

Perception of marijuana as a 'safe drug' is scientifically inaccurate

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The nature of the teenage brain makes users of cannabis amongst this population particularly at risk of developing addictive behaviors and suffering other long-term negative effects, according to researchers at the University of Montreal and New York's Icahn School of Medicine at Mount Sinai.

"Of the [illicit drugs](#), [cannabis](#) is most used by teenagers since it is perceived by many to be of little harm. This perception has led to a growing number of states approving its legalization and increased accessibility. Most of the debates and ensuing policies regarding cannabis were done without consideration of its impact on one of the most vulnerable population, namely teens, or without consideration of scientific data," wrote Professor Didier Jutras-Aswad of the University

of Montreal and Yasmin Hurd, MD, PhD, of Mount Sinai. "While it is clear that more systematic scientific studies are needed to understand the long-term impact of adolescent cannabis exposure on [brain](#) and behavior, the current evidence suggests that it has a far-reaching influence on adult addictive behaviors particularly for certain subsets of vulnerable individuals."

The researchers reviewed over 120 studies that looked at different aspects of the relationship between cannabis and the [adolescent brain](#), including the biology of the brain, chemical reaction that occurs in the brain when the drug is used, the influence of genetics and environmental factors, in addition to studies into the "gateway drug" phenomenon. "Data from [epidemiological studies](#) have repeatedly shown an association between cannabis use and subsequent addiction to heavy drugs and psychosis (i.e. schizophrenia). Interestingly, the risk to develop such disorders after cannabis exposure is not the same for all individuals and is correlated with [genetic factors](#), the intensity of cannabis use and the age at which it occurs. When the first exposure occurs in younger versus older adolescents, the impact of cannabis seems to be worse in regard to many outcomes such as mental health, education attainment, delinquency and ability to conform to adult role," Dr Jutras-Aswad said.

Although it is difficult to confirm in all certainty a causal link between drug consumption and the resulting behavior, the researchers note that rat models enable scientists to explore and directly observe the same [chemical reactions](#) that happen in human brains. Cannabis interacts with our brain through chemical receptors (namely cannabinoid receptors such as CB1 and CB2.) These receptors are situated in the areas of our brain that govern our learning and management of rewards, motivated behavior, decision-making, habit formation and motor function. As the structure of the brain changes rapidly during adolescence (before settling in adulthood), scientists believe that the cannabis consumption at this

time greatly influences the way these parts of the user's personality develop. In adolescent rat models, scientists have been able to observe differences in the chemical pathways that govern addiction and vulnerability – a receptor in the brain known as the dopamine D2 receptor is well known to be less present in cases of substance abuse.

Only a minority (approximately one in four) of teenage users of cannabis will develop an abusive or dependant relationship with the drug. This suggests to the researchers that specific genetic and behavioral factors influence the likelihood that the drug use will continue. Studies have also shown that cannabis dependence can be inherited through the genes that produce the cannabinoid receptors and an enzyme involved in the processing of THC. Other psychological factors are also likely involved. "Individuals who will develop cannabis dependence generally report a temperament characterized by negative affect, aggressivity and impulsivity, from an early age. Some of these traits are often exacerbated with years of cannabis use, which suggests that users become trapped in a vicious cycle of self-medication, which in turn becomes a dependence" Jutras-Aswad said.

The researchers stress that while a lot remains unknown about the mechanics of cannabis abuse, the body of existing research has clear implications for society. "It is now clear from the scientific data that cannabis is not harmless to the adolescent brain, specifically those who are most vulnerable from a genetic or psychological standpoint. Identifying these vulnerable adolescents, including through genetic or psychological screening, may be critical for prevention and early intervention of addiction and psychiatric disorders related to cannabis use. The objective is not to fuel the debate about whether cannabis is good or bad, but instead to identify those individuals who might most suffer from its deleterious effects and provide adequate measures to prevent this risk" Jutras-Aswad said. "Continuing research should be performed to inform public policy in this area. Without such systematic,

evidenced-based research to understand the long-term effects of cannabis on the developing brain, not only the legal status of cannabis will be determined on uncertain ground, but we will not be able to innovate effective treatments such as the medicinal use of cannabis plant components that might be beneficial for treating specific disorders," Dr Hurd said.

Provided by University of Montreal

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