

Fecal transplant success for diabetes might depend on the recipient's gut microbes

3 October 2017



This visual abstract depicts the findings of Kootte et al., who show that fecal microbiota transplantation from lean donors to obese patients with metabolic syndrome improves insulin sensitivity, a transient effect associated with changes in microbiota composition and fasting plasma metabolites. Credit: Kootte et al./*Cell Metabolism* 2017

A small clinical trial in the Netherlands found that a fecal transplant from a lean donor can temporarily improve insulin resistance in obese men—but only half of the recipients responded. Upon further investigation, the researchers discovered that they could predict the success of the treatment by analyzing each patient's fecal gut-bacterial makeup. This understanding could help shape the development of personalized fecal transplant for diabetes. The work appears October 3 in the journal *Cell Metabolism*.

"We have now shown that you can categorize

people based on their [fecal samples](#)," says senior author Max Nieuwdorp of the Department of Internal and Vascular Medicine at the University of Amsterdam. "This allows us to classify diseases with more sensitivity."

Six weeks after participants received fecal material from a lean donor, half of them saw an improvement in insulin sensitivity, whereas the other half saw no change. "The fifty-fifty responder-to-non-responder rate surprised me," says Nieuwdorp. "I thought we would have fewer people respond to the transplant." The researchers then compared the pre-treatment microbiota of both groups and found that the non-responders were the ones who started off with less bacterial diversity.

In this randomized control trial, the researchers recruited 38 [obese men](#) with [metabolic syndrome](#), a condition that includes high blood pressure, high blood sugar, and excess fat. They also recruited 11 lean donors with a healthy microbiota. The investigators took blood and stool samples to establish a baseline for each person and randomly paired obese men with a lean donor.

Six weeks later after the fecal transplant, the researchers took blood and stool samples again and observed a decrease in [insulin resistance](#), a major risk factor for type II diabetes, in half of the participants. They also observed changes in the recipients' microbiota composition. These were only short-term changes, though. Three months later, the microbiota for all recipients had gone back to their original states.

Nieuwdorp and his team had been inspired by previous studies about [fecal transplants](#) in *C. difficile* patients. "A pilot study of metabolic syndrome in 2012 led a randomized, controlled trial in *C. difficile* patients. The latter was published in the *New England Journal of Medicine* in 2013," he says. "With this most recent study, we gain more insight into what is happening in the interactions

between gut [microbiota](#) and human metabolism."

The results of this study can help future researchers predict the success of fecal-[transplant](#) studies. If recipients' fecal samples are screened beforehand, then the treatments can become more personalized. According to Nieuwdorp, "We have shown some major effects and started to see that there could be some real power to treat people by replenishing missing intestinal bacterial strains."

More information: Cell Metabolism, Kootte et al.: "Improvement of insulin sensitivity after lean donor feces in metabolic syndrome is driven by baseline intestinal microbiota composition."
[www.cell.com/cell-metabolism/f...](http://www.cell.com/cell-metabolism/fulltext/S1550-4131(17)30559-4)
[1550-4131\(17\)30559-4](https://doi.org/10.1016/j.cmet.2017.09.008) , DOI:
[10.1016/j.cmet.2017.09.008](https://doi.org/10.1016/j.cmet.2017.09.008)

Provided by Cell Press

APA citation: Fecal transplant success for diabetes might depend on the recipient's gut microbes (2017, October 3) retrieved 30 April 2021 from <https://medicalxpress.com/news/2017-10-fecal-transplant-success-diabetes-recipient.html>

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