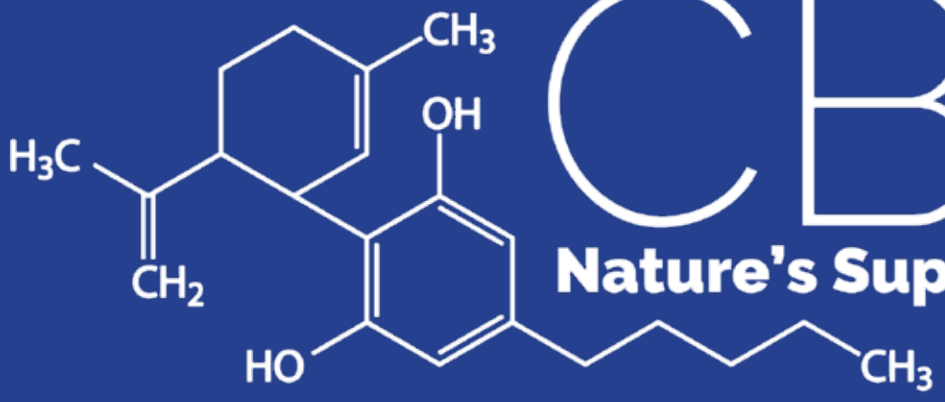
(cannabidiol)

CBD

Nature's Supplement



Introduction

It's about being healthy not high.

Even though it seems like cannabidiol (CBD) is something new, it has been used by humans since the dawn of civilization. CBD is a natural constituent of cannabis, a plant that has been utilized for centuries as medicine. CBD itself was first identified in the 1930s and 1940s, and its specific chemical structure was not documented until 1963. The research didn't end there; many scientists now consider CBD to be the single most important cannabinoid ever discovered. You may hear more about THC (Δ9-tetrahydrocannabinol) in the news—it's the cannabinoid that gets you "high"—yet CBD is the real cannabinoid superstar. CBD is responsible for most of the health and wellness benefits of the cannabis plant without the psychoactivity of THC. And new benefits are being discovered all the time! In this report, you'll learn about CBD, your endocannabinoid system, and you'll see a tiny sample of the research that's been conducted and continues to be pursued worldwide.

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About Hemp

How is hemp different from marijuana?

Hemp and marijuana are different varieties of *Cannabis Sativa*, a diecious, flowering herb indigenous to many parts of the world. "Marijuana" is cultivated for high levels of THC, which is concentrated mostly in the flowers and trichomes of the plant.[1] Industrial hemp is cultivated for its fiber, and has trace levels of THC and comparatively higher levels of CBD. Hemp has been grown and cultivated worldwide for thousands of years for industrial and medical purposes, making useful items like rope, clothing, sails, paper, and thousands of other products. Hemp will not make you "high"[2] and, in fact, hemp contains almost every dietary essential we can't make ourselves.

The industrial hemp plant—although it contains little THC—has fallen victim to its close resemblance to marijuana. Other than a brief period during World War II, hemp has not been grown in the US since the 1930s[4]—with the exception of a USDA field grown in 1994 in Imperial Valley, California. This USDA-grown field was the product of the hard work of Christopher Boucher, who continues to be a modern-day hemp industry pioneer.[5] While permits to grow hemp are technically available from the US government, and certain states have passed laws allowing hemp to grow as an agricultural commodity, no permit to grow hemp has ever been issued by the DEA.[6]

Why would hemp (instead of marijuana) be grown for cannabidiol (CBD)?

Hemp is cannabis that grows as nature intended. Hemp is naturally rich in cannabidiol and low in THC. Most marijuana is carefully cultivated to be just the opposite: high in THC and low in CBD. When hemp is grown from specific cannabis varieties that have even higher levels of CBD naturally, it doesn't make legal or practical sense to obtain CBD from marijuana.

Through a combination of special plant cultivars, advanced plant genetics and growing techniques, an exceptionally high percentage of CBD can be produced naturally and consistently in the hemp plant. Through the application of proprietary technologies, certain companies have perfected a means of extracting CBD from hemp with an almost 99% purity rate, creating legal and non-psychoactive CBD-rich hemp oil. Because the federal government considers hemp distinct from marijuana, cannabinoids found naturally in hemp oil and hemp products face no legal restrictions and may be freely imported to the United States and in most of the industrialized world.[7] When derived from hemp, CBD-rich oil is the best way to obtain the benefits of the cannabis plant legally.

