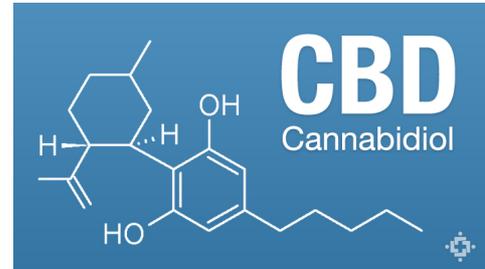


# CBD - Cannabidiol

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CBD is a constituent of cannabis plant which has promising medical properties. This substance appears to be pain-relieving, and it has anti-epileptic as well as anti-psychotic effects. CBD is also a strong anti-oxidant and anti-inflammatory. Of particular interest is the fact that CBD has nerve-protecting effects.

Cannabidiol or shortly CBD is one of the major cannabinoids identified in the cannabis plant. The cannabis shrub (up to 4 Meters high) produces over 60 various chemical compounds of such cannabinoids. One of the cannabis strains called *hemp*, has been selectively bred to produce a maximum of CBD. Hemp, which is legally cultivatable, contains hardly any content of the primary psychoactive compound of cannabinoids—THC.



CBD is, in contrast, not psychoactive, i.e. it doesn't have any psychological effects on the brain. Instead, CBD has a variety of medically desired properties and won't lead to any relevant side effects even given in high doses. Taking CBD is therefore considered explicitly secure.



## The Endocannabinoid System

While researching plant-based cannabinoids, scientists discovered the endocannabinoid system in the human body. Known as “the body's own cannabinoid system”, the endocannabinoid system is a subsystem of mammalian nervous systems, that is involved in a variety of physiological processes such as pain sensation, memory management and regulation of the immune system. The neuro-modulatory lipids, or so called endocannabinoids, are substances produced from within the body that activate the relevant Receptors CB1 and CB2, thereby deploying various processes of sending signals throughout neural pathways within any given organic system.

## Properties of CBD

CBD has the property of pain-relieving. It is often used for its anticonvulsant, anti-epileptic, anti-psychotic and anxiolytic effects. CBD is also considered to be an anti-inflammatory and anti-oxidant. It is neuroprotective and has an antibacterial effect against certain germs (MRSA) with high antibiotic resistance. CBD inhibits nausea, helps with muscle spasms and reduces the risks of the development of diabetes. All these health effects of CBD make it a superior candidate for treating chronic pain, inflammatory diseases of the nervous system, epilepsy, anxiety disorder, psychosis and schizophrenia.

Probably the most interesting feature of CBD is its neuroprotective potential, which is increasingly and intensively being put under scrutiny due to its associative nature with many neurodegenerative diseases such as Alzheimers, Parkinsons,



Huntington's disease, and ALS, or amyotrophic lateral sclerosis. CBD seems to have the capability to reduce various harmful phenomena such as neuro inflammation, excitotoxicity (by which nerve cells are damaged and killed due to the excess of neurotransmitters such as glutamate), and oxidative stress and nervous degeneration in the brain. CBD can be further approached as a candidate for treating chronic inflammatory bowel diseases like colitis ulcerosa or Crohn's Disease.

### Effects of CBD

CBD effects the body in many different ways. According to CBD expert, Dr. med. Franjo Grotenhermen, the following mechanisms are among the most important:

- Similar to capsaicin\*, CBD stimulates the vanilloid receptor type 1 with maximum effect. This explains partially the anti-inflammatory effect of CBD.
- CBD alleviates inflammatory and neuropathic pain. Such pain-relieving sensation is presumably mediated by glycine receptors while CBD suppresses those chronic pain stimuli.
- CBD inhibits the body's own degradation of its neurotransmitter—anandamide, thereby enhancing the cannabinoids concentration in the body. The observed anti-psychotic effects of CBD are co-related to this high-level of anandamide as just mentioned.
- CBD strengthens the adenosine's effect in signal transduction. Adenosine is the body's own substance which blocks the distribution of activated and animated neurotransmitters or messengers in the nervous system. Some of the CBD's anti-inflammatory effects are based on this mechanism mentioned above. A further reason for its anti-inflammatory effects relates to CBD's bindings to the GPR55-Receptor—one of the cannabinoid receptors which is likely targeted for treatment of inflammation and pain.
- CBD is an effective anti-oxidant or a free- radical catcher. It shows that CBD can prevent oxidative damage as effectively as, if not better than, vitamin C or vitamin E.
- CBD inhibits the replication of certain brain tumor cells (glioma), by evoking their autophagy—a natural mechanism of cell self-destruction.
- Researchers have examined CBD's preventative effects on cancer for many years. There is some evidence to suggest that CBD may inhibit the growth of new blood vessels in the cancerous tissues.
- CBD acts indirectly as an antagonist against the agonists (such as THC) of CB1 and CB2 receptors. Therefore, CBD reduces many negative effects and symptoms induced by THC.



