

## **Study pinpoints part of brain that triggers addiction**

December 10 2014, by Jared Wadley



(Medical Xpress)—Activating the brain's amygdala, an almond-shaped mass that processes emotions, can create an addictive, intense desire for sugary foods, a new University of Michigan study found.

Rewards such as sweet tasty food or even addictive drugs like alcohol or



cocaine can be extremely attractive when this <u>brain structure</u> is triggered.

"One reason they can be so problematic for certain individuals is their ability to become almost the sole focus of their daily lives, at the cost of one's health, job, family and general well-being," said the study's lead author, Mike Robinson, a former postdoctoral U-M fellow and currently an assistant professor of psychology at Wesleyan University in Connecticut.

The findings appear in the Journal of Neuroscience.

Most people encounter and consume highly delicious foods, such as chocolate chip cookies and candy, and addictive substances like alcohol, nicotine and caffeine on a regular basis. For many people, these rewards act as pleasurable treats that are both wanted and liked, but for the most part consumed in moderation.

Robinson said it is this moderation and balance of reward avenues that allows people to lead and maintain a healthy lifestyle.

However, for a small portion of vulnerable individuals, these rewards progressively become intensely craved, skewing their normal balance of desires and leading to addiction, he said.





Figure 1. Procedure for enhancement of laser-paired sucrose intwo-sucrose choicetest. Schematicshows apparatus and event timeline forsimultaneous choicetests. Two levers protruded on eitherside of sucrose dish in center. Pressing either lever earned an equivalent sucrose pellet and a distinctive 8 s sound which marked that lever's identity, but only one lever's pellet and sound was also paired simultaneously with onset of 8 s laser pulse (473 nm; 25 Hz; 8 –10 mW).

"Understanding what part of the brain is involved in causing intense narrowing of focus to make one reward valued at the detriment of all others might provide crucial insights into treating addiction and excessive/compulsive consumption disorders," Robinson said.

In the study, whenever the rats pushed a lever to earn a particular sugary reward, a laser light painlessly activated the amygdala in their brains for a few seconds, making neurons in it fire more excitedly. Their amygdala



was never activated when the rats earned an identical sugary reward by pressing a separate lever.

Then, a simultaneous opportunity to earn both sugary rewards was given. Faced with a choice, the rats focused only on earning the particular sugary reward that had previously excited their amygdala, while completely ignoring the other. The rats also were willing to work much harder to earn the sweet reward associated with amygdala activation than to earn the other sweet reward.

The amygdala activation focused the rats' desire on the sweet reward with which it was associated. By itself, the amygdala-stimulating laser appeared worthless to the <u>rats</u>, who didn't seem to care if the amygdalastimulation was on or off, unless the sugary reward was also present.

Robinson said the results suggest a role for the <u>amygdala</u> in generating focused and almost exclusive desire as seen in addiction.

"Understanding the pathways involved in addictive-like behavior could provide new therapeutic avenues for treating addiction and other compulsive disorders," he said.

The study's authors include Shelley Warlow, a doctoral student in biopsychology in the Psychology Department, and Kent Berridge, the James Olds Collegiate Professor of Psychology and Neuroscience.

**More information:** The study is available online: <u>jn.sfn.org/press/December-10-2</u> ... e/zns05014016567.pdf

Provided by University of Michigan



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