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Binge behavior/addiction linked to stress, tripling desire for sugar

ANN ARBOR, Mich.—Stressed individuals might be particularly prone to binge eating or drug addiction because of high levels of a hormone mechanism in their brain, according to new University of Michigan and Georgetown University research.

"There are lots of reasons why stressed people might over eat or gamble or chase after hedonic rewards. Unfortunately this new result reveals another one," said U-M psychology professor Kent Berridge. "People who feel bad during stress cope in part by overeating or pursuing other incentives.

"Now it turns out a stress chemical also activates the same brain mechanism that goes wrong in drug addiction to make us excessively want pleasurable things."

The study, published today in the journal BMC Biology, shows that rats with levels of corticotropin-releasing factor (CRF) in their brain similar to the levels experienced by humans when they are stressed show an exaggerated craving for a reward — some sugar -- whenever presented with a cue that had previously been associated with that reward.

"The brain stress substance tripled the intensity of desire for sugary treats normally triggered by cues for those treats," Berridge said.

This result explains why stressed individuals might be more likely to experience strong cravings for rewards and compulsively indulge in pleasurable activities such as eating or taking drugs.

U-M psychology researcher Susana Peciña and Berridge from U-M collaborated with Georgetown University physiology and biophysics professor Jay Schulkin to painlessly inject rats with either a high dose (500ng/0.2 ml) or a low dose (250ng/ 0.2 ml) of CRF, part of the brain's internal stress-signaling system that serves as a brain stress neurotransmitter.

They injected the rats in a part of the brain called nucleus accumbens, known to be involved in the mediation of both pleasurable rewards and stress signals in humans as well as rats.

They observed the rats' behavior in response to a cue -- a 30-second tone-- that had previously been associated with the release of a reward, in the form of sugar pellets.

When they heard the cue, the rats pressed on a lever that they expected to release more sugar pellets. The authors made sure that the rats did not experience stress due to CRF itself or to other factors in the experimental set-up.

Their results show that injection of a high dose of CRF tripled the intensity of bursts of sugar craving, measured by the pressing on the sugar-associated lever.

The lever-pressing activity was only enhanced if the injection of CRF was followed by the cue – it did not increase following the injection alone. The low dose of CRF, or an empty injection, also failed to enhance the lever-pressing activity significantly.

"When CRF reaches the nucleus accumbens it creates a special window of vulnerability to temptation," Berridge said. "This could trap individuals into chasing incentives they could normally resist, pulled in by tempting cues or images that become more powerfully wanted."

Related Links:

For more on Berridge and his work

For more on Peciña and her work

For more on Schulkin

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