

MDMA can be fatal in warm environments

4 June 2014

A moderate dose of MDMA, commonly known as Ecstasy or Molly, that is typically nonfatal in cool, quiet environments can be lethal in rats exposed to conditions that mimic the hot, crowded, social settings where the drug is often used by people, a study finds. Scientists have identified the therapeutically-relevant cooling mechanism to enable effective interventions when faced with MDMA-induced hyperthermia. The study, publishing tomorrow in the *Journal of Neuroscience*, was conducted by researchers at the National Institute on Drug Abuse's Intramural Research Program (NIDA IRP). NIDA is a part of the National Institutes of Health.

While MDMA can have a range of adverse health effects, previous studies have shown that high doses of MDMA increase body temperature, while results with moderate doses were inconsistent. This has led some people to assume that the drug is harmless if taken in moderation. However, this study shows that in rats even moderate doses of MDMA in certain environments can be dangerous because it interferes with the body's ability to regulate temperature.

"We know that high doses of MDMA can sharply increase body temperature to potentially lead to organ failure or even death," said NIDA Director Dr. Nora D. Volkow. "However, this current study opens the possibility that even moderate doses could be deadly in certain conditions."

It is impossible to predict who will have an adverse reaction even to a low dose of MDMA. However, in this study scientists gave the rats low to moderate doses that have been shown in past studies to not be fatal. They monitored the rats to determine drug-induced changes in brain and body temperature and in the body's ability to cool itself through blood vessel dilation. When rats were alone and in a room-temperature environment, a moderate dose of MDMA modestly increased brain and body temperature and moderately diminished the rats' ability to eliminate excessive heat. However, when researchers injected the same dose in rats that

were either in a warmer environment or in the presence of another rat in the cage, brain temperature increased, causing death in some [rats](#). These fatal temperature increases were because the drug interfered with the body's ability to eliminate heat.

"These results demonstrate that the use of MDMA in certain warm, [social settings](#) could be more dangerous than commonly believed," said Dr. Eugene Kiyatkin, first author on the study and NIDA IRP scientist. "Even with moderate doses, we saw drug-induced, fatal brain hyperthermia during conditions of social interaction and in warm environments."

These findings further suggest that medical interventions aimed at increasing the efficiency of whole-body cooling by targeting blood vessel constriction in the skin could be therapeutically relevant for counteracting the development of MDMA-induced hyperthermia.

Provided by National Institutes of Health

APA citation: MDMA can be fatal in warm environments (2014, June 4) retrieved 14 April 2021 from <https://medicalxpress.com/news/2014-06-mdma-fatal-environments.html>

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