

# Growing Potential: An Introduction to Medicinal Cannabis in New Zealand

## Foreword

With the Medicinal Cannabis market growing both internationally and here in New Zealand, the future of cannabis is looking bright.

Emerging scientific research is continually demonstrating the efficacy of cannabis-derived medical products for treating a range of conditions, with the market increase reflective of changing attitudes towards cannabis as medicine and acceptance of it as a welcome pharmacological resource to improve lives.

If you're looking for more specific information on the scope of treatment options medicinal cannabis may provide, or are simply curious about the potential of medicinal cannabis, it's important to be informed so you can make the right decision.

This resource has been written as a quick insight into cannabis, from its history and legality around the world, to the plant, its medical applications and efficacy in treating symptoms across a range of conditions.

You'll also learn about the work we're doing at NUBU, to make high-quality cannabis-based medicines accessible to kiwis who need them, and drive innovation in this exciting industry.



Mark Dye, CEO

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# The History of Cannabis

## A Brief History

Cannabis sativa is one of the world's oldest cultivated plants, with written records of its use amongst humans dating back to the 6th century B.C. Thought to have originated even further back in Europe and East Asia in the Holocene period, cannabis has a long and complex history as a plant that's been both revered and reviled by cultures alike as societies and attitudes have evolved over time.

Featuring in Western medicine as far back as 1840, the pharmacological properties of cannabis have been of interest to physicians, curious about its potential for treating a range of afflictions. William B. O'Shaughnessy, an Irish physician working in Calcutta introduced cannabis to Western medicine for tetanus and convulsive diseases. Around this time, Jean-Jacques Moreay de Tours experimented with cannabis for mental disorders. Despite this early interest in the plant's pharmacological properties, political and societal influences converged in the early 1900's to demonise cannabis for its potential for recreational use with the drug being federally prohibited in 1937, through the Marihuana Tax Act. This initiated a decades long smear campaign, spreading misinformation and fear about cannabis and severely inhibiting scientific research into the world of benefits this still mysterious plant has to offer humankind. (Bridgeman & Abazia, 2017,)

## Cannabis in New Zealand

The story of Cannabis in New Zealand is thought to have begun with Sister Mary Joseph Aubert. Sister Mary was a French nurse who immigrated to New Zealand from France in 1860 after refusing to accept an arranged marriage. She wanted to teach the indigenous population and on arrival in New Zealand began working with young Māori women in Auckland. In 1883 she moved to Jerusalem (Hiruharama) on the banks of the Whanganui River, starting a Catholic mission a few years later, known as Daughters of our Lady of Compassion.

It was here in Jerusalem that Mary began farming, growing fruit and collecting native plants including a crop that at the time was known as Indian hemp. Her charity work at the mission was not cheap, however Sister Mary was able to fund her enterprises by making and selling medicines from the native plants, of which many sources suggest, included cannabis. A

website dedicated to the life and teachings of Sister Mary Joseph Aubert says “it is hard to confirm the truth or otherwise of such accounts”.

The first official acknowledgement of cannabis' existence in New Zealand came in 1889 when The New Zealand Herb Doctor was published. For asthma, spasmodic coughs, neuralgia and menstrual cramps the recommended remedy was Indian hemp, to be smoked or taken as a tincture. The annual exam for pharmacy students also included a section on the preparation of cannabis. In 1891 Sister Mary signed a contract with Dunedin firm Kempthorne Prosser & Co to market her medicines to the public. Within the first 3 months over 10,000 bottles of Sister Mary's medicines were sold in Wellington alone. In 1894 Sister Mary pursued legal action against Kempthorne Prosser & Co for watering down her products in the search for increased profits.

# The Science: Breaking down the Cannabis Plant

The key to understanding the role cannabinoids have in medicine is exploring the plant responsible for producing them, cannabis.

A name associated with significant stigma and misinformation, the cannabis plant is highly versatile, grown in a number of locations around the world where it's used for everything from textiles to biofuels and as a therapeutic agent (Ladha et al., 2020).

## Cannabis at a glance

The cannabis plant has two key subspecies; Cannabis indica and Cannabis sativa, both with different physical characteristics.

### Indica

Indica-dominant cannabis strains are shorter, with dark green leaves and a higher cannabidiol content.