The remarkable fact is that CBD has a very low affinity to the receptors in the endocannabinoid systems. Its effect comes, more than likely, from its capacity to inhibit the clearance of the body's own endocannabinoids. Thus, by the intake of CBD, you may prolong and strengthen the effects of these endocannabinoids.

### Dosage Recommendations of CBD

CBD is already effective in doses of between 10 and 40mg. Depending on the requirements, it can be prescribed in higher doses of up to 800mg for adults.



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\* A naturel component in cayenne (chilli)

For children, the dosage is between 2 and 10mg per kg of body weight.

The effects on children with epilepsy show that each person reacts differently to CBD. Some children reacted well to low doses, whereas others required higher doses and others again did not respond to treatment with CBD.

### Medical Applications of CBD

- **CBD and pain**

CBD is a promising pain reliever. This mostly applies to nerve pain and pain caused due to inflammation. In these cases, CBD can simultaneously reduce inflammation and lessen the sensation of pain. Thus, CBD has proven to be effective against pain in multiple sclerosis. However, CBD is also effective against other types of pain.



- **CBD and migraines**

Although the cause of migraines is still shrouded in mystery, the severe headaches appear to be associated with nerve inflammation. Genetic studies have shown a link between existing migraine tendencies and a lack of CB1 receptors in the brain. CBD could help by inhibiting the breakdown of anandamide and thereby maintain a higher concentration of these messengers for the interaction with the remaining CB1 receptors.

- **CBD and epilepsy**

In some forms of epilepsy, CBD can effectively suppress seizures without neurotoxic or habit-forming side-effects, which would require a regular increase in dosage. This especially applies to certain genetic forms of epilepsy in children. In studies, half the patients taking CBD suffered no more attacks, whereas 38% experienced at least a partial improvement. There is a well-known case of a 5-year-old girl in the USA who suffered from a rare form of epilepsy which resulted in up to 300 attacks per day. When drugs no longer helped, her parents eventually discovered an extract from a CBD-rich variety of hemp. This helped, and the attacks were reduced from hundreds per day to one a week! The little girl could eat, talk and even ride her bike once again.

- **CBD and Alzheimer's**

With Alzheimer's disease, the brain gradually increasingly atrophies. Possible reasons are an inflammatory response to the nervous tissue deposits in the brain, the destruction of nerve cells and oxidative stress. Various studies show that CBD treatment can inhibit the inflammatory response in the brain effectively. In addition, CBD reduces oxidative stress and protects the nerve cells from damage or degeneration.

- **CBD and Parkinson's**



Parkinson's is a slowly progressing neurodegenerative disorder, with symptoms varying from tremors, to restricted mobility, to muscular rigidity. One of the reasons is the demise of dopamine producing neurons in the brain. According to studies, CBD can reduce this loss in dopamine. In addition, the psychotic symptoms of Parkinson's patients can be reduced.

- **CBD and ALS**

Amyotrophic Lateral Sclerosis (ALS) is a degenerative disease of the motor nervous system, leading to paralysis and muscle weakness. Studies consistently show that CBD can halt, or at least delay, the degeneration of nerve cells affected by ALS. This reduced degeneration is done by bringing the neurotransmitter glutamate into equilibrium, reducing the oxidative stresses and reducing local inflammatory reactions.



- **CBD and Schizophrenia**

While THC may favour the onset of psychosis, CBD does the exact opposite. In a double blind study in 2012, CBD preparations were given to patients with acute schizophrenia which proved to be as effective as drugs, but with far fewer side effects. Experts believe unanimously that this is related to the described increase of anandamide levels attributed to CBD.

