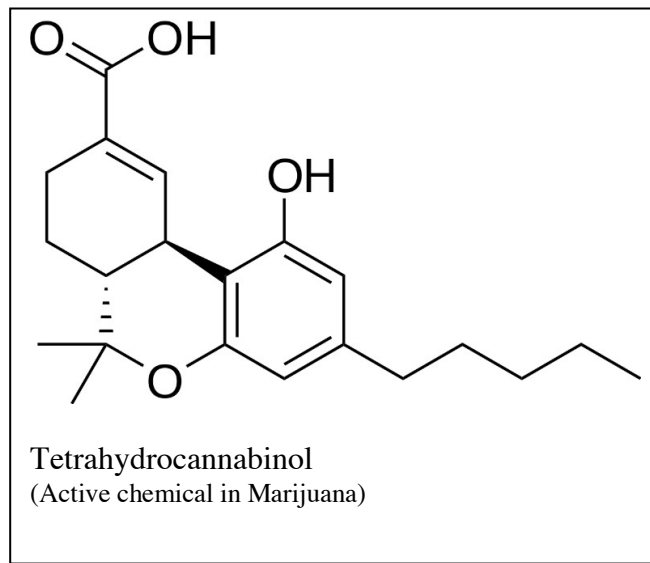


A Small Dose of Marijuana Or An Introduction to the Health Effects of Cannabis (or Marijuana)

By Steven G. Gilbert, PhD, DABT



Dossier

Name: Marijuana (THC, CBD)

Use: drug in leaves, smoke, or chewing

Source: Planted many varieties

Recommended daily intake: none (not essential)

Absorption: lung – quick route to the brain - seconds, skin, stomach much slower 30+ minutes

Sensitive individuals: fetus, children

Toxicity/symptoms: dependency producing, acute effects: nausea, vomiting, salivation, diarrhea, dizziness, mental confusion, weakness

Regulatory facts: Federal vs State regulations

- Federal: classified as Schedule I drug, with a high potential for abuse and no accepted medical use
- Many states have decriminalized cannabis and openly allow the sale of THC and various CBD products

General facts: long history of use; most widely used drug, over 100 chemicals in typical plant

Environmental: growing demand

Recommendations: use with caution, avoid if considering pregnancy

In prospective

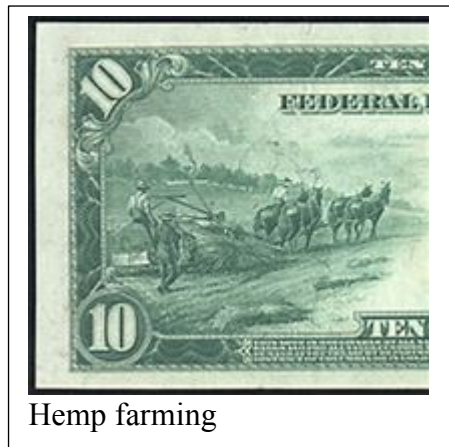
“If we are going to live so intimately with these chemicals eating and drinking them, taking them into the very marrow of our bones-we had better know something about their nature and their power.”

Rachel Carson, *Silent Spring*

Ten Dollar Bill Made From Hemp

In 1914 the first Federal Reserve Bank note were issued after being printed on hemp paper. The front side depicted Andrew Jackson, slave owner and president (1829-1837) above the signature of Andrew Mellon, the Secretary of the Treasury under multiple presidential administrations. Mellon was one of the richest people in the US and head of several banks and oil companies, including Standard Oil, which is today Exxon Mobile, one of the the world’s largest oil companies. He was also the uncle of Harry Anslinger, the first leader of the Federal Bureau of Narcotics, 1931-1961. Anslinger champing of Cannabis and Hemp Prohibition was a great

cheerleader of the Reefer Madness misinformation campaign and the primary person responsible for marijuana prohibition. The back of the bill depicted a farming scene on the left half and an early industry scene complete with smoke pollution pouring out of smoke stacks. The hemp *Farming*, a scene in Manchester Township, York County, Pennsylvania, was engraved by Marcus W Baldwin. Hemp was a useful and important commodity.



