

# CANNABIS & CANCER

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# Introduction

## ABOUT ME

- Acute Lymphoblastic Leukemia(ALL) Survivor
- Cancer Philanthropy is my purpose
- Co-Founder of Cresco Labs
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HEALING REALTY TRUST  
— Real Estate for Tomorrow's Medicine —



# History of Cannabis

Documents dating as far back as 2900 B.C. tell us cannabis has lived alongside humans for thousands of years and has been cultivated for medicinal purposes for just as long. Cannabis' impact on the human body can be credited, in large part, to what are called [Cannabinoids](#). Cannabinoids are chemical compounds secreted by the plant's trichomes that offer a wide array of therapeutic benefits. The two most well known cannabinoids are THC and CBD. Cannabinoids bind to receptor sites in the brain and body – this system of receptors is referred to as the [Endocannabinoid System](#).

Clinical research regarding the therapeutic benefits of cannabinoids is growing. Two aforementioned cannabinoids, THC and CBD, are showing to help patients suffering from pain, nausea, sleep and stress disorders, as well as stress relief, anxiety, inflammation and epilepsy. Cannabis contains over 100 different cannabinoids and more research becomes available every day detailing how cannabinoids can be used to treat a wide range of ailments. Without question, additional research into cannabis' impact on the human body is needed and appropriate.



# Endocannabinoid System

## THE ENDOCANNABINOID SYSTEM HUMAN CANNABINOID RECEPTORS

### CB1

Receptors are concentrated in the brain & the central nervous system but are also present in some nerves and organs.



### CB2

Receptors are mostly in peripheral organs, especially cells associated with the immune system.



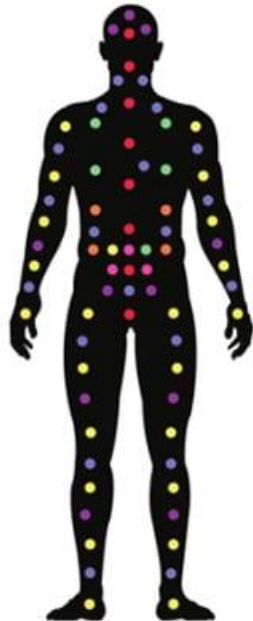
### TRPV1

Receptors are concentrated in the blood, bone, marrow, tongue, kidney, liver, stomach & ovaries.



### TRPV2

Receptors are concentrated in the skin, muscle, kidney, stomach & lungs.



### GPR 18

Receptors can be found primarily in bone marrow; the spleen and lymph nodes, and to a lesser extent the testes.



### GPR55

Receptors are found in the bones, the brain, particularly the cerebellum, and the Jejunum and ileum.



### GPR 119

Receptors are found predominantly in the Pancreas and the intestinal tract, in small amounts.



In 1964, researchers in Israel discovered the therapeutically active substances in cannabis that have come to be called cannabinoids and isolated the most popular and possibly effective cannabinoid, THC (tetrahydrocannabinol). More than 20 years later, in 1988, researchers identified the human body's endocannabinoid system.

## The Role of Receptors

Research since the discovery of the endocannabinoid system has led to the identification of specialized receptors in the body. Knowledge of these receptors, called CB1 and CB2, has greatly enhanced the overall knowledge of how cannabinoids synergistically interact with other cannabinoids and endocannabinoids to produce sometimes profound medical effects. An understanding of these receptors also allows for the production of synthetic cannabinoids and specialized extracts that best take advantage of the function of these receptors.

# Cannabis Compounds

**Cannabinoids are natural compounds found in the cannabis sativa plant, with around 160 identified among over 600 total compounds. The most well-known are THC and CBD, but many others also contribute to the plant's benefits. Here are a few you may know, and some you may not.**

## **THC**

Tetrahydrocannabinol (**THC**) binds to both CB1 and CB2 receptors, and it has psychoactive and physical (bioactive) effects. Its best-known effect is the "high" effect, but it may also improve appetite, relieve pain and anxiety.

## **CBD**

Cannabidiol (**CBD**) is an international health phenomenon, leading to billions of dollars in sales and thousands of different products. CBD works in the body in a complex way, and it's primarily bioactive, not psychoactive. Research has begun to show that it can benefit pain, improve sleep, reduce anxiety, and improve many other health conditions.

**THCVA** is a precursor to THCV, tetrahydrocannabivarin, and is similar to the other cannabinoids that come from the raw flowers of the cannabis plant. THCVA can potentially benefit pain relief and reduce inflammation. THCV has been studied more than THCVA, and some research studies show that it can have benefits in reducing overeating and obesity. Other potential benefits of THCV (and potentially THCVA) that are being studied include relief for PTSD, degenerative neurological illnesses like Alzheimer's, and depression and anxiety.

**CBG** (Cannabigerol) is a non-intoxicating substance. It's best to think of CBG's benefits as a way to support good health practices such as a balanced diet, regular exercise, and good sleep habits. Studies are still being conducted, but researchers anticipate finding similar health benefits as CBD to help with pain relief, better sleep, and stress management.

