



# Everything you wanted to know about medical marijuana, but were too afraid to ask

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15 February 2015

**SAN JOSE, CALIFORNIA**—Humans have been using cannabis for more than 5000 years. So why don't scientists know more about it? Three experts gathered here at the annual meeting of AAAS (which publishes *Science*) to discuss what scientists and doctors know about the drug and what they still need to learn. "By the end of this session, you'll know more about cannabis than your physician does," said Mark Ware, a family physician at the McGill University Health Center in Montreal, Canada, who organized the talk.

## **How does marijuana work?**

Our brains are primed to respond to marijuana, because "there are chemicals in our own bodies that act like THC [the psychoactive ingredient in pot]" and other compounds in cannabis called cannabinoids, explained Roger Pertwee, a neuropharmacologist at the University of Aberdeen in the United Kingdom who has studied cannabinoids since the 1960s. Cannabinoids produced by our bodies or ingested through marijuana use react with a series of receptors in our brains called the endocannabinoid system, which is involved in appetite, mood, memory, and pain sensation. Scientists have discovered 104 cannabinoids so far, but "the pharmacology of most of them has yet to be investigated," Pertwee said.

## **What are the known medical uses of marijuana?**

Marijuana has been used for decades to stimulate appetite and treat nausea and vomiting, especially in patients undergoing chemotherapy. Its success in easing the symptoms of multiple sclerosis patients led to the development of Sativex, a drug

manufactured by GW Pharmaceuticals that includes THC and cannabidiol, a cannabinoid that isn't psychoactive.

Marijuana or cannabis-derived drugs have shown promise in treating anxiety, depression, post-traumatic stress disorder, epilepsy, and neuropathic pain, but much of the evidence is still anecdotal and is awaiting confirmation in clinical trials. "We're a little short on evidence to make good guidelines" for prescribing cannabis for different conditions, Ware said.

### **Why haven't there been more clinical trials?**

At least in the United States, it's difficult to get funding for a cannabis clinical trial, said Igor Grant, a psychiatrist at the University of California, San Diego, who is one of the few scientists who has run clinical trials with the drug. Pharmaceutical companies prefer to invest in developing drugs they can patent, and the federal government currently lists marijuana as a Schedule I drug, or a dangerous substance with no medical benefit. That classification means researchers who want to work with the drug need approval from multiple federal agencies, including the Drug Enforcement Administration, Grant explained. "In the U.S. there are certainly a number of hurdles and processes one has to go through, and I think this does inhibit ordinary investigators who don't have the means or the knowledge or the staying power to get through the system."

Grant supports reclassifying cannabis as a Schedule III drug, which are recognized as having an accepted medical use and less potential for abuse for Schedule I and II drugs.

### **What are the safety concerns with medical marijuana?**

"There is no evidence for long-term damaging effects in adults," Grant said. Preliminary data linking marijuana use to an increased risk of schizophrenia have not been supported by further studies. The only confirmed long-term effect of marijuana use by adults is chronic bronchitis, he said.

The situation may be different for children and adolescents, whose brains are still developing. A study found that people who were heavy marijuana users as teenagers had lower IQs than their peers 20 years later, but the sample size was extremely small, Grant explained. More recently, scientists have started imaging the brains of teenagers before and after they start using marijuana, but the research needs to continue for much longer to fully understand how cannabis affects the developing brain. "The data are very weak at the moment," Grant said.