If one ingests CBD-rich hemp oil, will they fail a drug test?

It is unlikely, and here's the science: Immunoassays developed to detect THC metabolites usually have certain degrees of cross-reactivity with CBN (another cannabinoid), but have minimal or no detectable level of cross-reactivity with the ring-opened compounds such as CBD, CBC (cannabichromene), and CBG (cannabigerol). This means that CBD can adopt a very different conformation compared to THC. This ring-opened property of CBD causes the antibodies to not recognize the molecule and, therefore, CBD itself cannot trigger a positive result on a drug test. However, all hemp products contain trace amounts of THC and other cannabinoids that may be detected on sensitive drug screening tests. It is always wise to consult with your employer or with the testing providers themselves to determine the best way to adhere to specific substance testing requirements. For example, there are many employers who recommend that employees avoid poppy seeds and hemp products because of the potential that they could trigger a "false positive" test result.

Cannabidiol (CBD)

CBD is the second most prominent naturally occurring cannabinoid found in cannabis, comprising up to 40% of the plant.[8]

After THC (Δ9-tetrahydrocannabinol), CBD is by far the most studied natural cannabinoid and is the c**annabinoid that possesses the greatest therapeutic potential.** According to many scientists, physicians and researchers, **CBD may be the single most important cannabinoid ever discovered.**

Cannabidiol was first isolated in the 1930s and 1940s. Its structure and configuration were fully described in the1960s by Professor Raphael Mechoulam and his team of researchers in Israel. PubMed.gov—a service of the National Institutes of Health—has indexed over 1,100 studies on cannabidiol.[9]

Cannabidiol is "a cannabinoid devoid of psychoactive effect,"[10] and may have broad clinical potential for a wide spectrum of ailments. **CBD has been shown, in clinical settings, to alleviate symptoms associated with:**

- **Convulsions**
- **Inflammation**
- **Anxiety**
- **Nausea**
- **Metastasis of certain cancers**

In fact, hundreds of peer-reviewed studies indicate that CBD possesses rich clinical potential. **A literature review from 2009 recapped CBD's therapeutic capabilities:**

- **Anxiolytic**
- **Anti-psychotic**
- **Anti-epileptic**
- **Neuroprotectant**
- **Vasorelaxant**
- **Antispasmodic**
- **Anti-ischemic**
- **Anticancer**
- **Anti-emetic**
- **Antibacterial**
- **Anti-diabetic**
- **Anti-inflammatory**
- **Bone growth.**[11]

CBD: Nature's Supplement

In 2003, the US government patented CBD for medical use (more on that later) and made the following claims:

"CBD is a method of treating diseases caused by oxidative stress, comprising administering a therapeutically effective amount of a cannabinoid that has substantially no binding to the NMDA receptor to a subject who has a disease caused by oxidative stress."

"These studies with the non-psychotropic marijuana constituent, cannabidiol, demonstrate that **protection can be achieved against both glutamate neurotoxicity and free radical induced cell death." "Cannabidiol also acts as an anti-epileptic and anxiolytic**, which makes it particularly useful in the treatment of neurological diseases in which neuroanatomic defects can predispose to seizures (e.g. subarachnoid hemorrhage)."

"This unexpected superior antioxidant activity (in the absence of BHT tumor promoting activity) shows for the first time that **cannabidiol, and other cannabinoids, can be used as antioxidant drugs** in the treatment (including prophylaxis) of oxidation associated diseases, **and is particularly useful as a neuroprotectant."**[12]

