

The Anti-Inflammatory Properties of Cannabidiol

by Healthcare International Research Limited

INTRODUCTION

This is the sixth white paper published by Healthcare International Research. The aims of these papers are to review prevailing research in the opaque and often ambiguous world of Cannabidiol (CBD), to increase awareness and provide valid information. This paper discusses the anti-inflammatory properties of CBD and begins by revealing the colossal global inflammation problem impacting the human race. The paper then considers how the topical application of CBD can provide a safe and effective remedy for the treatment of inflammatory disease.

THE INFLAMMATION PROBLEM

Inflammation is an important component of the body's defence mechanism. It is a process by which the immune system identifies and eliminates harmful and foreign stimuli and commences the healing process¹. Inflammation can be either acute or chronic. Acute inflammation is a protective reaction by the immune system in response to invading pathogens or tissue damage. If left unresolved, acute inflammation can lead to chronic inflammatory diseases including arthritis, neurodegenerative diseases, metabolic syndrome, asthma, allergy, diabetes, inflammatory processes of aging, organ fibrosis, cardiovascular and periodontal diseases².

The impact of chronic inflammation on the human race is colossal. The World Health Organisation ranks chronic diseases as the single gravest threat to human health with medical experts declaring that chronic inflammatory diseases are the most significant cause of death in the world³. A recent paper published by Nature Medicine claims more than 50% of global deaths are attributed to diseases linked to chronic inflammation⁴. Researchers for the National Institute of Health in the United States published the following statistics for some specific chronic inflammation-mediated diseases⁵:

Cardiovascular diseases: In line with a 2017 report from the American Heart Association, cardiovascular diseases (CVDs) accounts for 1 out of every three deaths or approximately 800,000 deaths in the United States. CVD accounts for 31% of all global deaths.

Arthritis and Joint Diseases: These affect approximately 350 million people worldwide and nearly 43 million people in the United States or almost 20% of the population. Nearly, 2.1 million Americans suffer from rheumatoid arthritis.

Allergies: These rank among the sixth leading cause of chronic human diseases in the United States and affect more than 50 million Americans each year. Asthma affects more than 24 million people in the United States including more than 6 million children.

Chronic Obstructive Pulmonary Disease (COPD): The third most common cause of death in the United States in 2014, and nearly 15.7 million Americans (6.4%) were reported to have been diagnosed with COPD with experts claiming it is a growing problem.

Unfortunately, health professionals forecast the inflammation problem is set to increase at an alarming rate. Consequently, there is a general consensus amongst medical practitioners for new treatments and therapies to be used to reverse this trend⁶.

THE ANTI-INFLAMMATORY PROPERTIES OF CANNABIDIOL

The therapeutic potential of CBD has been researched extensively across a wide range of chronic illnesses which are typically accompanied by oxidative stress and inflammation⁷. CBD is one of the main pharmacologically active phytocannabinoids⁸ and has been clinically proven to be non-psychoactive, yet yields many beneficial pharmacological effects, including anti-inflammatory and antioxidant effects⁹. According to the World Health Organisation, 'in humans, CBD exhibits no effects indicative of any abuse or dependence potential. To date, there is no evidence of public health-related problems associated with the use of pure CBD'. In fact, CBD has been used to ease health issues such as insomnia,

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3 Kapellos, T.S., Bonaguro, L., Gemünd, I., et al., (2019) 'Human monocyte subsets and phenotypes in major chronic inflammatory diseases', *Frontiers in immunology*, p.2035.

4 Furman, D., Campisi, J., Verdin, E. et al., (2019) 'Chronic inflammation in the etiology of disease across the life span', *Nat Med* 25, pp.1822-1832.

5 Pahwa, R., Goyal, A. & Jialal, I. (2021) 'Chronic inflammation', *StatPearls*. Available online at: <https://www.ncbi.nlm.nih.gov/books/NBK493173/>.

6 Gambini, J. & Stomsnes, K. (2022) 'Oxidative stress and inflammation: From mechanisms to therapeutic approaches', *Biomedicines*, 10(4), p.753.

7 Oguntibeju, O.O. (2019) 'Type 2 diabetes mellitus, oxidative stress and inflammation: Examining the links' *Int. J. Physiol. Pathophysiol. Pharmacol*, pp.45-63.

8 Rong, C., Lee, Y., Carmona, N.E. et al., (2017) 'Cannabidiol in medical marijuana: Research vistas and potential opportunities', *Pharmacol. Res*, pp.213-218.

9 Iffand, K. & Grotenhermen, F. (2017) 'An Update on Safety and Side Effects of Cannabidiol: A Review of Clinical Data and Relevant Animal Studies', *Cannabis Cannabinoid Res*, pp.139-154.

anxiety and chronic pain¹⁰. During recent tests, CBD demonstrated a broad spectrum of biological activity, including antioxidant and anti-inflammatory activity. Scientists claim this is why its activity in the prevention and treatment of diseases whose development is associated with redox imbalance and inflammation continues to be tested¹¹.

In recent years, an uptick of research into the benefits of CBD concludes there is sufficient evidence of the anti-inflammatory properties contained within authentic cannabidiol based treatments. Published preclinical and clinical studies support the anti-inflammatory activity of CBD in humans¹². A pioneering study into the treatment of joint inflammation concluded CBD has demonstrated anti-inflammatory effects in several inflammatory conditions including arthritis¹³. Empirical research within pharmacology identified potential molecular targets and signalling pathways for CBD's anti-inflammatory activity¹⁴. In a comprehensive narrative review of CBD and sports performance, scientists recognise the potential anti-inflammatory effect of CBD in humans and the possible role in the performance and recovery of athletes¹⁵. The dominant view amongst experts in multifarious domains is that CBD shows immense promise as a treatment for inflammatory conditions and diseases¹⁶.

Cannabidiol's effectiveness in the treatment of anti-inflammatory conditions centres on its interaction with the endocannabinoid system (ECS). The ECS is an important component of regulating functions and responses to pain, illness, disease, sickness and en-

surging a healthy immune system¹⁷. The importance of the cannabinoid receptor system (CB1 & CB2) to help keep the ECS in optimal condition and ameliorate the inflammatory processes, has long been known by dermatologists and scientists¹⁸. Current research posits that the topical application of CBD directly to the skin allows the healing properties of CBD to be absorbed through the skin to interact with cannabinoid receptors near the treatment site, providing local pain relief to treat a specific area of pain or inflammation¹⁹. CBD topicals can bypass the body's CB1 and CB2 receptors and interact directly with a neurotransmitter that blocks the signals for pain by working through agents called anandamide and 2-AG. This approach can be a much safer way to deliver effective treatment of inflammation and ease pain than many traditional pain-relief treatments. Moreover, topical administration of CBD bypasses its poor oral bioavailability, gastrointestinal side effects, and any concerns that CBD may impact higher brain function²⁰.

CONCLUSION

The impact of inflammation on the human race is colossal, with some commentators declaring that chronic inflammatory diseases are the most significant causes of death in the world. Experts agree that new treatments and methods are needed to help reverse this trend and recent advancements and research outcomes in the topical application of CBD show promising results. Topical CBD applications have demonstrated a safe way to deliver anti-inflammatory properties and help reduce pain and play an important role in treating the inflammation problem.

This white paper was completed for HIR by Harry Rule. Harry is a leading independent researcher specialising in qualitative research across a wide range of sectors. He holds a Masters of Research and has recently completed a Doctor of Business Administration and leads HIR's research team.

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