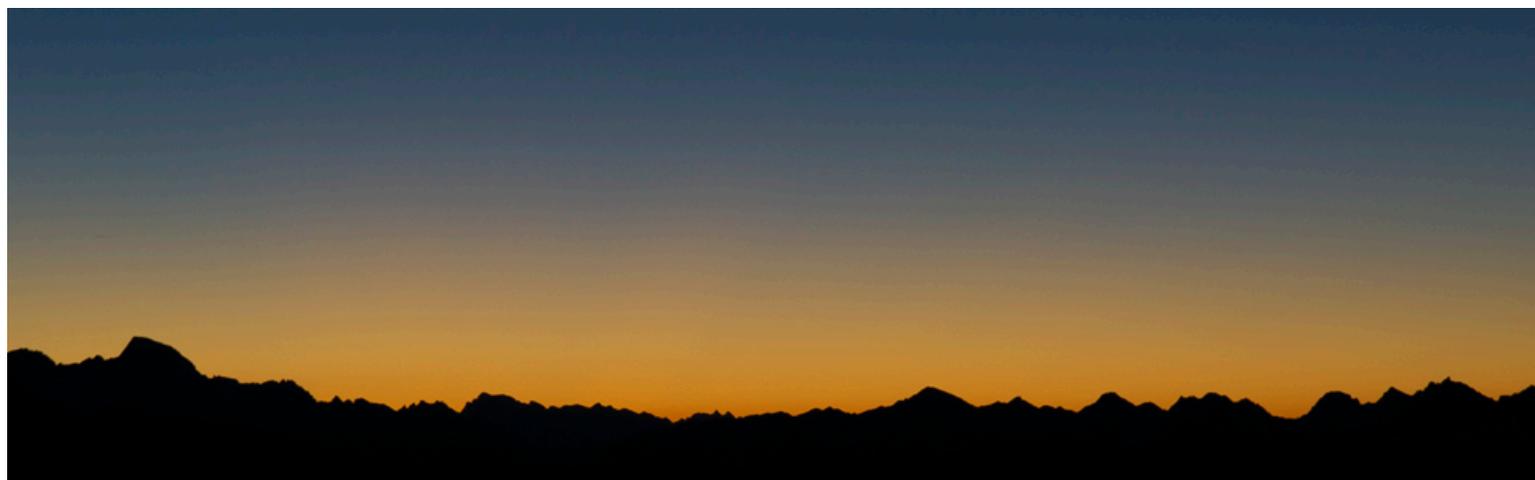
- **CBD and cancer**

Several studies have revealed the cancer fighting properties of CBD. In one study of breast cancer, CBD triggered the programmed cell death of the cancer cells. A reduction in the viability of cells and the induction of cell death by CBD was also observed in leukemia cells. The same applies to prostate cancer cells. In cell experiments, CBD inhibited the formation of metastases in lung cancer. Another anti-cancer effect is that CBD inhibits the formation of new blood vessels in tumours. Although treatment with CBD may not be an alternative to normal cancer treatment, it may be a useful and effective complementary treatment.

- **CBD and addictions**

There is evidence of the therapeutic potential of CBD with regards to the addiction of THC, nicotine and opiates. CBD appears to alleviate withdrawal symptoms. In one study\* smokers who wanted to quit, found it easier to quit smoking with the use of CBD than a comparison group which was given a placebo. The number of cigarettes smoked in the CBD group fell by 40% whereas there was no decline in tobacco use by the control group.

\* Morgan et al. (2013): Cannabidiol reduces cigarette consumption in tobacco smokers: preliminary findings. Addictive Behaviors 38(9): S. 2433-2436.



**CBD has a preventative or curative effect on the following medical conditions:**

#### **Neurological disorders**

- Alzheimer's
- Parkinson's
- Multiple Sclerosis (MS)
- Amyotrophic Lateral Sclerosis (ALS)
- Huntington's Disease (HD)
- brain tumours
- Epilepsy
- peripheral neuropathies

#### **Psychiatric disorders**

- addiction to smoking and cannabis
- anxiety (phobias)
- mild schizophrenia

#### **Pain**

- nerve pain
- migraine
- muscle spasms
- arthritis

#### **Interaction with other drugs**

CBD is metabolized in the liver, where it inhibits the activity of two enzymes which are responsible for the degradation of various drugs. These drugs can be degraded slower and are therefore more effective when taken together with CBD. Affected are the acid inhibitors, Pantoprazol, and Ondansetron, as well as the anti-epileptics Clobazam. (Frisium) and Risperidon (Risperdal). Therefore, one must exercise caution when using one of the above drugs in addition to high doses of CBD.

#### **Side effects**

CBD is generally pronounced safe. CBD should only not be taken during pregnancy since a study showed that CBD can reduce the protective function and change the properties of the placenta.