Table of Contents

Cannabidiol, more commonly known as **CBD**, is one of the two main, naturally-occurring chemical components of cannabis, and it has become a trending product in recent years despite years of stigma surrounding cannabis at large. Its contemporary mainstream appeal likely has to do with three important factors. The first is a matter of legality. CBD can be sourced from hemp. Now that the US passed the **Farm Bill** in 2018, which made it legal to grow industrial hemp, CBD sales are projected to skyrocket even more. Next are the claims for CBD’s therapeutic uses, including its ability to help treat anxiety, sleep disorders, chronic pain, epilepsy and seizures, arthritis and inflammation, depression, and opiate addiction, to name a few. Many preliminary studies provide data that suggests these benefits are real, but additional clinical research is necessary to prove anything about CBD. Lastly, unlike its infamous cousin **tetrahydrocannabinol, or THC**, the other major chemical component of cannabis, CBD is reported to be non-intoxicating, meaning it does not get you high.

**What is CBD?**
Molecules originating from the cannabis plant are called cannabinoids, and CBD is one of them. THC is another. In total, there are 120 cannabinoids found in cannabis, though CBD and THC are the most well known. CBD can be extracted from marijuana and hemp, two types of cannabis, so it has become a substance used in products like edibles, oils, and topical creams.

Only in recent years that notable effort and resources have been put into studying cannabinoids, mainly CBD and THC, so what is known about them is still limited. However, scientists have already discovered plenty of interesting data about CBD, including a bit about how it affects the human body.

Cannabinoids affect us because our bodies have an endocannabinoid system (ECS), composed of endocannabinoids and cannabinoid receptors. The two receptors are called CB1 and CB2. When CBD enters the body, the ECS, as well as other parts of our internal system, respond, creating a physiological reaction.

CBD interacts with and binds to receptors in at least 65 areas of the body. For instance, CBD binds to the body's serotonin receptors. Because serotonin is responsible for regulating things like mood, pain experience, and sleep, consuming CBD can affect these functions. Likely, that is why research is finding CBD has therapeutic benefits such as moderating anxiety, stress, depression, chronic pain, and sleep disorders. CBD interacts with the brain's GABA messengers, whose role is to reduce the activity of the neurons to which it binds. This might be why CBD has even stronger potential in managing stress and anxiety.

CBD also binds to orphan receptors in the body, which have a part in regulating blood pressure, how cancer cells migrate, and bone-related functions. CBD binds to vanilloid receptors as well, which deal with inflammation and perception of pain. Conclusive evidence has been found regarding CBD's use in treating epileptic seizures, related to its ability to prevent abnormal activation of our sodium channels, as abnormal firing that can cause seizures. Therefore, CBD can reduce both the quantity and intensity of seizures experienced. With these few examples alone (remember that CBD interacts with the body in over 65 places!), it becomes clear why scientists think CBD has genuine therapeutic potential.

Read more about the endocannabinoid system (ECS)
CBD’s adverse effects

CBD has been known to have some side effects, though it is generally tolerated fairly well. The side effects are not serious and include diarrhea, dry mouth, reduced appetite, fatigue, and tiredness. It also may have adverse interactions with other medications.

One greater concern regarding CBD has to do with the fact that it is largely unregulated. There is no quality control exercised by a regulatory agency over CBD products, and this has been found to impact purity, which can have dangerous results. Furthermore, additions to CBD products generally go unlabeled, so consumers do not have any idea what they are putting in their bodies. Consumer Reports tested some CBD products and found them to contain things like dextromethorphan, an ingredient in cough medicine, and 5F-ADB, a substance designed by underground chemists to imitate THC’s effects that is associated with serious side effects. This study was limited in scope. If such a limited study found these chemicals were added to CBD products, what would a more extensive study find? Regulation may solve this problem, but until that happens, consumers must be careful, do their homework and study reviews about specific CBD products. Always consult with your doctor and research products before purchasing them.

Why do people think CBD gets you high?

There is a stigma associated with cannabis because it can get you high. That has been the story for all of modern history and yet the truth is a bit different. THC is the psychoactive compound in cannabis. THC, often found in high concentrations in marijuana, gets you high. Cannabis is more than just marijuana, however. It also includes hemp, which contains less than 0.3 percent THC and much more CBD. Hemp does not cause intoxication.

The simple fact that CBD is also found in marijuana along with THC and that CBD is a product of cannabis can be confusing for people. For so long, cannabis as a whole was linked to getting high, and only more recently has the information come out to the public about the different facets of the cannabis plant. As cannabis has been legalized in many US states for medical or recreational purposes, not to mention decriminalized in a growing number of countries or even fully legalized in places like Canada, cannabis research has
significantly expanded. Once researchers figured out that CBD did not induce intoxicating effects, they began to extract it from marijuana and explore its potential uses. As more time goes by, the stigma that anything cannabis-related will make you high will fade.

**Why you cannot get high from CBD (but you can from THC)**

As mentioned CBD is non-psychoactive, and researchers now have a good idea about why THC produces intoxicating effects while CBD does not. Recall the cannabinoid receptors CB1 and CB2. They are located in the central nervous system and peripheral nervous system. When THC enters the body, it primarily binds to CB1 and CB2, largely concentrated in particular parts of the brain that have to do with memory, thinking, concentration, pleasure, coordination, and time. Therefore, it makes sense that THC influences all of those things, ultimately leading to altered perception, also known as feeling “high.” THC also causes the brain to release the neurotransmitter dopamine, responsible for the euphoric sensation associated with marijuana.

