

# Researchers reveal link between hunger and mood, new study

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Professor Francesco Leri. Credit: University of Guelph

It seems "hangry" isn't just a made-up term.

University of Guelph researchers have revealed that the sudden drop in [glucose](#) we experience when we are hungry can impact our mood.

"We found evidence that a change in glucose level can have a lasting effect on mood," said Prof. Francesco Leri, Department of Psychology. "I was skeptical when people would tell me that they get grouchy if they don't eat, but now I believe it. Hypoglycemia is a strong physiological and psychological stressor."

Published in the journal *Psychopharmacology*, the study examined the impact of a sudden glucose drop on emotional [behaviour](#) by inducing [hypoglycemia](#) in rats.

"When people think about negative mood states and stress, they think about the psychological factors, not necessarily the metabolic factors," said Ph.D. student Thomas Horman, who led the study. "But we found poor eating behaviour can have an impact."

The rats were injected with a glucose metabolism blocker causing them to experience hypoglycemia, and were then placed in a specific chamber. On a separate occasion, they were given an injection of water and placed in a different chamber. When given the choice of which chamber to enter, they actively avoided the chamber where they experienced hypoglycemia.

"This type of avoidance behaviour is an expression of stress and anxiety," said Leri. "The animals are avoiding that chamber because they had a stressful experience there. They don't want to experience it again."

The researchers tested blood levels of the rats after experiencing hypoglycemia and found more corticosterone, an indicator of physiological stress.

The rats also appeared more sluggish when given the glucose metabolism blocker.

"You might argue that this is because they need glucose to make their muscles work," said Leri. "But when we gave them a commonly used antidepressant medication, the sluggish behaviour was not observed. The animals moved around normally. This is interesting because their muscles still weren't getting the glucose, yet their behaviour changed."

This finding supports the idea that the animals experienced stress and depressed mood when they were hypoglycemic, he said.

For people who experience anxiety or depression, the study results have implications for treatment, said Horman.

"The factors that lead someone to develop depression and anxiety can be different from one person to the next. Knowing that nutrition is a factor, we can include eating habits into possible treatment."

These findings also provide insight into the connection between depression and diseases such as obesity, diabetes, bulimia and anorexia, Horman said.

Having established that hypoglycemia contributes to negative mood states, the researchers plan to determine whether chronic, long-term hypoglycemia is a risk factor for developing depression-like behaviours.

While missing one meal may make you "hangry," Horman said, these findings suggest your mood could be impacted if meal-skipping becomes a habit.

"Poor mood and poor eating can become a vicious cycle in that if a person isn't eating properly, they can experience a drop in mood, and this drop in [mood](#) can make them not want to eat. If someone is constantly missing meals and constantly experiencing this stressor, the response could affect their emotional state on a more constant level."

**More information:** Thomas Horman et al, An exploration of the aversive properties of 2-deoxy-D-glucose in rats, *Psychopharmacology* (2018). [DOI: 10.1007/s00213-018-4998-1](https://doi.org/10.1007/s00213-018-4998-1)

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