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Meth exposure in young adults leads to long-term behavioral consequences

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Young adults who use methamphetamine may be more vulnerable to age-related brain degeneration when they grow older, new animal research suggests.

“The emergence of behavioral deficits in animals months after methamphetamine discontinuation may be relevant to human methamphetamine abusers,” says Nora Volkow, MD, director of the National Institute for Drug Abuse. “It suggests that even though their current use may not result in deficits, as they age these deficits will become manifest.” Volkow did not participate in the study.

The new work examines the idea that methamphetamine puts young users at risk of developing deficits later in life that are symptomatic of Parkinson’s disease in individuals with depletion of glial derived neurotrophic factor (GDNF), a protein that protects and repairs dopamine in areas of the brain related to movement control. Loss of nerve cells that produce dopamine is a major factor in the disease.

In their work, published August 15 in *The Journal of Neuroscience*, Jacqueline McGinty, PhD, at the Medical University of South Carolina, and her colleagues examined the role of GDNF in mice. At 2.5 months of age, the equivalent of adolescence in humans, mice with a partial GDNF gene deletion were compared to mice without the gene deletion; both were given either methamphetamine or saline injections four times over an eight-hour period. McGinty’s team discovered that the effects of this methamphetamine binge were exacerbated in the mice with the

GDNF deletion. In addition, at 12 months, the GDNF-depleted mice moved significantly less than genetically normal mice treated with methamphetamine.

“Methamphetamine intoxication in any young adult may have deleterious consequences later in life, although they may not be apparent until many decades after the exposure,” says McGinty. “These studies speak directly to the possibility of long-term public health consequences resulting from the current epidemic of methamphetamine abuse among young adults.”

Future studies might involve identifying the reasons for increased vulnerability to methamphetamine in GDNF-depleted mice in order to help minimize the harm methamphetamine causes to the brain..

Source: Society for Neuroscience