

Steady relationships reduce amphetamine's rewarding effects

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Long-term relationships make the commonly abused drug amphetamine less appealing, according to a new animal study in the June 1 issue of *The Journal of Neuroscience*. The findings suggest that social bonds formed during adulthood lead to changes in the brain that may protect against drug abuse.

Prairie voles are rodents that form lifelong bonds with mating partners. In the new study, researchers directed by Zuoxin Wang, PhD, of Florida State University, found that male voles in established relationships displayed less interest in [amphetamine](#) compared with their single counterparts. Amphetamine exposure led to changes in the nucleus accumbens — a part of the brain's reward system — that differed depending on the relationship status of the voles.

Wang and his colleagues found brain cells of both paired and single voles released a similar amount of dopamine — a brain chemical important in pleasurable activities like eating and sex — in response to amphetamine. However, this released dopamine may have had differential effects in paired and single voles. Once released, dopamine binds to molecules called receptors on the surface of brain cells. Amphetamine use increased D1 receptor binding in the nucleus accumbens in single voles, but decreased it in paired voles, suggesting the single and paired voles had opposite responses to the drug.

Drugs that blocked dopamine from binding to the D1 receptor in the [nucleus accumbens](#) lessened amphetamine reward in single voles, while

drugs that increased dopamine binding at this site appeared to make amphetamine more appealing to the paired voles.

"Our results indicate that the pair bonding experience may alter the neurobiological response to drugs of abuse, which in turn may diminish the rewarding effects of the drug itself," study author Wang said.

Earlier work in Wang's laboratory showed single voles sought out the rewarding effects of amphetamine and that repeated exposure to the drug threw off their drive to form lifelong partnerships. In the current study, the researchers explored whether relationships formed during adulthood could buffer against amphetamine's rewarding properties.

"While this study is very interesting, it will be important to determine whether pair-bonded voles would be less likely to work for drugs of abuse if given unlimited access," said Larry Young, PhD, an expert in social behavior at Emory University, who was unaffiliated with the study. "Understanding the neurobiology of how [social bonds](#) protect against the rewarding aspects of drug abuse may ultimately inform novel therapies for addiction."

Provided by Society for Neuroscience

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