The Endocannabinoid System

Everyone has an endocannabinoid system (ECS).[13] In fact, the ECS evolved long before humans; it is over 600 million years old. It regulates variety of biological processes, like pain, sleep, mood, and appetite. However, experts believe that the overall function of the ECS is the regulation of homeostasis. It is difficult to succinctly describe a complex system like the ECS, but what's important to know is that there are two main types of cannabinoid receptors— CB1 and CB2—on cells throughout the body. They are most abundant in the brain and immune system respectively. Your body naturally makes its own cannabinoids—endocannabinoids like anandamide and 2-AG—that share a similar chemical structure with plant-based cannabinoids like CBD. Endocannabinoids (and plant-based cannabinoids) link with protein molecule receptors—called cannabinoid receptors—on the surface of cells. CBD has also been shown to strengthen and improve the efficiency of mitochondria, the "powerhouses" of your cells that are responsible for ensuring that your cells work the way they should. [14] Research on the ECS has shown that as part of regulating homeostasis, and is responsible for repairing damaged cells. Research has also shown that cannabinoids are able to target cancer cells while sparing normal cells, meaning that the endocannabinoid system may act as a biological defense system.amazing potential, the ECS has become an attractive target for pharmaceutical drug development.

When a person ingests CBD or other cannabinoids, these cannabinoid receptors are activated. (CBD appears to have a greater affinity for CB2 receptors than CB1 receptors.) Research indicates that when you supplement your ECS with nontoxic, non-habit-forming cannabinoids, you may create a healthier endocannabinoid system and, almost certainly, a healthier you.[16]

From the National Institutes of Helath in 2006

"In the past decade, the endocannabinoid system has been implicated in a growing number of physiological functions, both in the central and peripheral nervous systems and in peripheral organs… modulating the activity of the endocannabinoid system turned out to hold therapeutic promise in a wide range of disparate diseases and pathological conditions, ranging from mood and anxiety disorders, movement disorders such as Parkinson's and Huntington's disease, neuropathic pain, multiple sclerosis and spinal cord injury, to cancer, atherosclerosis, myocardial infarction, stroke, hypertension, glaucoma, obesity/metabolic syndrome, and osteoporosis, to name just a few…"[17]

Emerging Research

The United States government (as represented by the Department of Health and Human Services) is the holder of:

US patent #6,630,507 – "*Cannabinoids as antioxidants and neuroprotectants*."[18]

This patent, commonly known as "the '*507 Patent*," *defines the benefits of CBD as recognized by the US government.* A biopharmaceutical company, KannaLife Sciences, Inc., has been awarded an exclusive license agreement with the National Institutes of Health – Office of Technology Transfer ("NIH-OTT") for the commercialization of the '**507 Patent**.[19]

The existence of this patent—filed in 2003—means that the *US Government is aware of the many potential health benefits of CBD*. The following pages are just a tiny sample of the thousands of peer-reviewed studies, news reports, and medical clinical research on cannabidiol.

Overall Safety of CBD

NORML—*Study: Non-Psychotropic Cannabinoid Proven to Be Safe in Humans*[20]

The oral administration of the non-psychotropic cannabis plant constituent cannabidiol (CBD) is safe and well tolerated in humans, according to clinical trial data published online by the journal Current Pharmaceutical Design.

Investigators reported that the oral administration of 10 mg of THC was associated with various physiological and behavioral effects—such as increased heart rate and sedation—whereas the oral administration of 600 mg of CBD was not.

They concluded, "There were no differences between CBD and placebo on any symptomatic, physiological variable. ... In healthy volunteers, THC has marked acute behavioral and physiological effects, **whereas CBD has proven to be safe and well tolerated."**

CNN—*Dr. Sanjay Gupta: Why I changed my mind on weed*[21]

We have been terribly and systematically misled for nearly 70 years in the United States, and I apologize for my own role in that. […] Keep in mind that up until 1943, marijuana was part of the United States drug pharmacopeia. One of the conditions for which it was prescribed was neuropathic pain…

Most frightening to me is that someone dies in the United States every 19 minutes from a prescription drug overdose, mostly accidental. Every 19 minutes. It is a horrifying statistic. As much as I searched, **I could not find a documented case of death from marijuana overdose.**

CNS Neuroscience & Therapeutics—*Cannabidiol: A Promising Drug for Neurodegenerative Disorders?*[23]

… CBD, which constitutes up to 40% of the Cannabis extract, may represent the most promising candidate for clinical utilization due to its remarkable lack of any cognitive and psychoactive actions, in addition to its excellent tolerability profile in humans. Because of its very low toxicity in humans, a large number of trials have been performed to assess the clinical efficacy of CBD in different pathologies.

