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Is Marijuana Medicine?

The marijuana plant contains several chemicals that may prove useful for treating a range of illnesses or symptoms, leading many people to argue that it should be made legally available for medical purposes. In fact, a growing number of states (20 as of March, 2014) have legalized marijuana's use for certain medical conditions.

The term "medical marijuana" is generally used to refer the whole unprocessed marijuana plant or its crude extracts, which are not recognized or approved as medicine by the U.S. Food and Drug Administration (FDA). But scientific study of the active chemicals in marijuana, called *cannabinoids*, has led to the development of two FDA-approved medications already, and is leading to the development of new pharmaceuticals that harness the therapeutic benefits of cannabinoids while minimizing or eliminating the harmful side effects (including the "high") produced by eating or smoking marijuana leaves.

Are "Medical" and "Street" Marijuana Different?

In principle, no. Most marijuana sold in dispensaries as medicine is the same quality and carries the same health risks as marijuana sold on the street.

However, given the therapeutic interest in cannabidiol (CBD) to treat certain conditions such as childhood epilepsy, strains with a higher than normal CBD:THC ratio have been specially bred and sold for medicinal purposes; these may be less desirable to recreational users because of their weaker psychoactive effects.

What Are Cannabinoids and How Might They Be Useful Medically?

Cannabinoids are a large family of chemicals related to delta-9-tetrahydrocannabinol (THC), marijuana's main psychoactive (mind-altering) ingredient. Besides THC, the marijuana plant contains over 100 other cannabinoids. Scientists and manufacturers of "designer" drugs have also synthesized numerous cannabinoids in the laboratory (some of which are extremely potent and, when abused, have led to serious health consequences). The body also produces its own cannabinoid chemicals (called endocannabinoids), which play a role in regulating pleasure, memory, thinking, concentration, movement, coordination, sensory and time perception, appetite, and pain.

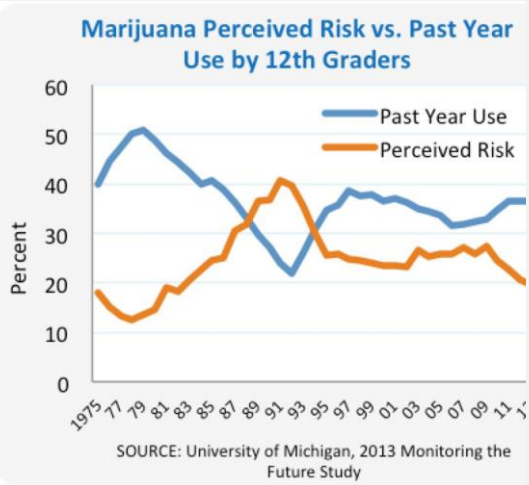
Currently the two main cannabinoids of interest therapeutically are THC and cannabidiol (CBD), found in varying rati-

os in the marijuana plant. THC stimulates appetite and reduces nausea (and there are already approved THC-based medications for these purposes), but it may also decrease pain, inflammation, and spasticity. CBD is a non-psychoactive cannabinoid that may also be useful in reducing pain and inflammation, controlling epileptic seizures, and possibly even treating psychosis and addictions.

Research funded by the NIH is actively investigating the possible therapeutic uses of THC, CBD, and other cannabinoids to treat autoimmune diseases, cancer, inflammation, pain, seizures, substance use disorders, and other psychiatric disorders.

Misperceptions of Safety

Growing acceptance of medical marijuana (and now its legalization for recreational use in 2 states) may be influencing how young people perceive the harm associated with marijuana use generally. Research shows that as high school seniors' perception of marijuana's risks goes down, their marijuana use goes up, and vice versa (see graph). Surveys show significant recent increases among 10th- and 12th-graders for daily, current, and past-year marijuana use.



Source: University of Michigan, 2013 Monitoring the Future Study

What Medications Contain Cannabinoids?

An FDA-approved drug called **Dronabinol** (Marinol®) contains THC and is used to treat nausea caused by chemotherapy and wasting disease (extreme weight loss) caused by AIDS. Another FDA-approved drug called **Nabilone** (Cesamet®) contains a synthetic cannabinoid similar to THC and is used for the same purposes.

A drug called **Sativex®**, which contains approximately equal parts THC and CBD, is currently approved in the UK and several European countries to treat spasticity caused by multiple sclerosis (MS), and it is now in Phase III clinical trials in the U.S. to establish its effectiveness and safety in treating cancer pain.

Although it has not yet undergone clinical trials to establish its effectiveness and safety (necessary to obtain FDA approval), a CBD-based drug called **Epidiolex™** has recently been created to treat certain forms of childhood epilepsy. This was prompted by anecdotal reports that some parents of children with a severe form of epilepsy called Dravet Syndrome report success in using a high-CBD strain of marijuana to control seizures in their children.

Why Isn't the Marijuana Plant an FDA-Approved Medicine?

The FDA requires carefully conducted studies in large numbers of patients (hundreds to thousands) to accurately assess the benefits and risks of a potential medication. Thus far, there have not been enough large-scale clinical trials showing that benefits of the marijuana plant (as opposed to specific cannabinoid constituents) outweigh its risks in patients with the symptoms it is meant to treat.

The known safety concerns of marijuana include impairment of short-term memory; altered judgment and decision-making; mood effects, including severe anxiety (paranoia) or even psychosis (loss of touch with reality), especially following high-dose exposures. Marijuana also significantly reduces motor coordination and slows reaction time, which makes it very dangerous to use before driving a car. Additionally, although we do not yet know whether marijuana smoking contributes to lung cancer risk, it can cause or worsen other respiratory problems such as bronchitis or chronic cough.

Are People With Health Problems More Vulnerable to Marijuana's Risks?

Regular medicinal use of marijuana is a relatively new phenomenon, and for that reason its effects on people who are weakened or vulnerable because of illness are still relatively unknown. It is possible that people suffering from diseases such as cancer or AIDS may be more vulnerable to the drug's various adverse effects. More research will be needed to determine if this is the case.

Growing evidence is showing that marijuana may be particularly harmful for young people: It may cause long-term or even permanent impairment in cognitive ability and intelligence when used regularly during adolescence, when the brain is still developing. There is also some evidence that marijuana use during pregnancy may be associated with neurological problems in babies and impaired school performance later in childhood.

Another safety concern is that, contrary to common belief, marijuana can be addictive: About 9% of people who try marijuana will become addicted to it. The number goes up to about 1 in 6 among people who start using marijuana as teenagers, and to 25-50% among daily users.

Learn More

For more information on marijuana and its health effects, visit http://www.drugabuse.gov/publications/drugfacts/marijuana

For information on marijuana and cannabinoid research conducted by NIDA and NIH, see http://www.drugabuse.gov/marijuana-research-nida