Meta-analysis of CBD Use in Dogs with Osteoarthritis

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Abstract

Cannabidiol is a non-psychoactive constituent of *Cannabis sativa* L.. Despite that no New Animal Drug Application (NADA) has been approved by the US Food and Drug Administration, advertisements for cannabidiol targeted for canines abound on the internet. Cannabidiol is an antagonist at the canonical CB1 receptor; density of this receptor is much higher in canines than in many other mammalian species. The Agricultural Improvement Act of 2018 legalized cultivation of *Cannabis sativa* L. containing less than 0.3% by dry weight of the psychoactive constituent Δ9-tetrahydrocannabinol. Since that time, numerous adverse events related to cannabis have been reported to the US FDA Animal and Veterinary Adverse Event website. This systematic review and meta-analysis aims to assess whether cannabidiol can improve symptoms of canine osteoarthritis compared to placebo or standard treatment. Comparison of constituents of several canine-targeted CBD products to human CBD products will be performed using HPTLC.

Introduction/Background

Osteoarthritis is the most common joint disorder, both progressive and degenerative, in both human and veterinary medicine. It causes chronic pain and active inflammation which leads to impaired mobility and/or disability. The incidence of osteoarthritis in veterinary medicine is an increasing problem, reported to be between 2.5 – 20% of the canine population over 1 year of age being affected.[2,8]

There is evidence suggesting the first use of medicinal cannabidiol was more than 5,000 years ago in what is now Romania. Cannabidiol is used medicinally in human medicine for anxiety, pain, dystonia, Parkinson's disease, Crohn's disease, but most commonly it is prescribed to treat epilepsy.[12]

Current standard treatments for osteoarthritis includes anti-inflammatory drugs, non-steroidal or corticosteroids for pain control. In veterinary medicine, there is growing concern for long-term use of NSAIDs, but there are not more effective options, which is why there is growing interest and need for a safe alternative to NSAIDs.[2,8]

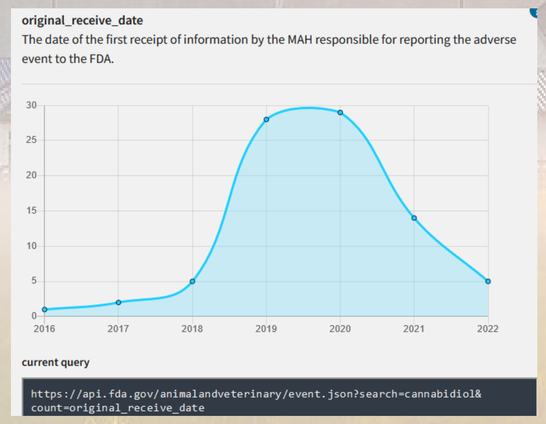
Do cannabidiols have a therapeutic potential? Can these drugs act synergistically with other treatments?

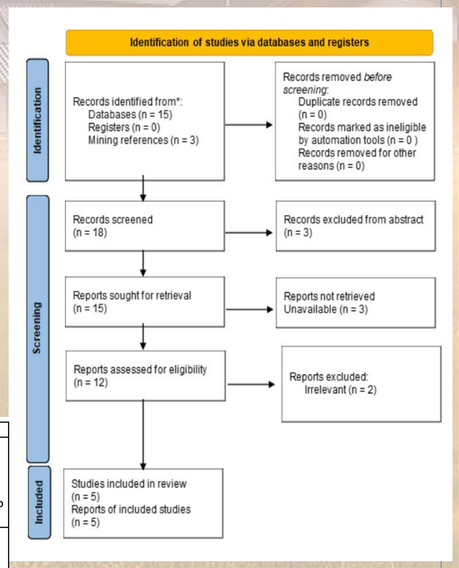
Methods

On March 16 2023 a PubMed search was performed using the terms "cannabidiol" AND "canine" AND "osteoarthritis" for trials and systematic reviews. Exclusion criteria were articles published in languages other than English and trials performed in other species. References from the included articles were mined to identify additional articles.

Preliminary Results

- **PRISMA Diagram - Systematic Review "OA and CBD and Canine"**
- **Graphic showing the number of FDA reports for ALL CBD-related events in all species reported to FDA**
- **Selected Preliminary Data Table**





Author	Author year	N subjects	Dose of CBD	Comparison	Results
Brioschi	2020	n = 21	2 mg kg^{-1} every 12 h	Group C: CBD was not administered	Dogs receiving oral transmucosal cannabidiol showed meaningful improvement in pain scoring when compared to Group C.
Kogan	2020	n = 32	0.25mg/kg on food QD for 3 d, then every 12 h	No control group	The addition of the CBD oil decreased pain, improved mobility, and improved quality of life.
Mejia	2021	n = 23	2.5 mg/kg every 12 h	Two groups: placebo followed by CBD treatment or CBD followed by placebo treatment	The study does not support the use of cannabidiol to treat OA-symptom pain due to adverse effects observed.

Discussion/Future Directions

The results of the Kogan hemp oil study indicated that the addition of the hemp-derived CBD oil did decrease the pain of, improve mobility and quality of life of the dogs with osteoarthritis. As the gabapentin was decreased or eliminated (n=11, n=10), owners reported their dogs spending more time with the family and overall improved quality of life.[7] The results of the Brioschi oral transmucosal cannabidiol oil study indicated that when combined with an anti-inflammatory drug, gabapentin, and amitriptyline, dogs receiving oral transmucosal cannabidiol showed meaningful improvement in pain scoring when compared to dogs that did not receive the cannabidiol. The CBD was seen to greatly enhance relief from osteoarthritic pain and improve quality of life.[2] In contrast, the results from the Mejia pilot-study indicated that the use of cannabidiol to treat osteoarthritis pain comes with adverse effects. The study did not support the use of cannabidiol to treat OA-symptom pain, due to the clinical pathology adverse effects seen in their study. Fourteen dogs displayed mild elevations in liver enzymes after initiating treatment with CBD oil, one dog displayed liver enzyme elevation during baseline, two dogs vomited after CBD oil treatment was initiated, one dog was excluded entirely because of intolerance. The study reports that the liver enzyme elevations are consistent with previous studies in both dogs and humans.[8] Future directions going forward from this systematic review and meta-analysis will continue to explore the potential benefits and harms of cannabidiol use in canines. Using HPTLC, comparison of constituents of several canine-targeted CBD products to human CBD products will be performed.