Cancer

Cancer Cancer.gov—*Cannabis and Cannabinoids (PDQ®)*[24]

Cannabinoids may cause **anti-tumor effects by various mechanisms, including induction of cell death, inhibition of cell growth, and inhibition of tumor angiogenesis invasion and metastasis**. One review summarizes the molecular mechanisms of action of cannabinoids as anti-tumor agents. Cannabinoids appear to kill tumor cells but do not affect their non-transformed counterparts and may even protect them from cell death. These compounds have been shown to induce apoptosis in glioma cells in culture and induce regression of glioma tumors in mice and rats. Cannabinoids protect normal glial cells of astroglial and oligodendroglial lineages from apoptosis mediated by the CB1 receptor.

San Francisco Chronicle—*Pot compound seen as tool against cancer*[25]

When McAllister and Desprez exposed the cells to cannabidiol in a petri dish, the cells not only stopped acting "crazy" but they also started to revert to a normal state. Both scientists were shocked. […]What they found is that the cannabinoid turns off the overexpression of ID-1, which makes the cells lose their ability to travel to distant tissues. **In other words, it keeps the cells more local and blocks their ability to metastasize**. Cancer kills through its ability to metastasize.

University of South Carolina School of Medicine—*Cannabidiol induced apoptosis in human leukemia cells: A novel role of cannabidiol in the regulation of p22phox and Nox4 expression.*[26]

The role of the mitochondria was further suggested as exposure to cannabidiol led to loss of mitochondrial membrane potential and release of cytochrome c. It is noteworthy that cannabidiol exposure led to an increase in reactive oxygen species (ROS) production as well as an increase in the expression of the NAD(P)H oxidases Nox4 and p22(phox). Furthermore, cannabidiol- induced apoptosis and reactive oxygen species (ROS) levels could be blocked by treatment with the ROS scavengers or the NAD(P)H oxidase inhibitors. Finally, cannabidiol exposure led to a decrease in the levels of p-p38 mitogen-activated protein kinase, which could be blocked by treatment with a CB2-selective antagonist or ROS scavenger. Together, **the results from this study reveal that cannabidiol, acting through CB2 and regulation of Nox4 and p22(phox) expression, may be a novel and highly selective treatment for leukemia.**

University of Milan—*Cannabidiol as potential anticancer drug.*[27]

Indeed, **cannabinoids possess anti-proliferative and pro-apoptotic effects and they are known to interfere with tumor neovascularization, cancer cell migration, adhesion, invasion and metastasization.** However, the clinical use of Δ(9)-THC and additional cannabinoid agonists is often limited by their unwanted psychoactive side effects, and for this reason **interest in nonpsychoactive cannabinoid compounds with structural affinity for Δ(9)-THC, such as cannabidiol (CBD), has substantially increased in recent years.**

Seizures & Epilepsy

CNN—*Medical marijuana helps stem 6-year-old's seizures*[28]

The liquid, nonpsychoactive form of marijuana that Jayden takes ensures the boy doesn't get "high." In a laboratory, the marijuana is distilled down to mostly cannabidiols, which advocates say is the potent medicinal value of the drug.

Seizure—*Cannabidiol exerts anti-convulsant effects in animal models of temporal lobe and partial seizures*[29]

Cannabis sativa has been associated with contradictory effects upon seizure states despite its medicinal use by numerous people with epilepsy. We have recently shown that **the phytocannabinoid cannabidiol (CBD) reduces seizure severity and lethality in the well-established in vivo model of pentylenetetrazole induced generalised seizures**, suggesting that earlier, smallscale clinical trials examining CBD effects in people with epilepsy warrant renewed attention. Here, we report the effects of pure CBD (1, 10 and 100 mg/kg) in two other established rodent seizure models, the acute pilocarpine model of temporal lobe seizure and the penicillin model of partial seizure.

