Cannabis use may influence cortical maturation in adolescent males

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Male teens who experiment with cannabis before age 16, and have a high genetic risk for schizophrenia, show a different brain development trajectory than low risk peers who use cannabis.

The discovery, made from a combined analysis of over 1,500 youth, contributes to a growing body of evidence implicating cannabis use in adolescence and schizophrenia later in life.

The study was led by Baycrest Health Sciences' Rotman Research Institute in Toronto and is reported in *JAMA Psychiatry* today, ahead of print publication.

Adolescence is a period of vulnerability with regard to the emergence of psychotic disorders, especially in boys. Environmental influences on the

continuing maturation of neural circuits during adolescence are of great interest to neuroscientists and medical professionals.

"Given the solid epidemiologic evidence supporting a link between cannabis exposure during adolescence and schizophrenia, we investigated whether the use of cannabis during early adolescence (by 16 years of age) is associated with variations in brain maturation as a function of genetic risk for schizophrenia," said senior author Tomas Paus, MD, PhD, the Anne and Max Tanenbaum Professor and Chair in Population Neuroscience at Baycrest, University of Toronto, and the Dr. John and Consuela Phelan Scholar at Child Mind Institute, New York.

"Our findings suggest that cannabis use might interfere with the maturation of the cerebral cortex in male adolescents at high risk for schizophrenia by virtue of their polygenic risk score. Their brains showed lower cortical thickness compared with low-risk male participants and low-or-high risk female participants who used the drug."

Dr. Paus, a prominent researcher and pioneer in the field of population neuroscience, strongly cautioned that more research is needed to determine whether lower cortical thickness actually increases the probability of schizophrenia in at-risk males later in life.

The research team used observations from three large samples of typically developing youth in Canada and Europe. Researchers examined data from a total of 1,577 participants (aged 12 - 21 years, 57% male / 43% female), that included information on cannabis use, brain imaging results, and polygenic risk score for schizophrenia. The data came from the Saguenay Youth Study in Quebec (Canada), the Avon Longitudinal Study of parents and Children in the U.K., and the IMAGEN Study in the U.K., Germany, France and Ireland.

According to the National Alliance on Mental Illness: "It is too early to

classify schizophrenia as either a neurodevelopmental (impairment of the growth and development of the brain) or a neurodegenerative (progressive loss of structure or function of neurons) disorder, as both seem to occur over the course of the illness. Research strongly suggests the emergence of schizophrenia is a result of both genetic and environmental factors."

"Brain aging is about brain development," said Dr. Paus. "Our study shows the importance of understanding environmental influences on the developing brain in early life as this can have important implications for brain health through the lifespan."

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