

Flaxseed fiber ferments in gut to improve health, reduce obesity

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Research in mice suggests that fermentation of flaxseed fibers in the gut changes the microbiota to improve metabolic health and protect against diet-induced obesity. The study, published ahead of print in the *American Journal of Physiology—Endocrinology and Metabolism*, was chosen as an APSselect article for February.

The organisms that live in the [digestive tract](#) (gut microbiota) play a role in regulating weight and the way the body processes sugar (glucose tolerance). The breakdown of dietary fiber in the gut—a process called fermentation—can produce favorable changes in the digestive system, such as an increase in beneficial fatty acids, which may reduce the production of fat tissue in the body and improve immune function. Flaxseed is a fiber-rich plant that has been shown to improve [cholesterol levels](#) and inflammation in the colon. However, there is little research on the fermentability of [flaxseed](#) and how flaxseed fiber affects gut microbiota.

Researchers studied mice assigned to four different diets:

- a standard diet that contained 4.6 percent soy-based fiber ("control");
- a [high-fat diet](#) that contained no fiber ("high-fat");
- a high-fat diet that contained 10 percent indigestible cellulose fiber ("cellulose"); and
- a high-fat diet that contained 10 percent flaxseed fiber ("flaxseed").

The research team measured the amount of oxygen the mice used, carbon dioxide produced, food and water consumed and energy expended. Glucose tolerance was also measured near the end of the trial. At the end of 12 weeks, the researchers examined the animals' cecal contents—bacteria and other biological materials in the pouch that forms the beginning of the large intestine (cecum).

The high-fat group had fewer bacteria associated with improved metabolic health, lower levels of beneficial fatty acids and more of a bacterium linked to obesity when compared to the other groups. Bacteria levels in both the cellulose and flaxseed groups returned to healthier levels when compared to the high-fat group. The flaxseed group was more physically active and had less weight gain than the other high-fat [diet](#) groups. The mice that received flaxseed supplements also had better glucose control and levels of beneficial fatty acids that were comparable to the healthy control group. When examining the cecal contents, the research team found evidence that the bacteria present ferment fibers from the thick, glue-like layer of the flaxseed shell. The bacteria that perform fermentation then produce more beneficial fatty acids.

"Our data suggest that flaxseed fiber supplementation affects host metabolism by increasing energy expenditure and reducing obesity as well as by improving [glucose tolerance](#). Future research should be directed to understand relative contribution of the different microbes and delineate underlying mechanisms for how flaxseed fibers affect host metabolism," the researchers wrote.

More information: Tulika Arora et al. Microbial fermentation of flaxseed fibers modulates the transcriptome of GPR41-expressing enteroendocrine cells and protects mice against diet-induced obesity, *American Journal of Physiology-Endocrinology and Metabolism* (2018). [DOI: 10.1152/ajpendo.00391.2018](https://doi.org/10.1152/ajpendo.00391.2018)

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