Cannabidiol: uses, pharmocology and legality



A Cannabidiol Era

Introduction

In recent years, Cannabidiol (CBD) has risen in popularity and is known as a holistic miracle for a variety of ailments. Cannabidiol (CBD) can be used to help with certain skin conditions, disease states, and mental disorders. CBD is related to cannabis plant, but is used more for its medicinal properties. As the legalization of marijuana becomes more prevalent in our society, the United States and other countries are slowly starting to legalize and pass laws regarding cannabidiol use. In the pharmaceutical industry, medications containing cannabidiol have been approved and patented by the Food and Drug Administration (FDA) to treat specific epileptic disorders. Because of the cannabidiol explosion, more research and information is now becoming available.

What Is CBD

Cannabidiol (CBD) is derived from the *Cannabis sativa* hemp plant which contains many unique compounds such delta-9 tetrahydrocannabinol, also known as THC. Because CBD and THC share the same molecular formula, C21H3O2, their chemical structure is nearly identical. The only significant difference in their chemical structure is that CBD contains a hydroxyl group and THC contains a cyclic ring.

Cannabidiol does not have a psychoactive effect on the brain, which essentially means it does not cause a feeling of being ' high'. The level of THC in CBD can be high or low, or none, depending on how cannabidiol is extracted from the cannabis plant. Once the medicinal properties of CBD are extracted from the plant, by methods of dilution, CO2, ethanol, or through oils (like olive oil or coconut oil), it is made into oil that can be used in a wide variety of products such as oils, tinctures, pills, balms, or edible forms. Many researchers focus on THC or a combination of THC and cannabidiol and not enough recognition and research is solely committed to understanding cannabidiol on its own.

Brief CBD History

The cannabidiol molecule was first discovered in 1940 by Dr. Roger Adams and his team at the University of Illinois. This molecular was not fully understood until 1946, when Dr. Walter S. Loewe was the first to conduct a study on lab animals and cannabidiol. The research showed that cannabidiol did not cause the same altered state of mind that was found with THC. In 1963, Mechoulam and Shvo first termed the chemical structure of cannabidiol. This eventually led Mechoulam to have another cannabidiol breakthrough in 1980, when he conducted a study that showed cannabidiol as a possible treatment for epilepsy.

Pharmacokinetics

Pharmacokinetics describes the actions, the time of onset and the duration of effects of a particular drug or supplement. The route of administration for CBD can determine the absorption, distribution, and elimination process of the products therapeutic effect. The amount needed and the time it takes for the absorbed CBD to travel through the bloodstream to the specific target sites is called the bioavailability.

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CBD can be administered orally, rectally, topically, through injection, or inhalation. First pass metabolism can affect the low oral bioavailability of CBD. First pass metabolism is caused by the actions of enzymes of the gastrointestinal lumen, gut wall enzymes, bacterial enzymes, and hepatic enzymes before reaching the circulatory system. The specific enzymes are the CYP2C19 and CYP3A4 enzymes, and UGT1A7, UGT1A9, and UGT2B7 isoforms.

The most effective way to take CBD would be sublingually, because it would bypass the first pass metabolism, or as an inhalant, which did have a study done with having a bioavailability of 11% – 45% (Scuderi, 2009). The half-life of cannabidiol was determined to be18–32 hours (Devinsky et al. 2014).

Pharmacodynamics

Cannabidiol (CBD) has been found to interact with a variety of different biological targets, including cannabinoid receptors (Pisanti et al., 2017) and other neurotransmitter receptors (Laun et al., 2018). Research has shown that when CBD and THC are consumed at the same time, CBD is an indirect antagonist towards cannabinoid receptor type 1 (CB1) and cannabinoid receptor type 2 (CB2). CBD will bind with CB1 and turn off the receptor because of its biochemical shape. CBD also decreases the ' high' from the THC because THC is unable to bind to the CB1 receptor (Mechoulam et al., 2007; Pertwee, 2008). These receptors are what protect the central nervous system and immune system from stressful influences and provide cellar homeostasis from becoming over active in the body (Laprarie, et. al., 2015). The CB2 receptor is usually found in organs that impact the immune system. It has been studied to act as an antagonist of GPR55, a G protein-coupled receptor and putative cannabinoid receptor that is expressed in the caudate nucleus and putamen in the brain. (Ryberg et al., 2007)