# Benefits of Cannabis

- The #1 symptom physicians recommend cannabis for is treating chronic pain.
- According to a review published in Clinical Psychology Today, cannabis could relieve depression, PTSD and anxiety.
- THC and CBD, have been shown to reduce nausea and vomiting caused by chemotherapy.
- Cannabis has been known to stimulate appetite, which can be beneficial for cancer patients who may experience loss of appetite due to treatments.



Credit: Health e-News

## **Cannabinoids have been found to help with**

Appetite and digestion, Metabolism, Pain, Inflammation and immune responses, Mood, Memory and learning, Motor control, Sleep, Cardiovascular system, Muscle formation, Bone growth and health, Liver function, Reproductive system/fertility, Stress, Skin and nerve function

# Cannabis Products

## Inhalation

- Forms: Smoking and Vaping. Onset 2 to 10 minutes.
- Both use heat so the cannabinoids are absorbed into the bloodstream through the lungs:
- Smoking – heats up the dried cannabis flowers
- Vaping – uses a stream of heated air to vaporize the ingredients

## Ingestion

- Forms: Edibles, Pills, Capsules, Tablets and Liquid. Onset 30 minutes to 2 hours.
- Produce stronger effects
- Digested down in gastrointestinal tract and pass through the liver before entering the bloodstream

## Topical

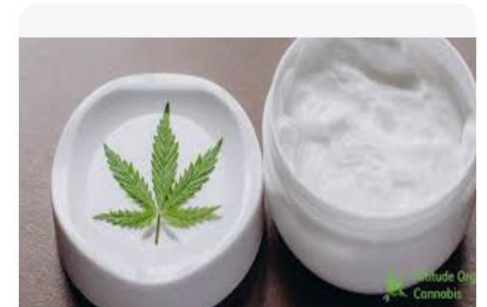
- Forms: Lotions, Balms, Creams, Salves and Patches. Onset 15 to 30 minutes.
- Applied to the outside of the skin and provide localized relief
- Other than patches, they do not reach the bloodstream



Photo: Casjah Photo/Getty Images/Stockphoto



Metro/Getty Images



Attitude On Cannabis

# Edible Consumption

## Edibles Guide

Edibles are consumable products that have been infused with medical cannabis. There are two main types of edibles: sublingual and gastrointestinal. Sublingual is Latin for ‘under the tongue’ and that is exactly what you do – you place the edible on or under your tongue. This type of edible allows the cannabinoids to enter your bloodstream through the tissues in your mouth and the effects start to take place shortly after. With gastrointestinal edibles, absorption takes place after the edible has entered your digestive track. This means that it will take longer to feel the effects. While edibles are a great option for patients they can easily lead to disaster if you are not cautious. A common mistake that many first-time edibles users fall victim to is eating too much.

## Start Low & Go Slow

The suggested starting dose for an edible is 10mg. This may not seem like much for an experienced smoker, but it is best to consume conservatively the first time. Gastrointestinal edibles can take up to 90 minutes before the effects become noticeable. If you have eaten 10mg and still have yet to feel the effects, wait at least 90 minutes before consuming more.

## Plan ahead & Be Safe

While the effects of smoking cannabis are instantaneous, edibles tend to take longer to “kick in” and last for a much longer time. The effects from edibles are noticeable for roughly five hours with the peak of the effects occurring around two and a half hours after consumption. Because of the longevity of the effects, it is important to plan before eating an edible. Do not consume edibles on an empty stomach, as that may intensify the effects. Read the label thoroughly to make sure you are taking the correct serving size.

# Cancer and Cannabis

## Symptom Relief

Unfortunately, many people with cancer experience significant discomfort from both the illness itself and the side effects from conventional medications. Research has shown cannabis to be effective in treating many of symptoms of cancer or side effects from conventional cancer treatments since the 1970s. Numerous studies over the past three decades have reported that the use of cannabis reduces pain, nausea, vomiting and stimulates appetites in patients receiving chemotherapy treatment. A 1999 Institute of Medicine report noted that for “patients already experiencing severe nausea or vomiting, pills are generally ineffective, because of the difficulty in swallowing or keeping a pill down, and slow onset of the drug effect...nausea, appetite loss, pain and anxiety...all can be mitigated by (inhaling) marijuana.”

## Condition Relief

According to the [National Cancer Institute \(NCI\)](#), “*Studies in mice and rats have shown that cannabinoids may inhibit tumor growth by causing cell death, blocking cell growth, and blocking the development of blood vessels needed by tumors to grow.*” Recently, the National Institute on Drug Abuse (NIDA) revised a [publication](#) on medical cannabis to include language specifically acknowledging that “recent animal studies have shown that marijuana extracts may help kill certain cancer cells and reduce the size of others.” Furthermore, one cell culture study suggests that purified extracts from whole-plant marijuana can slow the growth of cancer cells from one of the most serious types of brain tumors.”