CBD interacts very little with CB1 and CB2, and therefore CBD does not produce psychoactive effects. What’s more, CBD actually blocks THC’s ability to make you high because it alters how THC binds to CB1 receptors.

For a long time, marijuana growers in California, specifically created strains that had high concentrations of THC, naturally reducing the amount of CBD in that strain. Now, because more is understood about how both THC and CBD work, it has become clear that the more THC and the less CBD a marijuana strain has, the more intoxicated you will feel. On the other hand, recent years have seen the production of more balanced strains of marijuana with a lot more CBD in them. These strains have less intense psychoactive effects. CBD alone will never make you feel high. Users report feelings of relaxation and reduced stress from CBD, but intoxication is not part of its catalog of effects.

CBD vs THC

**How to take CBD**

CBD products, containing either no THC or trace amounts, can be found as **oils**, in **edibles**, in **pill** form, as a **topical product**, or even in its plant form. You can, therefore, ingest it orally, sublingually (under the tongue), it can be absorbed through the skin, or it can be smoked or vaped. Your method of consumption affects certain aspects of its effects. In addition, CBD can affect people differently based on their physiological variations.
Orally ingesting CBD, regardless if you ingest it in the straight oil form or in the form of edibles, you will produce the same effect. What is inside a CBD edible is CBD oil, after all. It takes between 30 minutes and two hours to digest CBD. Once it is digested, it enters the bloodstream slowly, and that is when its effects begin. CBD’s effects can last anywhere from two to five hours. Because it is so long-lasting, taking CBD orally, whether that’s in the oil, pill, or edible form, is popular to help with stress, anxiety, depression, enduring pain, and sleep issues. You can purchase CBD oil to use, make your own edibles or capsules with it, or buy pre-made capsules or edibles, which are quite convenient.

Another way to take CBD is sublingually. You place CBD oil from a tincture directly under your tongue and leave it there for 60 to 90 seconds. Effects begin within 20 to 40 minutes and last for a few hours. Some research reports that sublingual consumption of CBD is more effective than oral consumption because the CBD becomes more bioavailable. This means more CBD is absorbed into the bloodstream and then used by the body.

Taking CBD Sublingually
Vaping or smoking CBD allows for nearly immediate onset of its effects. However, the effects are much shorter-lived, only up to three hours. For those looking for quick effects, like if you are having trouble falling asleep, for pain management, or severe onset of anxiety, vaping or smoking CBD may be ideal. In order to vape CBD, you purchase a vape pen and a CBD cartridge specifically meant for vape pens.

CBD can be found in topical products like lotions, salves, and balms. They meant to help with inflammation, aches, pains, and in the treatment of skin disorders like acne, eczema, and psoriasis. Topical use of products with CBD in them target the specific areas of the body where applied. It is absorbed into the skin rather than entering the bloodstream. Usually, the effects begin within 20 minutes and can last a couple of hours.

CBD Skin Receptors
The length of time CBD stays in the body after its effects subside varies based on the amount consumed, frequency of use, method of consumption, and metabolism. CBD can be detected in the bloodstream for three to five days for those who consume it every day. It can be detected in the urine and seems to only last for about 24 hours. That being said, CBD does not generally lead to positive results on a drug test, as it is not a concern to employers given that it is not psychoactive.

Is CBD legal?
Since the passing of the Farm Bill in 2018, in all 50 US states, hemp and hemp products are legal. However, there is a caveat. In certain states, only hemp-derived CBD is legal, and some CBD products are derived from marijuana, so keep that in mind. You can be certain CBD is legal no matter if it is derived from marijuana or hemp if you live in a state where recreational cannabis use is permitted. Right now, 11 states and Washington, D.C., have legalized recreational marijuana, and 33 states have legalized medical marijuana.

Worldwide, CBD is legal in many countries, too many to list. Cannabis is only fully legalized in two countries: Canada and Uruguay. Quite a few other countries have permitted the use of medical marijuana or decriminalized cannabis.

**Final thoughts**

Despite the growing legality and subsequent popularity of CBD, many people still do not realize that CBD is non-intoxicating, non-psychoactive, and it does not get you high. However, as research continues to figure out the therapeutic effects of CBD, it will eventually become known for exactly what it is rather than enduring the stigma that follows CBD based on its connection to marijuana.

**References**


Diana Rangaves
PharmD, Clinical Consultant, Google Scholar

Dr. Diana Rangaves is Doctor of Pharmacy (Pharm D). She graduated from the University of California, San Francisco and specializes in pharmacotherapy management. Diana has a broad range of acute clinical background and ambulatory care. She was an academic college professor; teaching critical thinking, ethics, pharmacology, addiction, behavior patterns, pharmacy, and nursing. As a Clinical Pharmacist she is focused on chronic or disease state management.

Leonard Haberman
Physician & Chemist

Dr. Leonard Haberman is a physician and chemist who has been involved in solving chemical and medical problems for 43 years. He graduated from New York University as a dual major in chemistry and biology and went on to obtain a PhD in chemistry from the University of Minnesota where his focus was synthetic methods. He returned to the university in 2005, graduating with an MD degree in 2009. He has published in the open literature. He holds two patents and currently works as a consultant, assisting clients with projects within the disciplines of medicine and chemistry that have potential business applications.