Weight loss surgery benefits for gut microbiome last at least a decade

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This visual abstract depicts how two types of bariatric surgery, Roux-en-Y gastric bypass and vertical banded gastroplasty, produce long-term alterations of the gut microbiome independently of BMI and that these alterations modulate host metabolism and fat mass deposition. Credit: Tremaroli and Karlsson et al./*Cell Metabolism* 2015

Weight loss surgeries in patients have recently been shown to be associated with altered gut microbes. How long these microbiome changes last and whether they are directly associated with weight loss are not known.

A new human study published August 4 in *Cell Metabolism* shows that two types of bariatric surgeries, Roux-en-Y gastric bypass and vertical banded gastroplasty, result in similar microbiome remodeling changes that are maintained a decade later in a group of women. Transfer of the microbiota from the bariatric surgery patients was shown to decrease fat mass and increase carbohydrate use in mice.

What's more is that the microbiome changes are specific to the surgery and not just a reflection of altered weight changes (BMI), which paves the way for the exploration of probiotics as an alternative to weight-loss surgery.

Bariatric—or stomach-shrinking—surgery has become an efficient and relatively safe option for losing weight. While how it works is still somewhat of a mystery, it can benefit obese individuals in ways that go beyond shedding pounds—for example, by improving or even resolving conditions such as type 2 diabetes and hypertension. Changes to the gut microbiome seem to play an important role in the metabolic benefits gained from bariatric surgery, but the question has been: for how long?

To investigate, Fredrik Bäckhed of the University of Gothenburg in Sweden and his colleagues examined the gut bacteria of 14 women over 9 years after they underwent Roux-en-Y gastric bypass or vertical banded gastroplasty. Despite the differences in surgery procedures, the two weight-loss procedures had similar and long-lasting changes on the gut microbiome.

These effects were then shown to be transferable. When "germ-free" mice (which are bred to be free of all gut bacteria) were treated with stool samples from patients who underwent surgery, the animals were able to better metabolize fat via oxidation or breakdown and put on significantly less fat compared to mice colonized with stool from obese individuals.

"Our findings are important in light of the growing epidemic of obesity and associated diseases," Bäckhed says. "Since surgery always confers a risk, it is critical to identify non-surgical strategies. One potential strategy would be to devise novel probiotics based on our findings that can be supplied to obese individuals."

More information: *Cell Metabolism*, Tremaroli and Karlsson et al. DOI: 10.1016/j.cmet.2015.07.009

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