### Sativa

Sativa-dominant strains are typically taller, with thin leaves and are of a pale, green colour. These strains have a higher THC content.

The cannabis plant is incredibly complex, containing around 426 chemical constituents, more than 60 of which are cannabinoids. Of these, the most-researched are  $\Delta$ -9-THC, CBD,  $\Delta$ -8-THC and cannabinol.

Other major cannabinoids are

- Cannabigerol (CBG)
- Cannabidivarin (CBDV)
- Cannabinol (CBN)

With THC and CBD occurring in the highest volume, both with therapeutic applications, these present the greatest potential for medical benefits and will be explored here (Atakan, 2012).

## CBD vs THC

So what exactly is the difference?

### **CBD**

Cannabidiol (CBD) is a key cannabinoid found in cannabis and has significant medical potential. Though it has a low binding affinity for the CB1 and CB2 receptors, it's thought CBD's effects on the body may be regulated by other receptors. Cannabidiol is a mild analgesic, with anti-inflammatory applications. It's also an antioxidant and has shown promise in treating conditions like epilepsy and fibromyalgia, among others.

### **THC**

THC is the cannabinoid responsible for producing a 'high' as it is psychoactive. THC also has therapeutic effects and applications as an antiemetic, analgesic, antioxidant, anxiolytic, as well as the potential to inhibit the growth of cancer cells (Atakan, 2012).

### The Medical Benefits of CBD vs THC

<b>CBD</b>	<b>THC</b>
Anti-seizure	Analgesic
Anti-inflammatory	Anti-nausea
Analgesic	Appetite stimulant
Anti-tumor effects	Reduces glaucoma symptoms
Anti-psychotic	Sleep aid
Inflammatory bowel disease	Anti-anxiety
Depression	Muscular spasticity

## Other compounds

Alongside these, the plant also produces over 200 terpenes and numerous terpenoids and flavonoids. Interestingly, these are similarly being studied for their potential to moderate the characteristics of cannabis and its pharmacological effects.

### **Terpenes**

Responsible for giving cannabis its scent and flavour, terpenes are aromatic oils found in cannabis (and other plants) that impact its effects. There are over 20,000 known terpenes, with approximately 100 thought to exist in cannabis and hemp.

### **Flavonoids**

Flavonoids are antioxidant-rich compounds found in nature and many common foods, comprising up to 10% of a cannabis plant. They impact things like pigmentation, smell and flavour working synergistically with terpenes and cannabinoids to produce unique therapeutic effects.

While this barely scratches the surface when it comes to understanding the complexity of the cannabis plant, the compounds here are the reason why cannabis is being explored as a profound pharmacological aid, with the ability to regulate bodily functions and provide relief for a range of conditions (Atakan, 2012).

Let's explore the evidence for this below.

# The Science: Endocannabinoids

## The Endocannabinoid System

The pharmacological effects of cannabis are regulated by the endocannabinoid system (ECS), a complex cell-signalling system, discovered in the 1990's by medical researchers exploring the cannabinoid, THC (Sallaberry & Astern, 2018).

While researchers are still trying to understand the complex nature of this system, it has a definitive role in regulating a number of bodily mechanisms and disorders, including appetite, learning and memory, anxiety, depression, schizophrenia, stroke, multiple sclerosis, neurodegeneration, epilepsy, and addiction (De Fonseca et al., 2005).

## How it works

The Endocannabinoid System is an integrated system involving three key mechanisms:

- Endocannabinoid Receptors
- Endocannabinoids
- Enzymes

(Lu & Mackie, 2015)

## Endocannabinoid Receptors

Endocannabinoid receptors are present throughout the human body, located in organs, the brain, the GI tract, skeletal muscles and reproductive system. Cannabinoids bind to these to initiate a physiological response.

There are two major endocannabinoid receptors:

CB1 Receptors - found mostly in the central nervous system (CNS)

CB1 receptors are a key receptor in the CNS, essential for maintaining brain health and function. These are also the receptors responsible for the psychoactive effects of THC - one of 113 cannabinoids present in the cannabis plant.



CB2 Receptors - found in the peripheral nervous system (PNS).

CB2 receptors are typically found in immune cells. These influence inflammation and the body's immune response.

The physiological response elicited is determined by the receptor location and the endocannabinoid it binds to, complexifying the relationship between these two major components of the ECS (De Fonseca et al., 2005).

