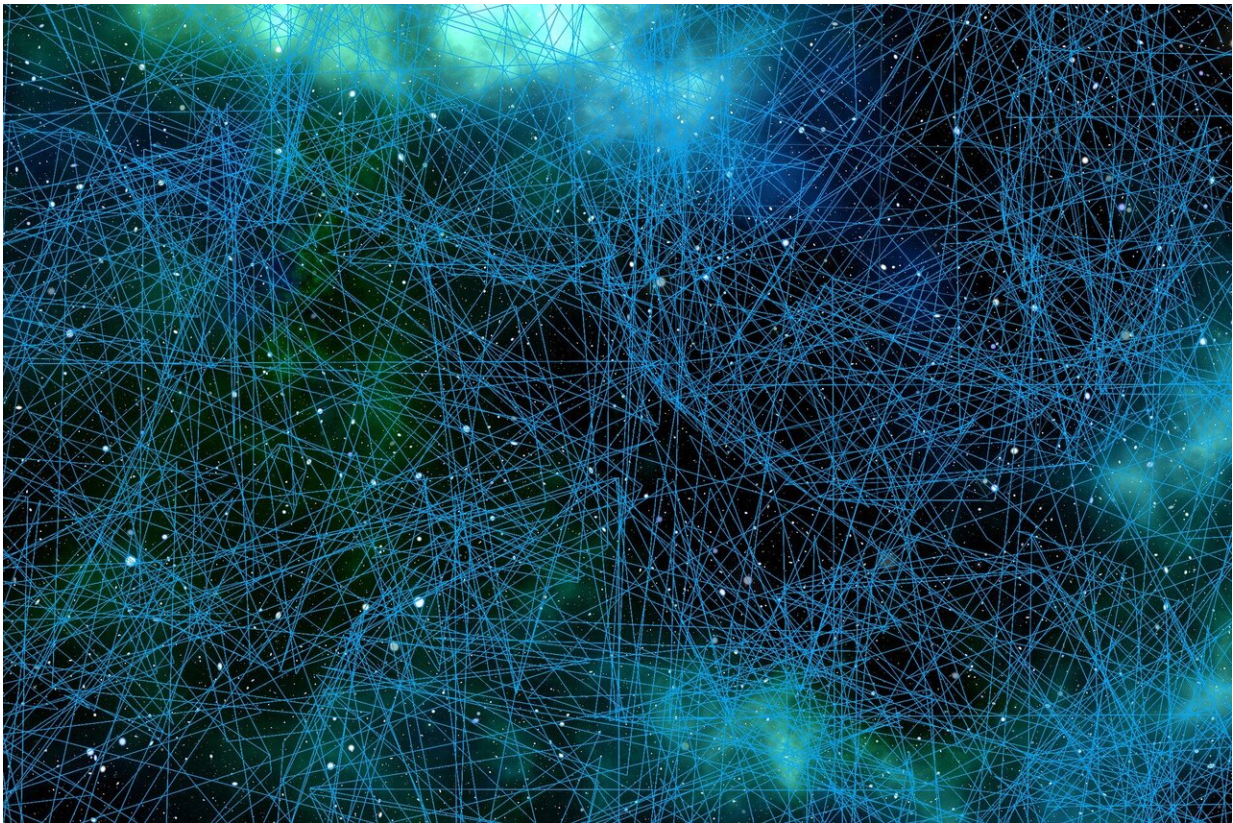


Researchers find neuron behind fatal anorexia, solution in high-fat diet

October 29 2020



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Researchers have long known that many people (mostly women) suffering from anorexia face a high risk of death. But, until now, they didn't know what causes the eating disorder to turn fatal.

In a research letter published in the Oct. 26 edition of *Nature Metabolism*, Yale researchers describe a specific neuron that appears to play an important role in whether anorexia becomes deadly.

They also discovered a potential treatment: a [high-fat diet](#).

"Over the last 25 years, our work has focused on understanding what drives hunger," said author Tamas Horvath, the Jean and David W. Wallace Professor of Comparative Medicine and professor of neuroscience and of obstetrics, gynecology, and reproductive sciences. "We wondered if neurons in the brain which are working at a high level when someone is dieting could be participating in some aspect of the disease."

For the study, the researchers looked at a specific neuron that is active during [food restriction](#), called the hypothalamic agouti-related peptide (AgRP), in food-restricted, exercising mice. They found a [direct relationship](#) between the workings of the neuron and the animals' likelihood of dying. In fact, all animals on a food-restricted, high-exercise diet whose AgRP neurons were inhibited died within 72 hours.

"If we diminished these neurons in animals who ate little and exercised compulsively, they died," said Horvath, who is also chair of the Department of Comparative Medicine and director of the Yale Program in Integrative Cell Signaling and Neurobiology of Metabolism.

Lowering levels of these neurons proved fatal, Horvath said, because they are needed to help the body access alternative forms of fuel—namely fat—in the absence of eating, combined with intense exercise. "If these [neurons](#) don't function, you are not able to mobilize fuels from fat stores," he said.

But when they provided fatty food to the mice with decreased AgRP

activity they found that "death [was] completely prevented." This finding could suggest a new tactic for treating anorexia in people, Horvath said. "If you are a person dying from anorexia and eat foods containing elevated fat, you may survive," he said.

Anorexia nervosa is an [eating disorder](#) that affects mainly adolescent girls. Those with the disorder severely restrict their eating, fear gaining weight, and exercise compulsively. Some 20 million women suffer from anorexia, which has the highest mortality rate of any mental illness.

Horvath and other Yale researchers are now extending their research to identify which fats may work best in preventing [anorexia](#) from becoming lethal. "Many people with this disorder are in the care of medical professionals, and there's an opportunity to bring these findings to the human population," he said.

More information: Maria Consolata Miletta et al. AgRP neurons control compulsive exercise and survival in an activity-based anorexia model, *Nature Metabolism* (2020). [DOI: 10.1038/s42255-020-00300-8](https://doi.org/10.1038/s42255-020-00300-8)

Provided by Yale University

Citation: Researchers find neuron behind fatal anorexia, solution in high-fat diet (2020, October 29) retrieved 27 April 2024 from <https://medicalxpress.com/news/2020-10-neuron-fatal-anorexia-solution-high-fat.html>

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