Hemp farming

Introduction to Cannabis / Marijuana

The Cannabis plant, often referred to as Marijuana, is truly a marvel, a natural wonder, which has made it very hard to control or regulate. It also provides a fascinating look into humans as the attempt to regulate the use of a recreational substances. The plant fiber, used for rope, and cloth about 10,000 years ago is usually called hemp. The age a

first use makes hemp one of the first plants purposefully cultivated by humans. The use as a recreational occurred about 2,700 BCE by the Chinese. The use of Cannabis as a medicine and mind altering plant attracted a wide range of interests from religious and government officials. Acceptance of cannabis by the rulers of society and the general people varied enormously depending on location and culture.

History Cannabis

A quick search of the web on marijuana or cannabis produces all kinds of information on the use and misuse of the cannabis plant. Below lists just a few of the highlights from a far more extensive list of events involving cannabis.

Time line

- 8000 BCE: used to make cloth and rope
- 2700 BCE: first medicinal or ritual purposes by Shen Nung a father of Chinese medicine
- 1484: Pope Innocent VIII labels cannabis as an unholy sacrament of the satanic mass and issues a papal ban on cannabis medicines
- 1563: Queen Elizabeth I ordered land owners with 60 acres or more to grow cannabis or face a fine
- 1500s: mandatory cultivation of Hemp ordered throughout the New World, ordered all families to plant one teaspoon of hemp seed.
- In preparation of war, mandatory cultivation laws were passed, and colonists increased their production of Hemp, for paper and clothes
- 1911: variety of states ban cannabis/Marijuana – effectively setting up the drug wars
- 1914: harvesting of hemp depicted on ten dollar bill was oriented on hemp paper
- 1937: The Marihuana Tax Act of 1937 effectively outlawed marijuana on the national level
- 1970: The Controlled Substances Act is enacted. Cannabis is classified as a Schedule I drug, with a high potential for abuse and no accepted medical use, thereby prohibiting its use for any purpose.
- 1973: Oregon became the first state to decriminalize cannabis, variety of states follow this lead
- 1996: California became the first state to legalize medical cannabis with the approval of a voter Proposition 215
- 2012: Colorado and Washington become the first two states to legalize the recreational use of cannabis, many states follow these examples
- 2018: The 2018 farm bill legalizes low-THC hemp nationwide and effectively releases hemp-derived cannabidiol (CBD) from the Controlled Substances Act
- 1972: President Richard Nixon opposes the policy of cannabis decriminalization.

- 1977: President Jimmy Carter endorses legislation to federally decriminalize cannabis, declaring that "Penalties against possession of a drug should not be more damaging to an individual than the use of the drug itself."
- 1980: Presidential candidate Ronald Reagan warns that "Leading medical researchers are coming to the conclusion that marijuana ... is probably the most dangerous drug in the United States."

(Some of the historical timeline markers were taken from Wikipedia "Timeline of cannabis laws in the United States".

https://en.wikipedia.org/wiki/Timeline_of_cannabis_laws_in_the_United_States)