Seizure activity wasvideo recorded and scored offline using model-specific seizure severity scales. In the pilocarpine model CBD (all doses) significantly reduced the percentage of animals experiencing the most severe seizures. In the penicillin model, CBD (10 mg/kg) significantly decreased the percentage mortality as a result of seizures; CBD (all doses) also decreased the percentage of animals experiencing the most severe tonic–clonic seizures. These results extend the anticonvulsant profile of **CBD; when combined with a reported absence of psychoactive effects, this evidence strongly supports CBD as a therapeutic candidate for a diverse range of human epilepsies.**

Pharmacology—*Chronic administration of cannabidiol to healthy volunteers and epileptic patients*[30]

In phase 1 of the study, 3 mg/kg daily of cannabidiol (CBD) was given for 30 days to 8 health human volunteers. Another 8 volunteers received the same number of identical capsules containing glucose as placebo in a double-blind setting. Neurological and physical examinations, blood and urine analysis, ECG and EEG were performed at weekly intervals.
In phase 2 of the study, 15 patients suffering from secondary generalized epilepsy with temporal focus were randomly divided into two groups. Each patient received, in a double blind procedure, 200-300 mg daily of CBD or placebo.
The drugs were administered for along as 4 1/2 months. Clinical and laboratory examinations, EEG and ECG were performed at 15- or 30-day intervals.

Throughout the experiment the patients continued to take the antiepileptic drugs prescribed before the experiment, although these drugs no longer controlled the signs of the disease. All patients and volunteers tolerated CBD very well and no signs of toxicity or serious side effects were detected on examination.

4 of the 8 CBD subjects remained almost free of convulsive crises throughout the experiment and 3 other patients demonstrated partial improvement in their clinical condition. CBD was ineffective in 1 patient. The clinical condition of 7 placebo patients remained unchanged whereas the condition of 1 patient clearly improved. The potential use of CBD as an antiepileptic drug and its possible potentiating effect on other antiepileptic drugs are discussed.

Dementia & Alzheimer's

The Border Mail—*Cannabis may help reverse dementia: study* [31]

A team from Neuroscience Research Australia is in the early stages of research examining if one of the main active ingredients in cannabis, called cannabidiol, could reverse some of the symptoms of memory loss in animals.

Tim Karl, a senior research fellow with the group, said cannabidiol does not have the same psychoactive effects as the main component of marijuana, THC, but it has been found to have anti-inflammatory, antioxidant and other effects that could be beneficial for the brain. […] The cell research, done at the University of Wollongong, found treating the cells with cannabidiol also reduced the amount of the harmful protein that they produced.

Dr Karl said there had been case reports in medical literature of marijuana smokers who had developed Alzheimer's disease, only to find their smoking seemed to relieve some of their symptoms.

"Most of the components [of marijuana] are detrimental, they worsen your cognitive performance and have psychoactive effects… cannabidiol seems to not have any of these negative effects," he said.

Collective Evolution—*New Study Shows Cannabinoids Improve Efficiency Of Mitochondria And Remove Damaged Brain Cells* [32]

A recent study conducted by Andras Biokei-Gorzo at the Institute of Molecular Psychiatry at the University of Bonn in Germany is suggesting that marijuana(or **the activation of the brain's cannabinoid system) triggers the release of antioxidants, which act as a cleansing mechanism**. This process is known to remove damaged cells and improve the efficiency of mitochondria. Mitochondria is the energy source that powers cells. The study was published in Philosophical Transactions Of The Royal Society, B. You can read the entire study here.

Israel National News—*Israeli Research Shows Cannabidiol May Slow Alzheimer's Disease* [33]

The research, still at an early stage, indicates that memory loss, the first and primary symptom of Alzheimer's disease, can be slowed down significantly in mice by cannabidiol. […]In the study conducted by Professor Raphael Mechoulam and a team led by Dr. Maria de Ceballos at the Cajal Institute in Madrid, Spain, mice were injected with a molecule found in the brain of humans suffering from Alzheimer's disease, and then treated for one week with cannabidiol. […] Mechoulam presented the findings this week at the Cannabis Medicines Symposium in London, hosted by the Royal Pharmaceutical Society of Great Britain (RPSGB) and said that human trials will hopefully follow in the near future. […] Mechoulam was the first scientist to isolate the THC component of cannabis and later discovered the first endo-cannabinoid.

