

Stress relief by 'comfort foods' may vary between sexes and across the estrous cycle

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Researchers at the University of Cincinnati have found that the brain networks that mediate stress relief after eating highly palatable foods may vary between males and females, and may also depend on the stage of the estrous cycle. The study performed by Ann Egan, a doctoral candidate in the University of Cincinnati Neuroscience Graduate Program in the laboratory of Dr. Yvonne Ulrich-Lai, PhD, used a rodent model of 'comfort food' to investigate the neurocircuitry behind this phenomenon. The research is to be presented this week at the Annual Meeting of the Society for the Study of Ingestive Behavior (SSIB), the foremost society for all aspects of eating and drinking behavior.

"We know that both men and women eat tasty foods as a strategy to reduce [stress](#), and in fact there is some evidence that suggests that women may be more prone to this 'comfort food' style of eating," explained Egan. "This study is important because it suggests that males and females may be using slightly different [brain regions](#), and the stress relief in females may also be affected by the stage of the estrous cycle. This can help us understand how eating behaviors can affect men and women differently, and how eating behaviors are affected by fluctuating hormone levels."

The researchers used a [rodent model](#) that is based on human snacking patterns. Female rats were given twice-daily access to a small amount of a sweet sugar drink for 14 days, while other [female rats](#) were only given water as a control. Then rats were subjected to a stress test, and their stress hormone response was measured. Similar to previous studies done in male rats, female rats that had been given the sugar solution had a lower stress hormone response to the stress challenge. However, in the female rats the reduced stress response only occurred if the rats were in the proestrus/estrus stage of their estrous cycle, when levels of estrogen are high.

Previous studies in male rats have identified particular brain regions that are important for the [stress relief](#), including the basolateral amygdala and prefrontal cortex. The researchers looked at protein markers of activity (FosB/deltaFosB and pCREB) in these brain regions to see if the sugar drink altered these protein levels similarly in male and female rats. FosB/deltaFosB was increased in the amygdala of males who were given the sugar drink compared to those drinking only water. Female rats also showed this increase in amygdala FosB/deltaFosB after the sugar drink, but only when they were in the proestrus/estrus stage of their cycle. In contrast, amygdala pCREB was increased by the sugar drink in males but not females. Instead amygdala pCREB varied across the estrous cycle in female rats and was unaffected by sugar drink. These different patterns show that comfort eating has some similar effects in male and female brains, but also has unique effects in the female brain that vary across the hormonal cycle. Pursuing these findings could lead to different strategies that could be useful for women and men who habitually eat to manage stress.

More information: "Sex-dependent brain activation by palatable food intake and the implications for stress relief by 'comfort' foods" Annual Meeting of the Society for the Study of Ingestive Behavior (SSIB), 2016.

Provided by Society for the Study of Ingestive Behavior

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