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The use and misuse of alcohol and marijuana can be traced to a common set of genes

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Marijuana is the most commonly used illicit drug in the United States. Roughly eight to 12 percent of marijuana users are considered "dependent" and, just like alcohol, the severity of symptoms increases with heavier use. A new study has found that use and misuse of alcohol and marijuana are influenced by a common set of genes.

Results will be published in the March 2010 issue of *Alcoholism: Clinical & Experimental Research* and are currently available at Early View.

"Results from a large annual survey of high-school students show that in 2008, 41.8 percent of 12th graders reported having used marijuana," explained Carolyn E. Sartor, a research instructor at Washington University School of Medicine and corresponding author for the study. "Although many may have used the drug on only a few occasions, 5.4 percent of 12th graders reported using it daily within the preceding month."

"The active ingredient in marijuana is THC, which mimics natural cannabinoids that the brain produces," added Christian Hopfer, associate professor at the University of Colorado School of Medicine. "The cannabinoid system is critical for learning, memory, appetite, and pain perception. Most users of marijuana will not develop an 'addiction' to it, but perhaps one in 12 will. What is not commonly appreciated about marijuana use is that strong evidence has emerged that it increases the risk of developing mental illnesses and possibly exacerbates pre-existing mental illnesses."

"Like any drug, marijuana can be used in a way that negatively impacts quality of life, interfering with functioning at school or work or leading to problems with family and friends," said Sartor. "Although at least three of six symptoms listed in the Diagnostic and Statistical Manual of Mental Disorders - Fourth Edition (DSM-IV) are needed to meet full criteria for cannabis (marijuana) dependence … the presence of even one or two of these symptoms could create distress or interfere with day-to-day functioning. There is strong evidence for a genetic component to use and dependence on marijuana as well as alcohol, and the use (and misuse) of these substances frequently occur together."

Researchers examined 6,257 individuals (2,761 complete twin pairs and 735 singletons) listed in the Australian Twin Registry, 24 to 36 years of age. Alcohol and marijuana use histories were gathered in telephone diagnostic interviews and used to derive levels of alcohol consumption, frequency of marijuana use, and DSM-IV alcohol and cannabis dependence symptoms.

"Our findings indicate that … many of the same genetic factors that contribute to alcohol use also contribute to marijuana use," said Sartor. "Likewise, alcohol dependence symptoms and cannabis dependence symptoms can be traced to some of the same genetic influences. For both alcohol and marijuana, the majority of genetic factors that contribute to use also contribute to dependence symptoms."

"In other words," said Hopfer, "the genetic influences on drug use are not specific to individual drugs, but seem to influence a general tendency to engage in drug use. This is important to note because there is a tendency to study drugs in isolation - alcohol, tobacco, marijuana, cocaine, etc. These findings add support to the notion of common mechanisms underlying all addictions."

"The fact that very little of the environmental influences on alcohol and

marijuana use, or on alcohol and cannabis dependence symptoms, could be traced to common sources indicates that there may be important distinctions between those environmental factors that influence alcohol-related outcomes and those that influence marijuana-related outcomes," said Sartor. "Identifying alcohol- and marijuana-specific risk factors is an important next step in this line of research."

"Marijuana research is relatively sparse compared to alcohol or nicotine research," added Hopfer. "However, if you look at reports of at least adolescents and young people using, it becomes clear that marijuana use, including daily marijuana use, is quite common and the effects of this are not well understood. The mental illness/marijuana connection has not received much press, although I think the evidence has grown substantially that marijuana is a causal risk factor for the development of mental illness."

Provided by Alcoholism: Clinical & Experimental Research