Drug Withdrawl

Addictive Behaviors—*Cannabidiol Reduces Cigarette Consumption In Tobacco Smokers* [34]

The role of the endocannabinoid system in nicotine addiction is being increasingly acknowledged. From the University College in London, this study published in the September 2012 issue of "Addictive Behavior" found that **cannabidiol (CBD) reduces cigarette consumption in tobacco smokers.**

The American Journal on Addictions—*Impact of Cannabis Use during Stabilization on Methadone Maintenance Treatment*[35]

A new study conducted by researchers at the Farber Institute for Neurosciences at Thomas Jefferson University, located in Philadelphia have determined through the close observation of 90+ opiate dependent individuals, that marijuana greatly reduces withdrawal symptoms in addicts undergoing methadone treatment. Concluding that, "**the present findings may point to a novel intervention to be employed during treatment for opiate dependencies that specifically targets cannabinoid– opiate system interactions.**" When asked to rate their withdraw discomfort level on the clinical opiate withdrawal scale, most recovering addicts found increased marijuana consumption reduced the level of discomfort associated with a painful process of opiate withdrawal. Leading scientists involved in this research to surmise, "these results suggested a potential role for cannabis and reduction of withdrawal severity during methadone induction."

Mount Sinai School of Medicine—*Cannabidiol as Treatment Intervention for Opioid Relapse (Medical Research Study)*[36]

Using a strategy of indirectly regulating neural systems to modulate opioid-related behavior, our preclinical rodent studies consistently demonstrated that cannabidiol (CBD), a non psychoactive component of cannabis, specifically inhibited cue-induced heroin-seeking behavior. **CBD's selective effect on drug-seeking behavior was pronounced after 24 hrs and endured even two weeks after the last drug administration following short-term CBD exposure. The fact that drug craving is generally triggered by exposure to conditioned cues suggests that CBD might be an effective treatment for heroin craving**, especially given its protracted impact on behavior. CBD has already been shown in Phase I of our study and in various clinical studies to be well tolerated with a wide safety margin in human subjects. CBD thus represents a strong candidate for the development as a potential therapeutic agent in humans for opioid craving and relapse prevention.

Autism

Stanford University via The Scientist—*A Link Between Autism and Cannabinoids,*[37]

Neuron—*Autism-Associated Neuroligin-3 Mutations Commonly Disrupt Tonic Endocannabinoid Signaling.*[38]

A new study shows that mutations associated with autism block the action of brain molecules that act on the same receptors that marijuana's active chemical acts on. […] Two autism-related mutations in a synapseadhesion protein lead to deficits in prolonged endocannabinoid signaling in mice. It's a surprising connection that suggests such signaling problems could be implicated in autism spectrum disorders…

Tonic endocannabinoid signaling is long-lasting and contrasts with the brief pulses characteristic of phasic signaling. **Endocannabinoid signaling in general affects memory formation, learning, pain, and other important processes**, but the distinctions between tonic and phasic signaling have been poorly understood.

"It's a very stimulating finding which could be a real turning point in understanding tonic endocannabinoids and how this otherwise mysterious lipid signaling really works," said Bradley Alger, a neuroscientist at the University of Maryland School of Medicine who was not involved in the study.

ABC News—*Mother Gives Son Marijuana to Treat His Autism* [39]

"I'm not aware of any research on the efficacy of marijuana on the treatment of autism," said Stephen M. Edelson, director of the Autism Research Institute, which collects information from parents on alternative treatments they try. "That doesn't mean it doesn't work, it just means there's not scientific documentation that it does work." […] "As far as research, no there isn't and I would think there should be," said Edelson. **"That could be one of the few options to treat children who have these very severe behaviors."**

O'Shaughnessy's—*A Novel Approach to the Symptomatic Treatment of Autism* [40]

Parents of some autistic children report that cannabis eases behavioral problems more effectively than conventional pharmaceuticals. Their anecdotal evidence should be taken seriously by medical researchers.

The following anecdote was provided by Marie Myung- Ok Lee who teaches at Brown University. She is the author of the novel Somebody's Daughter and is a winner of the Richard Margolis award for social justice reporting. "My son J, who is nine years old, has autism. He's also had two serious surgeries for a spinal cord tumor and has an inflammatory bowel condition, all of which may be causing him pain, if he could tell us." […]

"Since we started him on his 'special tea,' J's face, which is sometimes a mask of pain, has softened. He smiles more. For the last year, his individual education plan at his special-needs school was full of blanks because he spent his whole day in an irritated, frustrated mess. Now, April's report shows real progress, including "two community outings with the absence of aggressions."

