

Use of cannabis extracts in small animal practice

Dr Edward Bassingthwaight
Whole Energy Body Balance Pty Ltd
8 Lutana Court, Frankston, Vic 3199

Introduction

CBD has a broad range of therapeutic benefits and is effective in reducing inflammation (which is present in most, if not all chronic diseases). CBD has a high therapeutic index, has minimal if any side effects, has a broad therapeutic spectrum, and awareness of this herbal medicine is growing in veterinary clients. People are actively seeking to treat their pets with it. How can we as vets advise our clients ethically?

The endo-cannabinoid system (ECS)

The ECS is a very deep regulatory system that is present in most animals, including mammals, birds, reptiles and fish. It has been evolutionarily conserved for at least 600 million years. Because of this, I believe that the data from research across species is likely to be of use in considering how the animals we treat will respond to treatment with exogenous cannabinoids.

The ECS is comprised of an abundance of receptors in a broad range of cells, tissues and organs throughout the body. The ECS is regulated by cannabinoids. A cannabinoid can be defined as a chemical compound that acts on an endo-cannabinoid receptor.

Endogenous cannabinoids (endo-cannabinoids) are short acting, being broken down enzymatically in a relatively short time. Exogenous cannabinoids have a much longer half life, increasing their potential and effectiveness as medicines.

There are two known types of endo-cannabinoid receptors, CB1 and CB2 (and it is likely there are more to yet be discovered). The two types of receptors have distinct functions and differing distributions throughout the body. CB1 receptors being found in higher concentrations in neural tissues – especially the brain and spinal cord. CB2 receptors are found in higher concentrations in immune tissues (the gut, spleen etc.).

However, both receptor types are widely distributed in many tissues and cell types throughout the body at lower concentrations. For example CB1 receptors are found in the liver, where activation has been found to increase lipogenesis. CB2 receptors are found at higher concentrations in immune tissues and on immune cells as well as being distributed at lower concentrations throughout the body.

Cannabinoids also interact with and affect the body through other mechanisms than these receptors in ways that are not yet elucidated.

The role of the ECS

The ECS has a strong role in maintaining overall homeostasis and healthy immune function. It is also involved in regulating or modulating inflammatory processes, memory, neurogenesis, appetite, energy balance & metabolism, stress response, anxiety, autonomic nervous system regulation (gut motility), reproduction (embryonic implantation), analgesia, thermoregulation, sleep and motor activity, bone health, skin health, arterial & respiratory health, emotional regulation, response to trauma, circadian rhythms and physical exercise.

The ECS has a wide scope of influence throughout the body, and can be thought of as a 'master regulator'. It is particularly influential over the neurological, immune, and endocrine systems. The ECS functions in many ways, but in particular by regulation of processes such as neurotransmitter function, apoptosis, mitochondrial function, and ion-gated channels.

Phyto-cannabinoids interface with the ECS receptor sites throughout the body, modulating the ECS and hence supporting healthy homeostasis, immune function, and reducing inflammation. Phyto-cannabinoids also effect the body in a variety of (as yet not well understood) ways apart from the ECS receptors.

Phyto-cannabinoids

The primary and best researched exogenous phyto-cannabinoids used in herbal medicine are derived from the Cannabis plant. Cannabis has a long, long history of safe use in humans (the first documented use is more than 4000 years ago).

A broad range of bioactive chemicals can be extracted from the ripe flowers or buds of the cannabis plant. The best known and researched phyto-cannabinoids from cannabis are Tetrahydrocannabinol (THC) and Cannabidiol (CBD). The psychoactive side effects of THC may be problematic, especially in dogs, so strains of cannabis that have very low levels of THC are preferred for preparing extracts for use as herbal medicine in most cases.

In low THC whole plant cannabis extracts, CBD accounts for up to 40% of the oil. The remainder is comprised of over 100 other cannabinol compounds, terpenes, and other bioactive phyto-chemicals.

It is worth noting that all the cannabinoid compounds exist in the carboxylated or acidic form in the raw plant material (e.g. THC-a, CBD-A) and if exposed to heat or sunlight these compounds will be de-carboxylated (e.g. THC, CBD). Carboxylated and de-carboxylated forms may display differing biological effects.

For example, THC-A is not psychoactive, whereas THC is. Also THC-A, CBD-A and other acidic cannabinoids show the highest Cox-1 and Cox-2 inhibition. This shows how important the extraction process can be in relation to the effectiveness of the extract for the disease being treated.

A list of some of the rich variety of biologically active phyto-cannabinoids and how they may be useful medicinally follows:

CBD: Well documented to be a powerful anti-inflammatory. Promises to be helpful in treating epilepsy, pain, anxiety (approved for this in dogs in Europe), cancer and more.

CBG: Promises to be helpful in treating glaucoma, depression, pain.

