Fact Sheet: Medical Marijuana

State of the Science

In the June 5, 2014 issue of the *New England Journal of Medicine*, the authors who are leading scientists state, “There is also a need to improve our understanding of how to harness the potential medical benefits of the marijuana plant without exposing people who are sick to its intrinsic risks.”

They note that the Institute of Medicine acknowledged the potential benefits of smoking marijuana in stimulating appetite, combatting chemotherapy-induced nausea, severe pain, and some forms of spasticity, but point out that the Institute stressed research efforts should focus on “the therapeutic potential of synthetic or pharmacologically pure cannabinoids,” components unique to the cannabis plant.

“Some physicians continue to prescribe marijuana for medicinal purposes despite limited evidence of a benefit. This practice raises particular concern with regard to long-term use by vulnerable populations,” they warn.

They include a table summarizing what is known—and not known—which we reproduce here without footnotes:

Clinical Conditions with Symptoms That May Be Relieved by Treatment with Marijuana or Other Cannabinoids.*

Glaucoma

Early evidence of the benefits of marijuana in patients with glaucoma (a disease associated with increased pressure in the eye) may be consistent with its ability to effect a transient decrease in intraocular pressure, but other, standard treatments are currently more effective. THC, cannabinol, and nabilone (a synthetic cannabinoid similar to THC), but not cannabidiol, were shown to lower intraocular pressure in rabbits. More research is needed to establish whether molecules that modulate the endocannabinoid system may not only reduce intraocular pressure but also provide a neuroprotective benefit in patients with glaucoma.

Nausea

Treatment of the nausea and vomiting associated with chemotherapy was one of the first medical uses of THC and other cannabinoids. THC is an effective antiemetic agent in patients undergoing chemotherapy, but patients often state that marijuana is more effective in suppressing nausea. Other, unidentified compounds in marijuana may enhance the effect of THC (as appears to be the case with THC and cannabidiol, which operate through different antiemetic mechanisms). Paradoxically, increased vomiting (hyperemesis) has been reported with repeated marijuana use.

AIDS-associated anorexia and wasting syndrome

Reports have indicated that smoked or ingested cannabis improves appetite and leads to weight gain and improved mood and quality of life among patients with AIDS. However, there is no long-term or rigorous evidence of a sustained effect of cannabis on AIDS-related morbidity and mortality, with an acceptable safety profile, that would justify its incorporation into current clinical practice for patients who are receiving effective antiretroviral therapy. Data from the few studies that have explored the potential therapeutic value of cannabinoids for this patient population are inconclusive.

Chronic pain

Marijuana has been used to relieve pain for centuries. Studies have shown that cannabinoids acting through central CB1 receptors, and possibly peripheral CB1 and CB2 receptors, play important roles in modeling nociceptive responses in various models of pain. These findings are consistent with reports that marijuana may be effective in ameliorating neuropathic pain, even at very low levels of THC (1.29%). Both marijuana and dronabinol, a pharmaceutical formulation of THC, decrease pain, but dronabinol may lead to longer-lasting reductions in pain sensitivity and lower ratings of rewarding effects.

Inflammation

Cannabinoids (e.g., THC and cannabidiol) have substantial anti-inflammatory effects because of their ability to induce apoptosis, inhibit cell proliferation, and suppress cytokine production. Cannabidiol has attracted particular interest as an anti-inflammatory agent because of its lack of psychoactive effects. Animal models have shown that cannabidiol is a promising candidate for the treatment of rheumatoid arthritis and for inflammatory diseases of the gastrointestinal tract (e.g., ulcerative colitis and Crohn's disease).

Multiple sclerosis

Nabiximols (Sativex, GW Pharmaceuticals), an oromucosal spray that delivers a mix of THC and cannabidiol, appears to be an effective treatment for neuropathic pain, disturbed sleep, and spasticity in patients with multiple sclerosis. Sativex is available in the United Kingdom, Canada, and several other countries and is currently being reviewed in phase 3 trials in the United States in order to gain approval from the Food and Drug Administration.

Epilepsy

In a recent small survey of parents who use marijuana with a high cannabidiol content to treat epileptic seizures in their children, 11% (2 families out of the 19 that met the inclusion criteria) reported complete freedom from seizures, 42% (8 families) reported a reduction of more than 80% in seizure frequency, and 32% (6 families) reported a reduction of 25 to 60% in seizure frequency. Although such reports are promising, insufficient safety and efficacy data are available on the use of cannabis botanicals for the treatment of epilepsy. However, there is increasing evidence of the role of cannabidiol as an antiepileptic agent in animal models.

* AIDS denotes acquired immunodeficiency syndrome, CB1 cannabinoid-1 receptor, and CB2 cannabinoid-2 receptor, HIV human immunodeficiency virus, and THC tetrahydrocannabinol.

Source: Nora D. Volkow, M.D., Ruben D. Baler, Ph.D., Wilson M. Compton, M.D., and Susan R.B. Weiss, Ph.D. "Adverse Health Effects of Marijuana Use." *The New England Journal of Medicine*, June 5, 2014, pp 2219-2227. Address reprint requests to Dr. Volkow at the National Institute on Drug Abuse, 6001 Executive Blvd., Rm. 5274, Bethesda, MD 20892, or at nvolkow@nida.nih.gov.