Heart Health & Diabetes

Graduate Entry Medicine & Health, Royal Derby Hospital— *Is the cardiovascular system a therapeutic target for cannabidiol?* [41]

Cannabidiol (CBD) has beneficial effects in disorders as wide ranging as diabetes, Huntington's disease, cancer and colitis. Accumulating evidence now also suggests that CBD is beneficial in the cardiovascular system. CBD has direct actions on isolated arteries, causing both acute and time-dependent vasorelaxation. In vitro incubation with CBD enhances the vasorelaxant responses in animal models of impaired endotheliumdependent vasorelaxation. **CBD protects against the vascular damage caused by a high glucose environment, inflammation or the induction of type 2 diabetes in animal models and reduces the vascular hyperpermeability associated with such environments.** A common theme throughout these studies is the anti-inflammatory and anti-oxidant effect of CBD. […] Similarly, in a different model of ischaemia-reperfusion, CBD has been shown to reduce infarct size and increase blood flow in animal models of stroke, sensitive to 5HT(1A) receptor antagonism. Although acute or chronic CBD treatment seems to have little effect on haemodynamics, **CBD reduces the cardiovascular response to models of stress, applied either systemically or intracranially, inhibited by a 5HT(1A) receptor antagonist. In blood, CBD influences the survival and death of white blood cells, white blood cell migration and platelet aggregation.** Taken together, these preclinical data appear to support a positive role for CBD treatment in the heart, and in peripheral and cerebral vasculature. However, further work is required to strengthen this hypothesis, establish mechanisms of action and whether similar responses to CBD would be observed in humans.

Multiple Sclerosis

British Journal of Pharmacology—*Cannabidiol inhibits pathogenic T cells, decreases spinal microglial activation and ameliorates multiple sclerosis-like disease in C57BL/6 mice* [42]

KEY RESULTS: Treatment with CBD during disease onset ameliorated the severity of the clinical signs of EAE. This effect of CBD was accompanied by diminished axonal damage and inflammation as well as microglial activation and T-cell recruitment in the spinal cord of MOG-injected mice. Moreover, CBD inhibited MOG-induced T-cell proliferation in vitro at both low and high concentrations of the myelin antigen. This effect was not mediated via the known cannabinoid CB1 and CB2 receptors. […] Suppression of microglial activity and T-cell proliferation by CBD appeared to contribute to these beneficial effects.

Schizophrenia Department

CNS Diseases Research—*Medical use of cannabis. Cannabidiol: a new light for schizophrenia?* [43]

Given the need to reduce the side effects of marketed antipsychotics, and their weak efficacy on some schizophrenic symptoms, cannabinoids have been suggested as a possible alternative treatment for schizophrenia. **CBD, a non-psychoactive constituent of the Cannabis Sativa plant, has been receiving growing attention for its anti-psychotic-like properties.** Evidence suggests that CBD can ameliorate positive and negative symptoms of schizophrenia. Behavioral and neurochemical models suggest that CBD has a pharmacological profile similar to that of atypical anti-psychotic drugs and a clinical trial reported that this cannabinoid is a well-tolerated alternative treatment for schizophrenia.

CBD: Nature's Supplement

CBD's time is here

The medical cannabis movement continues to research the therapeutic properties of THC, but *research continues to reveal the immense health benefits of CBD—without the psychoactive effects from THC.* In fact, there have been more scientific studies on CBD in the last decade, than in the years since its discovery. The results of this research have been promising for many ailments. The non-psychoactive, non-addictive CBD might be the cannabinoid that brings cannabis prohibition to an end. As the push for cannabis legalization continues, the demand for access to CBD for research, clinical trials, and drug development will only increase. Hundreds of scientists from pharmaceutical companies— including *Merck, Pfizer, Eli Lilly, Bristol-Myers Squibb, AstraZeneca, and Allergan*—are regularly attending meetings of the International Cannabinoid Research Society.

With Big Pharma and its lobbying apparatus getting behind medical cannabis, is it only a matter of time before legislative action follows? We believe so. At the same time, the groundswell of public support for medicinal cannabis continues to gain strength. The writing is on the wall: *Medical cannabis has finally arrived*.

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