CBD: promises to be helpful in treating depression, inflammation, neurological disease.

CBC: is known to relieve pain, reduce inflammation, inhibit cell growth in tumour/cancer cells, and promote bone growth

CBD isolates vs whole plant extracts

The medical industrial model is to take a whole plant extract, isolate all the biologically active constituents, and then research the effects of each compound in terms of how it works, what it can treat, how safe it is and so on.

This process is hideously expensive, and driven by the motivation to patent and register medicines for the extremely lucrative pharmacological market. Without the possibility of profits, the investment in research doesn't stack up.

This system, and with good reason, is vital to test the safety and efficacy of novel chemicals (potential medicines) that are synthesised by mankind. However, Cannabis is a herbal medicine with a very long history of safe use, and I believe that it should not have to be tested as rigorously for safety as a novel compound.

I believe that there is simply no need to treat cannabis as anything other than what it is – a herbal medicine with a very long history of safe use. The regulatory legislation that CBD has been rolled into has more to do with the fact that CBD rich whole plant hemp extracts are safer and more effective than many expensive pharmaceutical medicines.

It is a threat to the profits of many massive pharmacological companies, to be blunt, so they have lobbied heavily to leverage the illegality of THC (and its popularity as a recreational drug) to pressure governments to treat CBD and other cannabinoid isolates as dangerous drugs, when they are not. They are very safe. They are highly effective. I believe that CBD rich, low THC whole plant cannabis extracts should not be regulated in such a way to make them both hard for patients to source, and far more expensive than they should be.

Also, the regulatory and legislative environment leads to the creation of isolates as medicines. Whole plant extracts contain a broad spectrum of phyto-cannabinoids that affect the physiology of our patients in many different ways. I believe that in whole plant extracts, the many bioactive compounds are synergistic and thus more effective as a medicine than isolates are. Whole plant extracts are also cheaper, as less extractive processes are required.

Pharmacokinetics, dose rates, drug interactions, and possible side effects/adverse reactions
CBD in dogs has a terminal half life of 9 hours. CBD also has a high protective index (or therapeutic index). The possible dose rates may vary significantly – from 0.2 mg/kg up to 3 mg/kg or even more. Higher doses may be required in refractory epilepsy or severe inflammatory disease.

When using whole plant extracts, I believe that using mg/kg of the total cannabinoid content is a good guide. Twice daily medication is recommended, but three times daily may be used if need be. Once daily can be highly effective in some cases.

Cannabis extracts may display a biphasic dose response curve, so in some cases higher doses will actually be less medicinally effective than lower doses.

CBD is known to inhibit cytochrome P450 enzymes, and so may interact adversely with anxiety medications, psychotropics, some antihistamines, some corticosteroids and some antibiotics.

On the other hand, CBD can potentiate epilepsy medications, and may cause NSAID's and opiates to work more effectively, allowing the same benefits at a lower dose rate.

CBD rich low THC whole plant extracts have minimal or no side effects in nearly all dogs at lower doses. At higher doses a mild sedative effect may be noted. As with all medications, there will be rare cases of extreme sensitivity to cannabinoids.

CBD: a medicine with a very broad therapeutic spectrum

Most, if not all chronic disease has inappropriate inflammation as either a cause or a complicating factor as well as extensive disruption of healthy overall homeostasis and immune function. Due to cannabinoids having such a strong anti-inflammatory, immune modulating and homeostatic effects, along with it's high protective index and broad therapeutic spectrum, I believe that whole plant CBD rich (low THC) cannabis extracts show massive potential as a safe, effective medication for inclusion in holistic protocols for treating chronic disease in animals.

I believe that it is of particular value for treating the diseases of old age in companion animals – in particular arthritis and canine cognitive dysfunction. It may also be of value for treating immune disease, allergies, IBD, epilepsy, glaucoma, cancer, pain, inflammation, anxiety, cancer and more.

There is some great research supporting the efficacy of cannabis extracts (CBD) already available, and much more in the pipeline. And there is a hell of a lot of anecdotal evidence of people seeing massive improvements in their sick pets after treating them with CBD.

Its frustrating that the legislative environment makes it so hard for vets and pet owners to access and use this very safe, highly effective herbal medicine to help treat animals with a broad range of health issues.

Alternative medications that interact with the ECS (and that may be used with CBD)

There are some alternatives – another very safe natural extract with a wealth of research to support its efficacy as an anti-inflammatory medicine is PEA (Palmitoylethanolamide). PEA is also known to be helpful in treating epilepsy, and may have anti-anxiety effects.

Terpenes are another group of phyto-chemicals which are potent herbal medicines in their own right, and can be combined with cannabis extracts to boost the medicinal effects. Limonene, linalool, alpha-pinene, beta-pinene, myrcene, and beta-carophyllene are terpenes of therapeutic value which can be sourced from “My Terpenes” in Australia.

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