New insights into the neural risks and benefits of marijuana use

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Research released today underscores both the dangers and the

therapeutic promise of marijuana, revealing different effects across the lifespan. Marijuana exposure in the womb or during adolescence may disrupt learning and memory, damage communication between brain regions, and disturb levels of key neurotransmitters and metabolites in the brain. In Alzheimer's disease, however, compounds found in marijuana, such as the psychoactive compound delta-9-tetrahydrocannabinol (THC), may improve memory and mitigate some of the disease's symptoms. The findings were presented at Neuroscience 2018.

Marijuana is the most commonly used illicit drug in the United States and its popularity is expected to rise as it is legalized in more places. It is also the illegal drug most commonly used by pregnant women, despite the potential for long-term harm to the fetus. Many people start using marijuana as teenagers—a particularly vulnerable time as the brain is still developing—when there is evidence for increased risk. At the same time, a growing number of people are turning to marijuana for the relief of symptoms of chronic diseases such as epilepsy and multiple sclerosis. These use patterns highlight the need to better understand the long-term effects of marijuana, particularly in sensitive populations such as unborn children and adolescents.

Today's new findings show that:

- Prenatal exposure to THC in rats has lasting effects on metabolites in the brain, making the animal more vulnerable to stress later in life (Robert Schwarcz, abstract 609.12).
- Rats exposed to synthetic compounds that are similar to THC during fetal development show impaired formation of the neural circuits involved in learning and memory as adolescents (Priyanka Das Pinky, abstract 424.17).
- Cannabinoid use by adolescent rats boosts activity in brain pathways responsible for habit formation (José Fuentealba

Evans, abstract 602.07).

- In adolescent rats, cannabinoids may disturb the development of a protein lattice important for balancing excitatory and inhibitory activity in a brain region involved in decision-making, planning, and self-control (Eliza Jacobs-Brichford, abstract 645.09).
- Long-term cannabinoid use alters metabolism and connectivity of brain regions involved in learning and memory in adult mice (Ana M. Sebastião, abstract 778.08).
- Treating Alzheimer's disease mice with the psychoactive compound found in marijuana improves memory and reduces neuronal loss, suggesting a possible therapy for the human disease (Yvonne Bouter, abstract 467.14).

"Today's findings lend new understanding of the complex effects that cannabis has on the brain," said press conference moderator Michael Taffe, Ph.D., of Scripps Research Institute and an expert in substance abuse research. "While it may have therapeutic potential in some situations, it is important to get a better understanding of the negative aspects as well, particularly for pregnant women, teens, and chronic users."

More information: www.brainfacts.org/

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