



*American College of Neuropsychopharmacology*

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## **Erasing Cocaine Memories in Mice can Prevent Relapse**

HOLLYWOOD, FL (December 3, 2012) – A new study shows that it may be possible to “erase” the memory for cocaine in mice and thereby to decrease their craving for the drug. The findings have important implications for future treatment strategies for drug addiction in humans. They were presented today at the American College of Neuropsychopharmacology (ACNP) Annual Meeting.

The study, led by Sheena Josselyn at the University of Toronto, in Ontario, Canada, examined the brain mechanisms that control how cues in the environment can trigger memories of the rewarding properties of cocaine, which can result in drug seeking. It also investigated whether disrupting these drug memories can prevent relapse.

First, the scientists increased the expression of a molecule called CREB, which plays a key role in memory formation, in a part of the brain called the lateral amygdala, thought to be involved in forming cocaine-related memories. The investigators found that boosting CREB in the lateral amygdala of mice increased cocaine-related memories in the mice, reflected in greater drug-seeking behaviors.

Next, the scientists used a selective toxin to destroy those brain cells in the lateral amygdala in which CREB became active when mice were learning about the rewarding properties of cocaine. Destroying those neurons, which contained the memory for cocaine reward, decreased the animals’ cocaine-seeking behaviors.

Finally, the scientists took advantage of new technology that can be used to temporarily inactivate specific neurons rather than destroy them. Once again, they found that temporarily inactivating neurons that encode cocaine-related memories decreased drug-seeking behaviors in mice.

According to Josselyn, “even after a strong memory for cocaine had formed in mice, we were able to essentially erase it by killing the relevant brain cells or temporarily reducing their activity. That is, the mice behaved as if they had never received cocaine.”

These findings suggest that blocking the expression of drug-related memories may be a new treatment approach for addiction. “Our results indicate that a critical component of a cocaine memory may reside in a small portion of neurons and that treatments could be targeted to just these neurons”, said Sheena.

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