

# Marijuana Use in Adolescence, But Not Adulthood, Linked to Permanent Brain Damage

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**Teens who regularly use marijuana may be at risk for developing serious psychiatric disorders such as schizophrenia, a new study suggests.**

This is because regular marijuana use in adolescence, but not adulthood, may permanently damage brain function and cognition, according to new research.

Scientists from the University of Maryland School of Medicine hope that the latest findings will help warn policy makers contemplating legalizing marijuana about the potential long-term dangers of the drug.



- "Over the past 20 years, there has been a major controversy about the long-term effects of marijuana, with some evidence that use in adolescence could be damaging," senior author Asaf Keller, Ph.D., Professor of Anatomy and Neurobiology at the University of Maryland School of Medicine said in a news release.

Previous studies have suggested that children who start using marijuana before the age of 16 are significantly more likely to develop permanent cognitive deficits and psychiatric disorders like schizophrenia.

"There likely is a genetic susceptibility, and then you add marijuana during adolescence and it becomes the trigger," Keller explained.

**The current study wanted to identify the biological evidence and determine whether marijuana use during adolescence really comes with permanent health risks.**

In the study, researchers examined the cortical oscillations in mice. Cortical oscillations, or patterns of neuronal activity, are believed to underlie the brain's various functions. Researchers say that these oscillations are very abnormal in people with schizophrenia and in other psychiatric disorders.

The study revealed that mice exposed to very low doses of the active ingredient in marijuana for 20 days had "grossly altered" cortical oscillations in adulthood. Researchers said these mice also exhibited impaired cognitive abilities.

"We also found impaired cognitive behavioral performance in those mice. The striking finding is that, even though the mice were exposed to very low drug doses, and only for a brief period during adolescence, their brain abnormalities persisted into adulthood," lead researcher Sylvina Mullins Raver, a Ph.D. candidate in the Program in Neuroscience in the Department of Anatomy and Neurobiology at the University of Maryland School of Medicine, said in a statement.

After repeating the experiment in adult mice, researchers found that the cortical oscillations and ability to perform cognitive behavioral tasks remained normal in mice exposed to the drug only after they've fully matured. Researchers said this suggests that it was only marijuana exposure during the critical period of adolescence that impaired cognition through this mechanism.

Further analysis revealed that the frontal cortex, the brain area that controls executive functions such as planning and impulse control, is significantly more affected by the drugs during adolescence. Researchers noted that the frontal cortex is also the area most affected in schizophrenia.

While the latest study was on mice, researchers believe that the findings have implications for humans as well. They say the next step is to continue researching the underlying mechanisms that cause these changes in cortical oscillations.

"The purpose of studying these mechanisms is to see whether we can reverse these effects," explained Keller. "We are hoping we will learn more about schizophrenia and other psychiatric disorders, which are complicated conditions. These cognitive symptoms are not affected by medication, but they might be affected by controlling these cortical oscillations."

The [latest findings are published in the journal \*Neuropsychopharmacology\*](#).