

Study shows stress could be just as unhealthy as junk food

October 16 2017



Credit: George Hodan/public domain

We all know that a poor diet is unhealthy, but a new BYU study finds that stress may just as harmful to our bodies as a really bad diet.

In a new paper published in *Nature Scientific Reports*, BYU professor of microbiology and molecular biology Laura Bridgewater found that when [female mice](#) were exposed to [stress](#), their gut microbiota—the

microorganisms vital to digestive and metabolic health—changed to look like the mice had been eating a [high-fat diet](#).

"Stress can be harmful in a lot of ways, but this research is novel in that it ties stress to female-specific changes in the gut microbiota," Bridgewater said. "We sometimes think of stress as a purely psychological phenomenon, but it causes distinct physical changes."

Bridgewater and her collaborators at Shanghai Jiao Tong University in China took a large group of 8-week-old mice and exposed half of the males and half of the females to a high-fat [diet](#). After 16 weeks, all of the mice were exposed to mild stress over the course of 18 days.

Researchers then extracted microbial DNA from the mice fecal pellets before and after the stress to test how the gut microbiota was affected. They also measured mouse anxiety based on how much and where the mice traveled in an open field arena.

The researchers found fascinating differences between genders: Male mice on the high-fat diet exhibited more anxiety than females on the high-fat diet, and high-fat males also showed decreased activity in response to stress. However, it was only in female [mice](#) that stress caused the gut [microbiota](#) composition to shift as if the animals were on a high-fat diet.

While the study was only carried out on animals, researchers believe there are could be significant implications for humans.

"In society, women tend to have higher rates of depression and anxiety, which are linked to stress" said Bridgewater, who also serves as Associate Dean of the BYU College of Life Sciences. "This study suggests that a possible source of the gender discrepancy may be the different ways [gut microbiota](#) responds to stress in males vs. females."

BYU's Chenhong Zhang served as an author on the paper. Liping Zhao, Shengtian Li, Jing Wang, Qianpeng Zhang, Weiwei Hu and Yanqui Wu of Shanghai Jiao Tong University also contributed to this study.

More information: Laura C. Bridgewater et al, Gender-based differences in host behavior and gut microbiota composition in response to high fat diet and stress in a mouse model, *Scientific Reports* (2017).

[DOI: 10.1038/s41598-017-11069-4](https://doi.org/10.1038/s41598-017-11069-4)

Provided by Brigham Young University

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