March 2014 Health Notes by Evelyn Ames Physiological Effects of Marijuana

"Marijuana—often called *pot, grass, reefer, weed, herb, Mary Jane*, or *MJ*—is a greenish-gray mixture of the dried, shredded leaves, stems, seeds, and flowers of *Cannabis sativa*—the hemp plant. Most users smoke marijuana in hand-rolled cigarettes called *joints*, among other names; some use pipes or water pipes called *bongs*. Marijuana cigars, or *blunts*, are also popular. To make blunts, users slice open cigars, remove some of the tobacco, and mix the remainder with marijuana. Marijuana also is used to brew tea and sometimes is mixed into foods. http://www.drugabuse.gov/publications/marijuana-abuse/what-marijuana.

When pot is smoked, the main active ingredient, Delta-9-tetrahydrocannabinol or THC, rapidly passes from the lungs into the bloodstream and circulates throughout the body (the blood-brain barrier does not prevent THC from entering the brain). Effects usually last from 1 to 3 hours. When it is consumed in beverages or food, effects take longer to be felt (about ½ to an hour) and last longer (for about 4 hours). Note that often other ingredients/substances are added and the user generally does not know what those are. Due to enhanced cultivation practices, marijuana is generally more potent compared to previous decades.

How marijuana effects the brain. "THC binds to specific sites called *cannabinoid receptors* (CBRs) located on the surface of nerve cells. These receptors are found in high-density in areas of the brain that influence pleasure, memory, thinking, concentration, movement, coordination, and sensory and time perception. … THC activates the reward system in the same way that nearly all drugs of abuse do: by stimulating brain cells to release the chemical dopamine" http://www.drugabuse.gov/publications/marijuana-abuse/how-does-marijuana-produce-its-effects). Marijuana:

- impairs a person's ability to form new memories
- disrupts coordination and balance by binding to receptors in the cerebellum and basal ganglia (this is area that regulates balance, posture, coordination, and reaction time).
- interferes with learning, doing complicated tasks, participating in athletics, and driving motorized vehicles and riding bicycles.

Reviewers of research studies at NIDA write that "Our understanding of marijuana's long-term brain effects is limited. Research findings on how chronic cannabis use affects brain *structure*, for example, have been inconsistent. It may be that the effects are too subtle for reliable detection by current techniques. A similar challenge arises in studies of the effects of chronic marijuana use on brain *function*. Although imaging studies (functional MRI; fMRI) in chronic users do show some consistent alterations, the relation of these changes to cognitive functioning is less clear. This uncertainty may stem from confounding factors such as other drug use, residual drug effects (which can occur for at least 24 hours in chronic users), or withdrawal symptoms in long-term chronic users."

Effects on General Physical Health. "Within a few minutes after inhaling marijuana smoke, an individual's heart rate speeds up, the bronchial passages relax and become enlarged, and blood vessels in the eyes expand, making the eyes look red. The heart rate—normally 70 to 80 beats per minute—may increase by 20 to 50 beats per minute, or may even double in some cases. Taking other drugs with marijuana can amplify this effect." "Limited evidence suggests that a person's risk of heart attack during the first hour after smoking marijuana is four times his or her usual risk. This observation could be partly explained by marijuana raising blood pressure (in some cases) and heart rate and reducing the blood's capacity to carry oxygen. Such possibilities

need to be examined more closely, particularly since current marijuana users include adults from the baby boomer generation, who may have other cardiovascular risks that may increase their vulnerability." "The smoke of marijuana, like that of tobacco, consists of a toxic mixture of gases and particulates, many of which are known to be harmful to the lungs. Someone who smokes marijuana regularly may have many of the same respiratory problems that tobacco smokers do, such as daily cough and phlegm production, more frequent acute chest illnesses, and a greater risk of lung infections." http://www.drugabuse.gov/publications/marijuana-abuse/how-does-marijuana-produce-its-effects

Grandparents take note: How marijuana use affects school, work, and social life?
http://www.drugabuse.gov/publications/marijuana-abuse/how-does-marijuana-use-affect-school-work-social-life

- Marijuana's negative effects on attention, memory, and learning can last for days or weeks after the acute effects of the drug wear off.
- Someone who smokes marijuana daily may be functioning at a reduced intellectual level most or all of the time.
- Evidence suggests that, compared with their nonsmoking peers, students who smoke marijuana tend to get lower grades and are more likely to drop out of high school.
- A meta-analysis of 48 relevant studies—one of the most thorough performed to date—found cannabis use to be associated consistently with reduced educational attainment (e.g., grades and chances of graduating). Marijuana use among middle and high school aged youngsters may make them "dumber!" Also of concern is what is happening to the young person's developing brain during this period of adolescent growth. Learning how to handle stress and other societal challenges is critical during adolescence.
- However, a *causal* relationship is not yet proven between cannabis use by young people and psychosocial harm.
- Study among postal workers found that employees who tested positive for marijuana on a pre-employment urine drug test had 55 percent more industrial accidents, 85 percent more injuries, and a 75-percent increase in absenteeism compared with those who tested negative for marijuana use.

Margaret Haney, professor of clinical neuroscience and co-director of the Substance Use Research Center at Columbia University, debunks 5 myths about the physiological effects of pot.

- Marijuana is neither all good or all bad. Example: potential medical benefits include reducing nausea and vomiting from chemotherapy. Smoking is not the best way to administer because "it produces changes in lung function consistent with the development of cancer." Marijuana has more tar than cigarettes and pot "smokers perform worse than nonsmokers on tests of respiratory function."
- Marijuana can produce abuse and dependence but has a lower risk compared to alcohol and nicotine.
- Users often think marijuana is not addictive but data show that dependence can develop. "Epidemiological data suggest that about 42 percent of the U.S. population has tried marijuana and about 9 percent met criteria for dependence on marijuana at some point in their lifetime, while 15 percent met criteria for dependence on alcohol and 32 percent for tobacco." "Withdrawal from marijuana is associated with increased anger, irritability, anxiety, decreased appetite, weight loss, restlessness, disturbances in sleep onset and maintenance, and craving. Symptoms usually start after 12-24 hours after last use, peak in 2-4 days and last about 2-3 weeks."

- "Adolescents and people with psychiatric illness (e.g., depression, anxiety, schizophrenia) or with other drug dependencies appear to be at a greater risk of developing dependence."
- http://www.britannica.com/blogs/2010/10/debunking-myths-about-the-physiological-effects-of-marijuana-5-questions-for-neurobiologist-margaret-haney/

Sites for information: NIDA Home Page: http://www.drugabuse.gov NIDA Drug Facts: http://www.drugabuse.gov/publications/term/160/DrugFacts
Easy-to-Read Drug Facts: http://easyread.drugabuse.gov

Driving a car while "stoned" on marijuana and alcohol is a recipe for a deadly car crash!