

Oxytocin reduces cravings for methamphetamine

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Many people have suggested that addiction hijacks the body's natural drives in the service of compulsive drug use. A new study now suggests that hijacking another natural system in the brain may help overcome drug addiction. Published in *Biological Psychiatry*, the study shows that administration of oxytocin—a naturally occurring molecule well known for its role in social bonding and childbirth—reduces drug-seeking behavior in methamphetamine-addicted rats.

"There are virtually no pharmacotherapeutics for methamphetamine addiction, a chronically relapsing disease that destroys many lives," said first author Dr. Brittney Cox, now at the University of California Irvine. "Our results are important because they support development of novel, oxytocin-based therapeutics for [methamphetamine abuse](#) in humans."

To show this, Cox and colleagues developed a new method to assess addiction-like behaviors with meth, which could not be studied with previous techniques because of the drug's long-acting effects. The researchers allowed [rats](#) to self-administer meth using a paradigm designed to examine individual differences in the rats' drug-taking behavior, then tested the effects of oxytocin on their motivation to acquire the drug.

Although oxytocin administered to rats had no effect on the amount of methamphetamine they wanted when it required minimal effort, it strongly decreased the amount of effort rats were willing to exert to obtain the drug they desired, and it decreased relapse to methamphetamine seeking in both males and females.

"Intriguingly, these effects were strongest in animals with the greatest motivation to seek methamphetamine, indicating that oxytocin has potential as a treatment for addiction," said Cox.

The study also pinpoints the brain region where

the oxytocin has its effect. When Cox and colleagues infused oxytocin specifically into the [nucleus accumbens](#), a small brain region implicated in [drug addiction](#), they found that it had the same effects as when they administered it systemically. Infusion of an oxytocin blocker to the brain region blocked the systemic effects of oxytocin, driving home the necessary role of the nucleus accumbens for oxytocin's effects.

"It will be interesting to learn whether oxytocin has a direct effect on the rewarding effects of [methamphetamine](#) or whether these effects are modulated by this hormone's effects on natural rewards, particularly social activity," said Dr. John Krystal, Editor of *Biological Psychiatry*, referring to the mechanism behind the effects that remains to be determined.

The researchers also found that using their new method, measures of motivation accurately predicted relapse behavior, which was not predicted by drug-taking itself when low effort was required. The technique used to assess addiction-like behavior in rats can also be used in humans, so if similar results are found in addicted people, the researchers hope the technique may help identify people most susceptible to addiction and be useful for predicting the efficacy of [oxytocin](#) treatment.

More information: Brittney M. Cox et al. Oxytocin Acts in Nucleus Accumbens to Attenuate Methamphetamine Seeking and Demand, *Biological Psychiatry* (2017). DOI: [10.1016/j.biopsych.2016.11.011](https://doi.org/10.1016/j.biopsych.2016.11.011)

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