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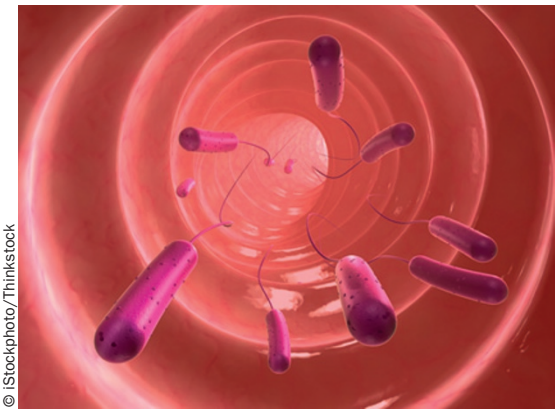
SURGERY

# Altered gut microbiota trigger weight loss



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Changes in the gut microbiota are partially responsible for the weight loss and reduced adiposity observed in mice following Roux-en-Y gastric bypass (RYGB) surgery, shows a recent study in *Science Translational Medicine*.

RYGB surgery restricts food intake and alters metabolism. In addition, this procedure causes a shift in the gut microbiota, but the contribution of the altered microbial community to RYGB outcomes is unclear. Liou *et al*. hypothesized that because the gut microbiota and RYGB influence similar metabolic parameters, changes in gut microbiota could have a role in the metabolic benefits resulting from bariatric surgery.

The investigators used an RYGB mouse model to examine whether changes in gut microbiota after RYGB are conserved among humans and rodents, and to identify the potential mechanisms underlying weight and adipose tissue loss. The researchers examined the gut microbial community before and weekly over 3 months after RYGB surgery and compared it with that of sham-operated *ad-libitum*-fed mice and with that of weight-matched sham-operated control mice. Analysis of faecal samples, by 16S ribosomal RNA gene sequencing, showed that RYGB led to a rapid (within 1 week) and sustained modification of the gut microbiota. A substantial increase in the amount of verrucomicrobia (*Akkermansia*) and gammaproteobacteria (*Escherichia*) was seen in faecal samples from RYGB-treated mice, which is similar to the microbial changes found in human patients after gastric bypass surgery.

Transfer of caecal contents from RYGB-treated and control mice to nonoperated, germ-free mice led to a significant reduction in body weight and fat deposition in animals receiving the RYGB microbiota. Moreover, the RYGB-associated changes in gut microbiota were independent of dietary composition and weight change.

The mechanisms behind the microbial-induced changes in metabolism are unclear, although the researchers suggest that by-products from microbial fermentation, short-chain fatty acids, could affect host physiology.

Identifying the key metabolic pathways is the next important step to understanding how the gut microbiota shapes energy balance and the metabolic response to surgical intervention, the authors conclude.

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**Original article** Liou, A. P. *et al*. Conserved shifts in the gut microbiota due to gastric bypass reduce host weight and adiposity. *Sci. Transl. Med.* **5**, 178ra41 (2013)