It has also been found to act as an inverse agonist of GPR3, GPR6, and GPR12. (Laun et al., 2018) Although currently classified as orphan receptors, these receptors are most closely related phylogenetically to the cannabinoid receptors.[12] In addition to orphan receptors, CBD has been shown to alter serotonin signals and act as a serotonin 5-HT1A receptor partial agonist (Russo et al., 2005) boosting signals through the through serotonin receptors to block reabsorption of serotonin in the brain. Can increase the availability of serotonin in synaptic space, helping brain cells transmit more serotonin signals to reduce anxiety and boost mood. Research suggests that CBD regulates the production and function of the endocannabinoid system, increasing the levels of endocannabinoids, such as anandamide, produced by the body. (Campos et al., 2002) The endocannabinoid system aids in regulating mood, appetite, memory, and pain sensation (Hampson AJ, et. al, 1998).

Use for CBD

Cannabidiol has been shown to suppress inflammation which is one of the primary causes of chronic pain (Russo, 2008), neuropathic pain (Xiang, 2012), Parkinson's disease (Chagas et al., 2014), Lennox-Gastaut syndrome (Devinsky et. al, 2017; Devinsky et al., 2018a) and Dravet syndrome (Devinsky et. al., 2018b) and schizophrenia (Leweke et al., 2012). In 2015, an analysis of previous studies concluded that CBD oil is a promising treatment for numerous forms of anxiety, including social anxiety disorder, panic disorder, obsessive-compulsive disorder, generalized anxiety disorder, and post-traumatic stress disorder (Blessing et al., 2015). This has potentially had results of reducing hyperalgesia which is the sensitivity to pain as a result of having an enhanced pain response. Based on multiple studies done in the late 1990s, this could have been a result from a previous body injury or from opioid pain killers. Opioid use has been known to induce hyperalgesia. Research specifically on cannabidiol, however, has found few or no negative side effects. This means CBD oil may be a good option for people who do not tolerate the side effects of other medications or are afraid of becoming dependent on an abusive drug.

Pharmaceuticals

On June 2018, the U. S. Food and Drug Administration (FDA) approved Epidiolex, an oral administered cannabidiol solution, as a medical treatment for two rare forms of pediatric epilepsy: Lennox-Gastaut syndrome and Dravet syndrome. Lennox-Gastaut syndrome (LGS) is a severe form of epilepsy that has multiple types of seizures that usually take effect during infancy or between the ages of 3 to 5 years old. Dravet syndrome (DS) is a rare and complex childhood epilepsy disorder that is associated with drugresistant seizures and a high mortality rate which takes during infancy.

The medication is only indicated for those clinically diagnosed with LGS or DS. Its availability to be dispensed is by the five specialty pharmacies that are currently in the limited distribution network and not by other retail pharmacies. It is controlled as a Schedule V of the Controlled Substances Act because it has a low potential for abuse.

Drug testing

On June 2018, Quest Diagnostics released post in regard to the rise of CBD use and the likelihood for false positive drug tests for marijuana. They stated that if CBD or other hemp oil products could test positive on a drug test, an individual would need to use or consume about 1000-2000 mg, or more, of the cannabidiol product. Because of the availability of cannabidiol, some oils could have a THC concentration that could trigger a positive test result depending on usage patterns. These tests are detecting other cannabinoids, including cannabidiol, not selectively seeking for just THC.

Legalization

Cannabidiol has been deemed as a Schedule 1 substance and remains illegal at the Federal level. While there are some states that permit the sale and purchase of CBD within their state lines, products have a strict limit as to how much THC can be allowed in the product itself. An example is in Texas, CBD products may have THC in it but it must be at or below 0. 3%.

Conclusion

There is a present interest in understanding the benefit of CBD's holistic approach through supplements and other forms. Testing and research have become more prevalent within the few years as governments look to approve laws and regulations for cannabis. Because CBD oil is not regulated as a medical treatment, it is unclear what dosage a person should use or https://assignbuster.com/cannabidiol-uses-pharmocology-and-legality/ how frequently they should use it. A person should consult a doctor or healthcare professional that has experience with CBD oil to determine the right dosage for their needs. It could be safe to say that next year will be the most successful year for cannabis and cannabidiol industry to date.

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