## Endocannabinoids

Endocannabinoids are endogenous cannabinoids, which are neurotransmitters produced by the body. These are similar to phytocannabinoids, occurring naturally in the cannabis plant (Zou & Kumar, 2018).

- Anandamide (AEA)
- 2-arachidonoylglycerol (2-AG)

Derived from arachidonic acid, they bind to CB receptors, primarily CB1 and CB2, signalling them to elicit the physiological response (Gertsch et al., 2010).

## Enzymes

Enzymes are a crucial component of the system, responsible for metabolising endocannabinoids post-use (Basavarajappa, 2007).

The two key enzymes involved in this process are:

- fatty acid amide hydrolase, which breaks down AEA
- monoacylglycerol acid lipase, which typically breaks down 2-AG

The therapeutic potential of medical cannabis is a result of this complex system.

When exogenous cannabinoids are introduced to the body, they mimic endocannabinoids and modulate this system in the same way.

Modulation of this system has demonstrated therapeutic promise in a wide range of disparate diseases and pathological conditions, ranging from mood and anxiety disorders to neuropathic pain, cancer, stroke, hypertension, glaucoma and more (Pacher et al., 2006).

# The Evidence: Potential Health Benefits

Restrictions around cannabis for the majority of the 20th century impeded scientific development in the area of therapeutic research. With a number of anecdotal reports of cannabis as a therapeutic and pharmacological aid, it hasn't been until the last quarter of the century that pioneering clinical research has supported many of the claims and hypotheses around cannabis and its medical applications.

Discovery of the endocannabinoid system opened up new possibilities in the medical cannabis field, with changing public sentiment, regulation and the exponential increase in controlled studies now giving weight to a number of treatment uses for cannabis.

While research as a whole is still in its infancy, there are conditions for which cannabis shows strong evidence as a suitable treatment option, with limited evidence for others and some still being explored.

'The Health Effects of Cannabis and Cannabinoids: The Current State of Evidence and Recommendations for Research' by the National Academies of Sciences, Engineering, and Medicine in the USA, provides a comprehensive review of current scientific evidence related to the health effects and potential therapeutic benefits of cannabis.

## Good Evidence

Conditions for which there is strong/promising evidence for medical cannabis as a clinical aid:

- Chronic Pain
- Antiemetic for treatment of Chemotherapy-induced Nausea, Appetite Loss
- Spasticity with Multiple Sclerosis
- Epilepsy

## Moderate Evidence

Conditions for which there is moderate evidence for medical cannabis use as a clinical aid:

- Sleep Disorders
- Anxiety Disorders
- Fibromyalgia
- Appetite stimulation (HIV)
- PTSD

## Some Evidence

Conditions for which there is limited evidence for medical cannabis use as a clinical aid:

- Parkinson's Disease
- Glaucoma
- Agitation in Dementia
- Bladder Dysfunction
- Tourette's Syndrome

# The Evidence: Case Studies

With evidence already strongly supporting the use of cannabis as a treatment option for the conditions above, let's explore how and why cannabis.

## Chronic Pain

Chronic pain relief is the most common condition reported by patients using cannabis for relief. There is also evidence, particularly in the US, that a number of patients with moderate to severe pain as medical conditions are replacing opiate medications with cannabis. (National Academies of Sciences, Engineering, and Medicine et al., 2017,)

In the United States, Medicare Part D enrollees in states with medical access to cannabis suggest a significant reduction in the prescription of conventional pain medications (Bradford and Bradford, 2016).

## The Evidence

Five comprehensive studies of cannabis as a therapeutic treatment option for pain were cited as strong evidence of its efficacy. These spanned peripheral neuropathies, spinal cord damage and rheumatoid arthritis, as well as conditions like cancer pain, multiple sclerosis, musculoskeletal issues, and chemotherapy-induced pain (National Academies of Sciences, Engineering, and Medicine et al., 2017).

The consensus across all reviews was that cannabinoids demonstrate a modest effect on pain, showing its use for pain management is supported by robust clinical trials.

## Epilepsy

CBD has been evaluated, in addition to common anti-epileptic drugs (AEDs), in severe treatment-resistant epilepsy, through a number of recent studies and literature regarding clinical trials.

