presented at the Annual Meeting of the Society for the Study of Ingestive Behavior (SSIB), the foremost society for research into all aspects of eating and drinking behavior, finds that gastric bypass surgery induces changes in the gut microbiota and peptide release that are similar to those seen after treatment with prebiotics.

Previous animal research demonstrated that ingestion of a high-fat diet produces weight gain and profoundly affects the gut microbiota composition, resulting in a greater abundance of one type of bacteria called Firmicutes, and a decrease in Bifidobacteria spp and Bacteroidetes. A similar pattern has also been found in obese humans. Feeding of prebiotics, substances that enhance the growth of beneficial bacteria, changes the composition and/or the activity of the gastrointestinal microbiota, to promote the release of gut peptides and to improve glucose and lipid metabolism in diet-induced obese and type 2 diabetic mice.

Roux-en-Y gastric bypass (RYGB) surgery is considered the most effective treatment of morbid obesity and diabetes. Recent studies reported substantial shifts in the composition of the gut microbiota towards lower concentrations of Firmicutes and increased Bacteroidetes in obese subjects after RYGB. Most of the human studies on gut microbiota have been carried out using fecal samples which may not accurately represent how RYGB surgery affects the gut microbiota profile along different parts of the intestine.

Because RYGB may affect how nutrients are absorbed in different portions of the intestine, a new study conducted by researchers at the University of Zurich measured the bacterial composition and the amounts of different peptides that affect food intake along different intestinal segments after RYGB in rats. They found that 14 weeks after surgery, Bifidobacteria spp, and Bacteroides-Prevotella spp content were significantly increased in several portions of the intestine in RYGB rats compared to control animals. In fact, the changes in gut microbe populations after RGYB resembled those seen after treatment with prebiotics. Gut microbiota changes were also associated with altered production of gastrointestinal hormones known to control energy balance.

The lead author on this study, Melania Osto, Ph.D. said "Our findings show that RYGB surgery leads to changes in gut microbiota that resemble those seen after treatment with prebiotics. The results of this study suggest that postsurgical gut microbiota modulations may influence gut peptide release and significantly contribute to the beneficial metabolic effects of RYGB surgery."

Provided by Society for the Study of Ingestive Behavior