Cannabinoids in Vet Medicine

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A little Cannabinoid history:

Cannabinoids have been used in traditional medicine for thousands of years. Reports of use go back to ancient China, medieval Persia, and 19th century Europe. Treatment was largely aimed at various somatic disorders such as headache, fever, bacterial infections, diarrhea, rheumatic pain, or malaria.

Cannabinoid Classifications:

1. **Endogenous cannabinoids** – released in response to increases in intracellular calcium.
2. **Herbal cannabinoids** – chemical produced by the female plants of Cannabis sativa and are found in the resin of the herb.
3. **Synthetic cannabinoids** – manufactured cannabinoids that bind to cannabinoid receptors (originally created for research).

Cannabinoid Receptors

Next to know – the body has cannabinoid receptors! The two main receptors are as follows:

CB1 receptors are found in the central nervous system in regions of the brain responsible for pain modulation (parts of the spinal cord, the periaqueductal gray), movement (basal ganglia, cerebellum) or memory processing (hippocampus & cerebral cortex). To a lesser extent, they can also be found in some peripheral tissues such as the pituitary gland, immune cells, reproductive tissues, gastrointestinal tissues, sympathetic ganglia, heart, lung, urinary bladder and adrenal glands.

CB2 receptors are primarily found in the periphery, and highest density on immune cells, especially B-cells and natural killer cells and also in tonsils or spleen; nevertheless, their presence has also been described in the CNS.

The psychotropic effects of cannabinoids are mediated only by the activation of CB1 receptors and not of CB2 receptors

Available in 100 mg/30 ml
and 200 mg/30 ml strengths.

Cannabinoids and animals:

The effects of cannabinoids on animals can be found on the experimental level and were obtained during the pre-clinical testing of individual substances in mice, rats and guinea pigs (i.e. laboratory rodents). Beneficial effects of cannabinoids in these animals have been reported e.g. for disorders of the cardiovascular system, cancer treatment, pain treatment, disorders of the respiratory system or metabolic disorders.

It has been shown that the mechanism of action of cannabinoids is very complex.

The activation of cannabinoid CB1 receptors results in retrograde inhibition of the neuronal release of acetylcholine, dopamine, GABA, histamine, serotonin, glutamate, cholecystokinin, D-aspartate, glycine and noradrenaline.

CB2 receptors localized mainly in cells associated with the immune system are involved in the control of inflammatory processes. Their activation results in, among other effects, inhibition of pro-inflammatory cytokine production and increased release of anti-inflammatory cytokines.

Some cannabinoids were shown to act not only at cannabinoid receptors but also at vanilloid or serotonin 5-HT3 receptors.

Non-Rodent papers & Findings are less abundant. Promising research is never the less available!

- Research dating back to the 1950's in Czechoslovakia showed antibiotic properties of cannabinoids. More recent research backs this up as well!
- The most frequently reported companion animal use of cannabinoids is for glaucoma.
- Promising results shown for inflammation and pain applications in dermatology (healing of lesions, reducing mast cell hyperactivity, and reducing allergic skin reaction) and oncology (inhibitor of angiogenesis in osteosarcoma cells, stimulation of eating, and antiemetic activity

What about Osteoarthritis?

Injection (intra-peritoneal) or oral administration of Cannabidiol (CBD) at onset of clinical symptoms of induced arthritis in mice resulted in a blocking of progression of arthritis. Both methods of administration were equally effective. Dose dependency showed a bell curve when administered: 2.5mg/kg and 20mg/kg (highest and lowest doses tested) were ineffective when given i.p., whereas 5 mg/kg was 'just right'! Orally, 25mg/kg was most effective (again a dose not the highest or lowest tested).

- Evaluation of the biochemical events following administering of CBD in this model show that there is a combined immunosuppressive and anti-inflammatory actions that result in anti-arthritic effects in induced-OA. One study engaged in looking at the importance of CB2 receptors in the progression of OA created by destabilization of the medial meniscus in mice. They found that mice that were lacking in CB2 receptors had a more severe OA sequalae than 'normal mice' who had CB2 receptors.
- Thus, CB2 pathways seem to play a role in the pathophysiology of OA in mice, and show that pharmacological activation of CB2 has a protective effect. Use of a synthetic non-psychoactive cannabinoid acid (ajulemic acid) was tested on rats with induced arthritis. Synthetic cannabinoid was found to suppress production of matrix metalloproteinases (a substance found in joint tissue of patients with inflammatory arthritis signifying cartilage degradation and bone erosion).
- Synthetic cannabinoid acid (AjA) may be useful in both rheumatoid and osteoarthritis

Note-worthy

- Cannabis-based medical products were introduced to human medicine in the last years in many countries (among others Austria, Canada, Czech Republic, Finland, Germany, Israel, Italy).
- For dogs and cats, the veterinarian-recommended, ready-made hemp based supplement (containing non-psychoactive Cannabidiol - CBD)
- The reluctant attitude of veterinarians towards the use of cannabinoids/medical marijuana in animals could be associated with the risk that owners will make attempts to treat their animals using cannabis-based products, which can lead to intoxication.
- Legislative regulations may differ in various countries and the use of cannabinoids/ medical marijuana must be in accordance with the respective rules.