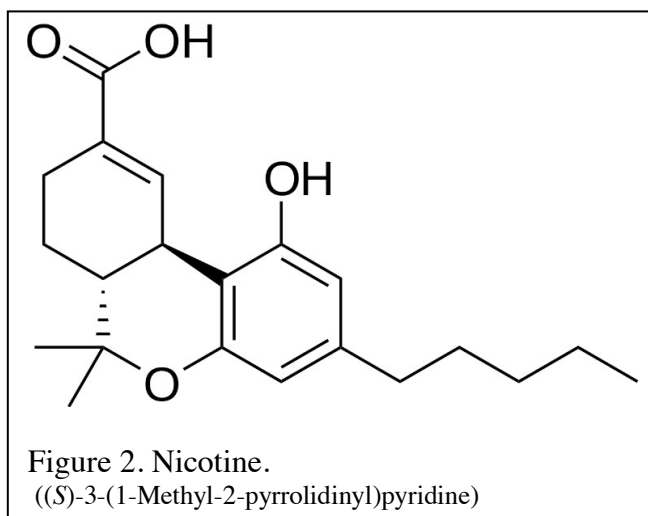
Mechanism of Action

The primary neuroactive compound in Cannabis is Tetrahydrocannabinol (THC). THC is one of over 100 cannabinoids produced by cannabis. Depending on the strain of cannabis the plant may have approximately 3 to 20% of THC. There is some evidence that THC can reduce nausea and vomiting during anticancer drugs, improve appetite in people with HIV/AIDS, or to treat chronic pain and muscle spasms. Treatment of other conditions have been proposed but there has been on limited studies do to restrictions applied by many governments.

The recreational effects of Cannabis are well known to 100s of million people around the world. US Federal lists THC as a Schedule I by US federal law under the Controlled Substances Act for having "no accepted medical use" and "lack of accepted safety". However, dronabinol, a manufactured pharmaceutical form of THC, has been approved by the FDA as an appetite stimulant for people with AIDS and an antiemetic for people receiving chemotherapy. This controversy between legal vs illegal Cannabis has been going for centuries. Schedule I by US federal law[15] under the Controlled Substances Act for having "no accepted medical use" and "lack of accepted safety". However, dronabinol, a pharmaceutical form of THC, has been approved by the FDA as an appetite stimulant for people with AIDS and an antiemetic for people receiving chemotherapy.

There is no lethal dose of THC. Dogs and monkeys were given 9,000 mg/kg with no lethal effects.

The mechanism of action of THC and other cannabinoids depends on the cannabinoid receptors CB1 and CB2. Both of these receptors are agonist to THC and CBDs, which means that THC and CBD stimulate the activity of the receptors. CB2 is mainly expressed in cells of the immune system. The mechanism of action of THC and indeed the whole



class of these compounds is complex and not well understood. THC is metabolized primarily in the liver by the cytochrome P450 enzyme system. Approximately 100 metabolites have been identified with many still psychoactive. THC is excreted primarily in the feces (about 50%) and about 29% in the urine.

Consumption of Cannabis

The consumptions usually by inhalation(smoking or vaporizing) or by ingestion (food or drink). All consumption involves heating the plants Tetrahydrocannabinolic acid (THCA, 2-COOH-THC) which is a precursor of tetrahydrocannabinol (THC), the main active component of cannabis. It is important to consider the different methods of consumption and the effects it has on absorption of the THC and neuroactive experience. The acute effects of Cannabis or THC are best experienced through smoking the Cannabis leaves. In this more the Cannabis is delivered directly to the brain the CB1 and CB2 receptors. You quickly receive a “rush” or “high”. Cannabis can also be consumed by ingestion typically in a cookie or brownie. The Cannabis absorption through the gut is slower thus producing a more gradual “high” and subsequently raked more time to decline. No matter what properties are being considered it must be remembered that there is tremendous variability in the cannabis being consumed such as the amount of THC or other CBDs in the product.

Health or General Effects

The effects of any preparation of Marijuana varies tremendously depending in plant. The study of the medicinal or positive health effects of Cannabis has been hampered by the having a consistent stain to study as well as leg al issues. Despite these imitations some studies have shown that appetite can be improved, reduce nausea and vomiting, treat chronic pain, and quite muscle spasms. Over 30 states have medically prescribed cannabis such as dronabinol and nabilone. The ability to prescribe THC or other cannabinoids as greatly increased its medical uses.

The adverse effects that have been attributed to Cannabis have been many and often motivated by some other issue such as religion or other prejudice. Many of the medical issues associated with Cannabis may also be the result of multiple drug exposure.

