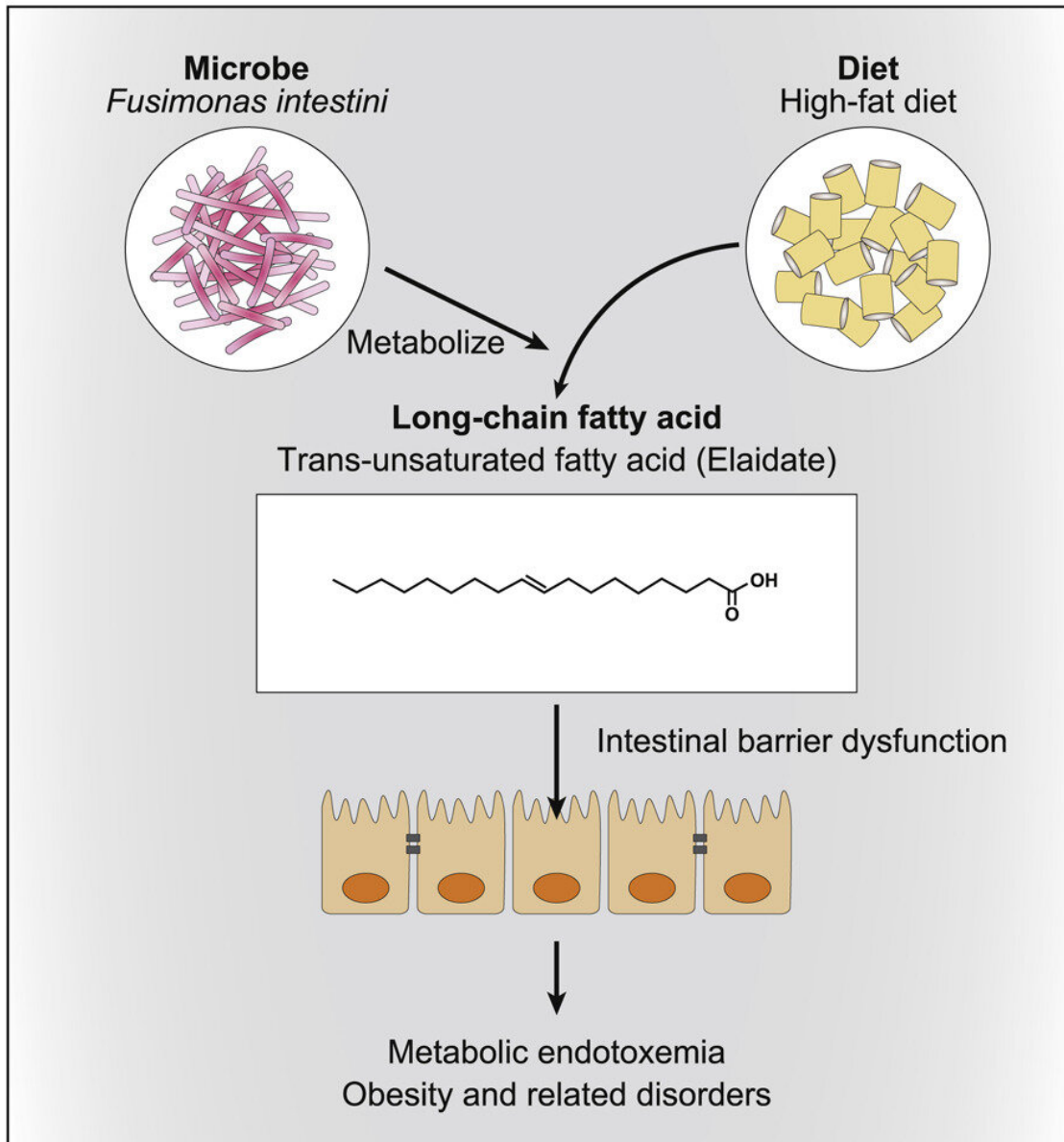


# How a gut microbe can exacerbate obesity

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Graphical abstract. Credit: *Cell Metabolism* (2023). DOI:

10.1016/j.cmet.2022.12.013

RIKEN researchers have discovered how a species of gut microbe exacerbates obesity in mice fed a high-fat diet. Now published in *Cell Metabolism*, this finding could help scientists develop new ways of treating obesity via the microbiome.

Obesity, which is a major risk factor for other [metabolic disorders](#) such as type 2 diabetes, is a growing health problem globally. While it might seem that [obesity](#) could be addressed by adjusting the diet, many people fail to respond to diet-based treatments alone.

Increasing evidence indicates that changes to the microbes in the gut play a role in the onset and maintenance of obesity in people. But just how this plays out in practice has been difficult to uncover. One reason for this difficulty is the sheer number of bacterial species: there are estimated to be more than 3,500 species of human gut microbes, of which any one person might have somewhere between 200 and 1,000 in their gut.

Now, Hiroshi Ohno of the RIKEN Center for Integrative Medical Sciences and co-workers have shown how one bacterial species called *Fusimonas intestini*, which is prevalent in people with obesity and diabetes, makes obesity worse in mice fed a [high-fat diet](#).

They discovered that a high-fat diet can alter the expression of certain genes in *F. intestini* that are involved with the metabolism of [fatty acids](#). This phenotypic change caused the [bacterium](#) to overproduce trans fatty acids, which are associated with obesity. These fatty acids, in turn, interfered with the gut by impairing the integrity of the gut barrier and causing low-grade inflammation, which has been linked to weight gain.

To confirm that the changed gene expression was responsible, the team showed that mice that only had *Escherichia coli* bacteria with the same genetic changes in their guts were more likely to be obese.

This finding opens up the possibility of interventions to reverse this effect. "Removing *F. intestini* from the gut could help to prevent obesity or obesity-related metabolic problems, says Ohno. "Another strategy would be to prevent *F. intestini*'s metabolism."

Ohno was tipped off about *F. intestini* during a conversation with food scientist Keishi Kameyama of the Japanese food company Ajinomoto, one of the study authors, over lunch during a conference. "He mentioned that *F. intestini* increased in obese mice and that he had isolated it," recalls Ohno. "So we started discussing how we could collaborate and discover how this species could affect, and maybe cause, obesity."

But not all gut bacteria are bad for obesity; some can help to counteract it. The team is now investigating other [bacterial species](#) that can help prevent the rapid body weight gain that usually occurs in mice on a high-fat diet.

**More information:** Tadashi Takeuchi et al, Fatty acid overproduction by gut commensal microbiota exacerbates obesity, *Cell Metabolism* (2023). [DOI: 10.1016/j.cmet.2022.12.013](https://doi.org/10.1016/j.cmet.2022.12.013)

Provided by RIKEN

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