

Why do the different people's bodies react differently to a high-fat diet?

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Gut flora, otherwise known as gut microbiota, are the bacteria that live in our digestive tract. There are roughly one thousand different species of bacteria, that are nourished partly by what we eat. Each person has their own specific gut flora and metabolism and these differ according to our dietary habits. Previous studies in mice have shown that a high-fat diet is capable of causing an imbalance in the gut flora, thus causing metabolic diseases such as diabetes or obesity.

Rémy Burcelin's research team spent three months studying how a fatty (a diabetogenic but not obesitogenic diet) diet affected the [gut flora](#) of male mice of the same age, all with the same genetic background. Most of the mice developed diabetes while remaining thin, whereas some remained thin but did not develop diabetes. Why is this so?

In order to confirm the theory that gut flora affects the way in which our body reacts to a high-fat diet, the research team looked at the microbial profile of different types of mice (thin and diabetic and thin and non-diabetic, which indicates two phenotypes). They showed that there was a difference in the quantities of gut bacteria between diabetic and non-diabetic mice. The thin but diabetic mice presented a flora composed mainly of "bacteroidetes" type bacteria, unlike the thin and non-diabetic mice that presented a flora composed mainly of "firmicutes" type bacteria.

So is gut flora the cause or the result of metabolic disorders? To find the answer to this question, Remy Burcelin's team directly modified the gut

flora of a group of mice by adding dietary fibers and gluco-oligosaccharides to their high-fat diet. "By adding these fibers, we modulated most of the physiological characteristics. The metabolism of the mice that we treated with these fibers was similar to that of the thin, non-diabetic mice.

But the gut flora of the mice treated with fibers changed greatly compared to that of the other phenotypes observed", says Matteo Serino.

Rémy Burcelin's team came to the conclusion that "the gut flora could guide the [metabolism](#) towards developing diabetes or not, depending on its profile". "Although we cannot compare the bacterial flora of a mouse with that of a human, because there is only 2% similarity, certain inflammatory mechanisms caused by certain bacteria such as *Faecalibacterium prausnitzii* seem to be identical". The researchers think that the bacteria present in the gut flora could be an indication as to whether or not an individual will develop diabetes. "It is possible that by adding dietary fibers that target the gut flora, we could prevent the development of [metabolic diseases](#) such as diabetes, even in persons who have a high-fat diet".

More information: [dx.doi.org/10.1136/gutjnl-2011-301012](https://doi.org/10.1136/gutjnl-2011-301012)

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