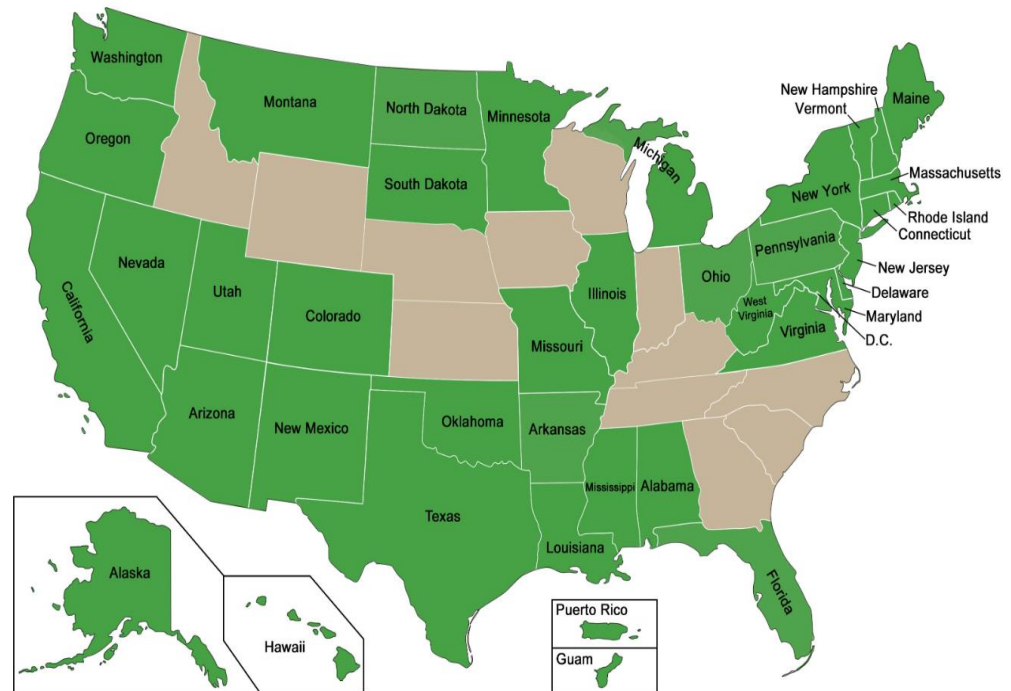
**While there are countless stories related to the efficacy of cannabis in dealing with the side effects associated with common cancer treatments (as stated above, even in 1991 roughly 44% of oncologists in America were recommending that their patients consume cannabis for relief), there are a significant number of wonderful stories where people have utilized a cannabis-based treatment protocol to help beat cancer into remission.**

# FDA & CANNABIS

Although it is still a Schedule I controlled substance under federal government guidelines. The FDA has recently recommended the rescheduling of cannabis to a Schedule III drug. In this breakthrough recommendation - it is the first time the federal government has acknowledged that Cannabis has medical Benefits.

Cannabis is already legal for medical consumption in 40 states, with 24 allowing adults to legally use it for recreational purposes.

**States and Territories in Which Cannabis is Legal for Medical Purposes**



Credit: National Cancer Institute

# STUDIES

- In 2021, [GW Research Ltd \(GW\)](#) sponsored a clinical trial. One group of participants used a mouth spray containing a mixture of CBD and THC in combination with a traditional chemotherapy drug called temozolomide. They received between 3-12 sprays a day (up to 30 milligrams of CBD and 32.4 mg of THC), depending on their maximum tolerated dose. This trial included a comparison group that did not use the cannabinoid spray, and by comparison, almost twice as many patients who received the spray were alive after one year.
- In 2019, [Dr Laureano de la Vega](#), a Cancer Research UK Fellow at the University of Dundee, started to explore if CBD can limit cancer's ability to spread, using lung and triple negative breast cancer cells grown in the lab. CBD can revert the EMT in highly invasive breast cancer cells. Treatment of 6D breast cancer cells with CBD was able to significantly reduce migration.
- A study by [McAllip et al](#), showed that THC reduced human breast cancer cell proliferation via stimulation of CB2 receptors. THC treatment inhibited the cell cycle progression in breast cancer cells at the G2/M phase, which was attributed to the down-regulation of Cdc2, and induced apoptosis
- Patients were recruited and treated at a clinic specializing in medical cannabis care from October 2015 to March 2019. The [study](#) found that medical cannabis treatment was associated with improvements in pain severity and interference observed at one month and maintained over the 12-month observation period. Significant improvements were also observed in physical and mental health starting at three months. Significant decreases in headaches, fatigue, anxiety, and nausea were observed after initiation of treatment.

# FUTURE ADVANCEMENTS

## According to *Marijuana and Medicine: Assessing the Science Base*

- Several researchers and companies are pursuing the development of a smokeless inhaled delivery method for cannabinoid medications
  - Scientists at HortaPharm B.V. are testing a device that gently heats marijuana, releasing a cannabinoid vapor that patients can inhale.
  - A British firm, GW Pharmaceuticals Ltd., has licensed another technology, known as a nebulizer, that uses mechanical means to turn whole marijuana extracts into a fine mist
- One of the future directions in cannabis research for cancer treatment involves the development of targeted therapies
  - By better understanding the specific receptors and pathways that cannabis interacts with, researchers can design drugs that specifically target cancer cells, while sparing healthy cells. This could lead to more effective and less toxic treatments, ultimately improving the quality of life for cancer patients.

**THANK YOU**