Regulatory Standards

Cannabis is most commonly illegal but the rules its procession are not enforced or is illegal except for medical reasons which requires a physician’s prescription. However, there are still large parts of the world where Cannabis is illegal. In the United States, the federal rules are in tension with the state rules.

Recommendation and Conclusions

The most important action is legalize Cannabis and to the needed studies to assess the both beneficial and adverse health effects. Similar to alcohol it is too easy for individuals to grow and use Cannabis.

More Information and References

Slide Presentation

- A Small Dose of Cannabis presentation material and references online:
Power point slides contains presentation material related to the health effects of Cannabis.

European, Asian, and International Agencies

- WHO – World Health Organization – Cannabis Online :
https://www.who.int/substance_abuse/facts/cannabis/en/ (accessed: 01 August 2020).
Summarizes worldwide consumption of Cannabis.

North American Agencies

- Government of Canada – Cannabis in Canada-Get the facts – Online:
<https://www.canada.ca/en/services/health/campaigns/cannabis.html> (accessed: 01 August 2020).
- Marijuana and Public Health - US Centers for Disease Control and Prevention (CDC). Online: <https://www.cdc.gov/marijuana/health-effects.html> (accessed: 01 August 2020).
US CDC site has multiple listing on health and cannabis. (The US also uses Marijuana and Cannabis interchangeably)

Marijuana intoxication: MedlinePlus Medical Encyclopedia. US NLM
Online: <https://medlineplus.gov/ency/article/000952.htm>

- Marijuana ("pot") intoxication is the euphoria, relaxation, and sometimes undesirable side effects that can occur when people use marijuana.. Some states in the United States permit marijuana to be used legally to treat certain medical problems. Other states have also legalized its use. (accessed: 01 August 2020).

Resources from Washington State Department of Agriculture

- **Hemp & CBD in food** –
 - <https://agr.wa.gov/departments/food-safety/food-safety/hemp-cbd-in-food>
- **Recreational Marijuana**
 - <https://agr.wa.gov/departments/marijuana>
- **Pesticide and fertilizer use for the production of marijuana in Washington**
 - <https://agr.wa.gov/departments/marijuana/pesticide-use>

National Academies of Sciences, Engineering, and Medicine. 2017. The health effects of cannabis and cannabinoids: The current state of evidence and recommendations for research. Washington, DC: The National Academies Press. doi:10.17226/24625. Online: <http://nap.edu/24625> (accessed: 04 August 2020).

Non-Government Organizations

Wikipedia resources – excellent well referenced resources

The Cannabis Portal – Online: <https://en.wikipedia.org/wiki/Portal:Cannabis> (accessed: 01 August 2020)

Comprehensive list of resources on Cannabis.

Cannabis (drug) – Online: [https://en.wikipedia.org/wiki/Cannabis_\(drug\)](https://en.wikipedia.org/wiki/Cannabis_(drug)) (accessed: 01 August 2020)

Well referenced review of Cannabis from history, legal, and health effects.

Legal history of cannabis in Canada – Wikipedia Canada – Online: https://en.wikipedia.org/wiki/Legal_history_of_cannabis_in_Canada (accessed: 01 August 2020)

References

Reece AS. Chronic toxicology of cannabis. *Clinical Toxicology* 2009; 47(6):517-524
Focus on the adverse effects of chronic ingesting Cannabis.

Morris NP. Educating Physicians About Marijuana. *JAMA Intern Med.* 2019;179(8):1017–1018. doi:10.1001/jamainternmed.2019.1529

Kimberly S. Grant, Rebekah Petroff, Nina Isoherranen, Nephi Stella, Thomas M. Burbacher. Cannabis use during pregnancy: Pharmacokinetics and effects on child development. *Pharmacology and Therapeutics* 182 (2018) 133–151.

Lauren M. Jansson, Chloe J. Jordan, Martha L. Velez. Perinatal Marijuana Use and the Developing. *JAMA* - Published Online: July 16, 2018. doi:10.1001/jama.2018.8401