## The Evidence

Conducted over the past few decades, key studies investigated the potential effects of CBD in the management of epilepsy and as an adjunct to other AEDs, with many assessing their safety for use in infants, teenagers and children.

Assessment of all available literature provided consensus that CBD as an addition to other AEDs contributed to significant reductions in the frequency of convulsive and total seizures and improved quality of life in these patients too (Silvestro et al., 2019,).

## Spasticity

A significant number of patients with chronic neurological conditions such as multiple sclerosis (MS) and paraplegia due to spinal injury have been seeking alternative therapies, including cannabis, to treat symptoms of spasticity, manifesting as loss of motor control or sustained involuntary activation of muscles.

## The Evidence

Evidence from randomised controlled trials included in systematic reviews demonstrated an oral cannabis extract and orally-administered THC were effective for reducing spasticity scores in patients with MS. The available literature supports consensus that there is substantial evidence oral cannabinoids are an effective treatment for spasticity in affected patients, with limited evidence in the case of spinal injury (National Academies of Sciences, Engineering, and Medicine et al., 2017,).

As scientific understanding, prevalence of studies and use of cannabis increases through improved quality and accessibility of available medicines, it's expected that continued breakthroughs and applications for medical cannabis will be determined.

# Additional Information

## For Prescribers

When seeking positive outcomes for patients through medical treatment, we believe no stone should be left unturned. This means assessing the full scope of treatment options and making those that are suitable available to a patient who could benefit from them. If you've been curious about the benefits medicinal cannabis could have for your patients, or have received enquiries, there is a wealth of information available to help you make an informed decision about whether you should prescribe it.

This information covers all of the considerations you'll have when wanting to provide the highest level of care for your patient, including the pharmacological effects of the medication, quality and potency, reputability, availability and cost.

Fortunately, with a detailed overview, you'll have all the information you need to decide whether medicinal cannabis is the right choice as part your prescribed treatment plan.

[Get in touch](#) to access additional resources, educational tools or to speak to one of our team.

## Dispensers

When choosing the right medication to make available to your patients, there are a number of key criteria you'll hope to meet. From availability to accessibility and quality, you'll want to be sure you're not only providing your patients with the best possible treatment options, but that they will have sustainable and affordable access to the medications they need to see their health become the best it can be.

Medicinal cannabis is a treatment option that is becoming increasingly sought-after by doctors, patients and dispensers as an effective standalone treatment and alternative to other medications. It is also relatively new, which means many dispensers and pharmacists have questions around margins, availability and the ease-of-access for them and their patients.

If you're curious about how simple it is for you to source high-quality medicinal cannabis products, regulations and restrictions about dispensing them, or would simply like to know more so you can make an informed decision, [get in touch](#). We have a wealth of information to help you make the right move for your patients and business.

## For Patients

### **Accessing Medicinal Cannabis in New Zealand**

The Medicinal Cannabis scheme was introduced to New Zealand on the 1st of April 2020. The purpose of the scheme is to improve access to quality medicinal cannabis products for patients. Under the new scheme, cannabis-based medicines can be prescribed by a doctor without having to get specialist or ministerial approval, and it will be easier to create and manufacture these medicines in New Zealand as well as import them. Over time this will allow more patients to access a wide range of products that meet stringent minimum quality standards.

More information on the medicinal cannabis scheme can be found here:

<https://www.health.govt.nz/our-work/regulation-health-and-disability-system/medicinal-cannabis-agency/about-medicinal-cannabis-scheme>

If you think medicinal cannabis could help you, the first point of call is a visit to your GP. Your doctor will have knowledge of your medical history and is in the best position to advise you on whether a medicinal cannabis product is a suitable treatment option for you. If your GP determines that medicinal cannabis could be beneficial to your circumstances, they will be able to write you a prescription for a specific medicinal cannabis product. Once you have a prescription from a doctor, a pharmacy will be able to dispense the medication for you, in exactly the same manner as any other prescription medicine. The pharmacist will give you information on dosing and how to take the medicine.

Alternatively, there are several doctors and clinics around New Zealand who specialize in prescribing medicinal cannabis for treating a variety of conditions. As medicinal cannabis is a relatively new treatment option in New Zealand, some GPs may not feel comfortable prescribing it as a treatment option for their patients. If this is the case, these medicinal cannabis clinics will be your next best option.



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