Amphetamine use in adolescence may impair adult working memory

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University of Illinois psychology professor Joshua Gulley and his colleagues found that amphetamine use during adolescence can lead to long-term impairments in memory. Credit: Photo by L. Brian Stauffer, U. of I. News Bureau

Rats exposed to high doses of amphetamines at an age that corresponds to the later years of human adolescence display significant memory deficits as adults - long after the exposure ends, researchers report.

The declines in short-term or "working" memory are most pronounced when the rats are exposed during adolescence, rather than as adults, the researchers found.

"Animals that were given the amphetamine during the adolescent time period were worse at tasks requiring working memory than adult animals that were given the same amount of amphetamine as adults," said psychology professor Joshua Gulley, who led the study with graduate student Jessica Stanis. "This tells us that their working memory capacity has been significantly altered by that pre-exposure to amphetamine."

Gulley and his colleagues will present their findings Wednesday (Oct. 21) at the annual meeting of the Society for Neuroscience in Chicago.

The researchers tested two types of amphetamine exposure: intermittent (a steady dose every other day) and "binge-escalation," in which increasing amounts of the drug were given over a period of four days, followed by a simulated binge - a high dose every two hours for eight hours on the fifth day.

The findings reveal some of the potential long-term consequences of amphetamine abuse by adolescents and also may be relevant to those taking amphetamines for therapeutic purposes, such as for the treatment of Attention Deficit Hyperactivity Disorder (ADHD). Gulley cautions that the doses given to the rats are on the high end of what an older, larger adolescent might receive as a therapeutic dose, and that further study is needed to tease out the implications for human health.

The concerns are most robust for adolescents who abuse amphetamines, Gulley said, as they may use much higher doses than those who are prescribed drugs that contain amphetamines.

"Adolescence is a time when the brain is continuing to develop into its mature form, so drug exposure during this critical period could have long-lasting, negative consequences," he said. "Our findings reveal that adolescents are particularly sensitive to the adverse effects of amphetamine on cognitive function and that these effects can persist

well after drug use is discontinued."

Source: University of Illinois at Urbana-Champaign (news : web)

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