MedicalXpress

Food and alcohol reduce activity in 'hunger neurons' via different brain pathways

July 10 2019

How does the brain process rewards? Researchers at the University of Pennsylvania are investigating how the brain responds differently to two commonly ingested rewards—food and alcohol—to understand how they alter neural activity and behavior. Their findings were presented this week in Utrecht, Netherlands at the 2019 Annual Meeting of the Society for the Study of Ingestive Behavior (SSIB), one of the leading venues for research on eating and drinking.

In a study led by Dr. Amber Alhadeff, neural activity was measured in hungry mice consuming either food or alcohol. "Our modern neuroscience toolkit now allows us to monitor neural activity in behaving mice when we give them access to different kinds of rewards. This gives us unprecedented access into the mechanisms that control motivation and behavior," said Alhadeff. The study demonstrates that food and alcohol have similar effects on neurons that are known to be involved in food intake and reward. However, different pathways carry signals to the brain following ingestion of either food or alcohol. They found that the vagus nerve, a highway of information from the gastrointestinal tract to the brain, is responsible for transmitting food signals to "hunger neurons." Alcohol, on the other hand, does not utilize vagal signaling to communicate with these same hunger neurons, but likely accesses them, and suppresses their activity, directly through the bloodstream.

These divergent pathways of information flow could help explain why food and alcohol have different effects on our behavior, according to senior author Dr. J. Nicholas Betley. When the researchers measured

how alcohol affects food intake, they unexpectedly found that it has little effect on feeding behavior, despite its significant calorie content. "When we observed this, we started to think that mice don't actually compute the caloric content of alcohol" said Betley. Indeed, the University of Pennsylvania team went on to show that stimulation of "hunger neurons" in the brain robustly drives food intake, but has no effect on alcohol intake. In the future, these findings will be useful for determining the different mechanisms through which food and drugs impact neural activity and motivation for different rewards, providing insight into the underpinnings of obesity and substance abuse.

More information: Nutrients and drugs of abuse modulate hypothalamic neuron activity via distinct pathways, Presented July 2019, Society for the Study of Ingestive Behavior, Utrecht, Netherlands

Provided by Society for the Study of Ingestive Behavior

Citation: Food and alcohol reduce activity in 'hunger neurons' via different brain pathways (2019, July 10) retrieved 12 March 2023 from https://medicalxpress.com/news/2019-07-food-alcohol-hunger-neurons-brain.html