

Animal research suggests new strategy for treating cocaine addiction

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New research in monkeys suggests the feasibility of treating cocaine addiction with a “replacement” drug that mimics the effects of cocaine but has less potential for abuse – similar to the way nicotine and heroin addictions are treated.

Reporting at the annual meeting of the American Society of Pharmacology and Experimental Therapeutics in San Diego, Calif., scientists from Wake Forest University School of Medicine said treating monkeys with amphetamine significantly reduced their self-administration of cocaine for up to a month.

“This suggests the possibility of developing an amphetamine-like drug for treating cocaine addiction,” said Paul Czoty, Ph.D., lead author and assistant professor of physiology and pharmacology. “The research also demonstrates the usefulness for conducting studies in monkeys to test potential treatments.”

Czoty said the quest to develop a treatment for cocaine addiction has been ongoing for decades with little success. “While we have medications for heroin and tobacco abuse, there is no FDA-approved treatment for cocaine,” he said.

With both heroin and tobacco, there are treatments to replace the addictive drug with a drug that has similar effects on the body, but with less potential for abuse.

“With this strategy in mind, clinical researchers have turned to drugs currently available, including amphetamines,” said Czoty. “While it’s unlikely that amphetamine itself will turn out to be the best treatment, these drugs allow us to prove the concept of using a replacement drug to combat cocaine addiction.”

Amphetamines have been used in clinical studies with some success, said Czoty. His research in monkeys may help identify the best dose and schedule for administering a replacement drug – as well as evaluate potential treatment candidates and estimate potential side effects.

For the study, a monkey was taught to press levers multiple times to obtain food or a cocaine injection. With each injection, the number of required lever presses increased so that the animal had to work harder for the cocaine.

“This procedure measures the strength of the reinforcing effects of drugs,” said Czoty. “Each injection requires more and more work and eventually it gets to the point where it’s not worth it to the monkey because more than 1,000 presses are required.”

Access to cocaine was then removed and the monkey was treated intravenously with an amphetamine 24 hours per day. When re-exposed to cocaine one week later, a dramatic decrease in responding for cocaine was observed. They tested three different doses of amphetamine and found that a moderate dose was most effective. Although the treatment also decreased lever-pressing for food—which could be predictive of side effects in humans -- this effect disappeared within one week while the effect on responding for cocaine injections persisted for up to one month.

“This was a very positive finding – exactly what we had hoped to see,” said Czoty. “Cocaine use was significantly reduced – by about 60

percent.”

The researchers are currently repeating the study in additional animals. They hope it could eventually lead to identifying a slightly different drug that will obtain the same results as amphetamines.

Czoty said the study is significant because it and other similar studies in monkeys duplicate what has been found in small studies in humans, which suggests that the animal model can be used to test other treatments. The researchers, for example, plan to test topiramate (Topamax®), an anti-convulsant drug that is sometimes used to treat epilepsy and may be effective in treating alcoholism.

“We have found a model we can use to test new drugs and have an idea of what positive or negative effects would look like,” said Czoty.

Source: Wake Forest University

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