More Nuggets of Goodness

Gastroesophageal reflux disease (GERD) may be treated by activation of CB1 receptors in the periphery. A range of compounds demonstrated a dose-dependent inhibition of transient lower esophageal sphincter relaxation in a dog model.

Claims of clinical efficacy in epilepsy of CBD-predominant cannabis or medical marijuana come mostly from limited studies, surveys, or case reports. The mechanism remains unclear.

Cannabinoid ligands regulate bone mass. Cannabidiol (CBD) enhances the biomechanical properties of healing rat mid-femoral fractures.

Effect of Cannabidiol intradiscal injection was studied in coccygeal intervertebral discs of rats with induced disc degeneration. 120nmol of Cannabidiol significantly minimized the effects of the disc damage.

Dog Owners are Learning More about Cannabis

Dogs Naturally Magazine had an article recently: **Cannabis for your dog: How it can help.** The article talks more abouthemp rather than marijuana.

Both hemp and marijuana come from the plant Cannabis sativa (however, marijuana can also come from Cannabis Indica). According to the article marijuana has a THC content between 10 – 15%; but hemp has only 0.3% or less. Hemp however, is higher in CBD.

Veterinarians are finding CBD hemp to be useful in treating acute ailments like sprains and strains, torn ligaments, bone breaks and even during post-operative care to reduce swelling, pain and stiffness. Apparently, as with any herbal medicine, you may not see an immediate effect. Perhaps it will help with pain within a few hours, but inflammation could take longer to respond.

CBD hemp may make your dog a little drowsy. On rare occasions, side effects have included excessive itchiness or mild vomiting.

Dosing

There are not many studies that describe the exact dosage to be giving our pets, if we decide to give our animals cannabis products. However, research is available that can shed some light on the subject and allow us to make sensible conclusions about cannabinoid dosing. A study on epilepsy in rats (completed by the University of Utah, Turkanis et al. 1979) showed the anti-convulsant effects of CBD (0.3 mg/kg). The study compared CBD to THC and two prescription anti-convulsant drugs (Phenytoin and Ethosuximide). The study showed that CBD was the most effective “drug” tested for treating convulsions and after-discharge effects. Even at the lowest dose tested in the study, 0.3 mg/kg (this equals about 7mg for a 50lb dog), CBD showed dramatic results!

Below is a table that calculates CBD dosing based on 0.3mg/kg (proven safe and effective in animal studies).

Start low and work up. Watch out for disorientation, hyperactivity, vomiting, or excessive sedation.

(20 drops in full 1 ml dropper)

0.17 mg CBD per drop in **100 mg bottles**

5lb – 0.7mg = 2 to 6 drops
10lb – 1.4mg = 6 to 10 drops
15lb – 2.0mg = 12 to 14 drops
20lb – 2.7mg = 16 to 18 drops
25lb – 3.4mg = 20 to 22 drops
30lb – 4.1mg = 24 to 26 drops
35lb – 4.8mg = 28 to 30 drops
40lb – 5.5mg = 32 to 34 drops
45lb – 6.1mg = 36 to 38 drops
50lb – 6.8mg = 24 to 42 drops
55lb – 7.5mg = 44 to 46 drops
60lb – 8.2mg = 48 to 50 drops
65lb – 8.9mg = 52 to 54 drops
70lb – 9.6mg = 56 to 58 drops
75lb – 10.2mg = 36 to 62 drops
80lb – 10.9mg = 66 to 68 drops
85lb – 11.6mg = 70 to 72 drops
90lb – 12.3mg = 74 to 76 drops
95lb – 13.0mg = 78 to 80 drops
100lb – 13.6mg = 82 to 84 drops
105lb – 14.3mg = 86 to 88 drops
110lb – 15.0mg = 90 to 92 drops
115lb – 15.7mg = 94 to 96 drops
120lb – 15.4mg = 49 to 50 drops

0.33 mg CBD per drop in **200 mg bottles**

5lb – 0.7mg = 1 to 3 drops
10lb – 1.4mg = 3 to 5 drops
15lb – 2.0mg = 6 to 7 drops
20lb – 2.7mg = 8 to 9 drops
25lb – 3.4mg = 10 to 11 drops
30lb – 4.1mg = 12 to 13 drops
35lb – 4.8mg = 14 to 15 drops
40lb – 5.5mg = 16 to 17 drops
45lb – 6.1mg = 18 to 19 drops
50lb – 6.8mg = 20 to 21 drops
55lb – 7.5mg = 22 to 23 drops
60lb – 8.2mg = 24 to 25 drops
65lb – 8.9mg = 26 to 27 drops
70lb – 9.6mg = 28 to 29 drops
75lb – 10.2mg = 30 to 31 drops
80lb – 10.9mg = 33 to 34 drops
85lb – 11.6mg = 35 to 36 drops
90lb – 12.3mg = 37 to 38 drops
95lb – 13.0mg = 39 to 40 drops
100lb – 13.6mg = 41 to 42 drops
105lb – 14.3mg = 43 to 44 drops
110lb – 15.0mg = 45 to 46 drops
115lb – 15.7mg = 47 to 48 drops
120lb – 15.4mg = 49 to 50 drops

References:

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