

## **Research Findings Relating to Cannabidiol (CBD) and its Influence on Inflammatory Bowel Disease and Irritable Bowel Syndrome**

**- by Nurse Romy -**

This article is based upon published scientific findings.

However, please note that the information provided does not constitute medical advice.

The endogenous endocannabinoid system is considered our homeostatic regulator and it “is one of the most important physiological systems involved in establishing and maintaining human health” (Alger, 2013, p. 1). This system has been understood and appreciated as an important neuromodulatory system for the last twenty-five years – a relatively small time period of scientific awareness. The endocannabinoid system is integral to the achievement of homeostasis and it is comprised of many components that are found throughout our bodies – in our brains, our organs, our connective tissue, our glands, and in our immune cells (Alger, 2013). Components of this internal system include neurotransmitters called endocannabinoids, cannabinoid receptors and the enzymes that are responsible for endocannabinoid synthesis and degradation. How does this body system act to achieve homeostasis? In brief, it plays an important role in responding to “endogenous and environmental insults” (Lu & Mackie, 2016, p. 516).

Evidence indicates that the endocannabinoid system is involved in many gastrointestinal processes, including cell growth, inflammation and pain management. Research shows that external modulation of the endocannabinoid system could prove beneficial when addressing a host of diseases that include gastrointestinal reflux disease, irritable bowel syndrome (IBS), inflammatory bowel disease (IBD), and cystitis (Izzo, Muccioli, Ruggieri & Schicho, 2015).

This raises the question, how can the internal endocannabinoid system benefit from an external nudge? Scientific based literature is pointing to the use of cannabidiol (CBD) as a possible answer. This exogenous plant-based cannabinoid combined with related compounds called terpenes is proving to hold the potential to exert significant effects on the body. This leads to the question; how does CBD interact with our bodies? In short, CBD does not directly interact with internal receptor sites (CB1 receptors and CB2 receptors) in our body, instead it nudges the body to produce more naturally occurring endocannabinoids

that then in turn activate the receptors (Fine & Rosenfeld, 2013). The homeostatic balance created by the endocannabinoid system helps to explain why so many people are finding success with CBD.

### **IBD – Crohn’s Disease and Ulcerative Colitis**

Anecdotal and scientific evidence is pointing to CBD as a potential option for people with IBD. A recent study conducted by researchers in Italy, looked at intestinal inflammation and hypermotility in mice. The researchers induced colitis and then administered Cannabis extract with a high CBD concentration, known as full spectrum CBD. Pagano et al. (2016) concluded that when the full spectrum CBD was given following the inflammatory insult, (1) anti-inflammatory effects were documented and, (2) reduced motility was shown. Interestingly, the study highlights the beneficial effects of full spectrum CBD versus pure CBD that has had all other phytocannabinoids and other non-cannabinoid constituents removed – commonly known as isolate. The full spectrum CBD contains many additional pharmacologically active ingredients, such as the phytocannabinoid THC, and non-cannabinoid constituents such as flavonoids, phytosterols and terpenes – all of which have shown to reduce colitis in rodent models. In this study the full spectrum CBD acted to reduce intestinal inflammation, while the pure CBD was found to be ineffective. The researchers added that the exact anti-inflammatory mode of action of CBD for IBD warrants further study.

Couch, Tasker, Theophilidou, Lund and O’Sullivan (2017) conducted an in vitro study with the objective of measuring the anti-inflammatory effects of CBD within the acutely and chronically inflamed human colon. Study findings show that CBD prevents increases in cytokine production in the colonic cells collected from IBD and acute appendicitis explants. IBD is a term used to refer to two conditions, Crohn’s disease and ulcerative colitis. Pro-inflammatory cytokines are molecules released from various immune cells and they promote inflammation within the body. The researchers concluded that CBD acts as an anti-inflammatory agent within the colon.

In 2018, Irving et al. published a placebo-controlled pilot study that sought to determine the efficacy of CBD for ulcerative colitis (UC) patients. Results showed that the placebo group had more gastrointestinal related adverse effects suggestive of worsening

UC. Analysis of 3 different subjective scales showed improved outcomes for the patients taking the CBD. In summary, several factors were noted that suggest CBD “may be beneficial for symptomatic treatment of UC” (Irving et al., 2018, para. 3).

### **IBS - Irritable Bowel Syndrome**

The diagnosis and treatment of IBS provides many challenges for those in the medical community and much frustration for patients afflicted with the syndrome. The reason for this is that IBS is described as a “subjective pain syndrome” that lacks objective signs and therefore diagnoses are made by exclusion, which results in extensive diagnostic work-ups devoid of results (Russo, 2016, p. 154). To add to the difficulty, many IBS sufferers do not respond to treatment. This disorder is characterized by gastrointestinal pain, discomfort, and spasm, with diarrhea and/or constipation. An estimated 10-15% of people in the Western world are believed to suffer from this idiopathic disorder.

Russo (2016) states that “GI propulsion, secretion, and inflammation” in the gastrointestinal tract are all controlled by the endocannabinoid system and this explains why cannabinoids would serve as a viable treatment option for those with IBS. In 2001 a theory was presented proposing that an endocannabinoid deficiency may be the underlying cause for conditions such as IBS. The theory of clinical endocannabinoid deficiency (CED) is described as a loss of “endocannabinoid tone” and function (Russo, 2016, p. 155). An endocannabinoid system that operates at a sub-par level can result in a lowered pain threshold together with an imbalance in “digestion, mood and sleep among the almost universal physiological systems subserved by the endocannabinoid system” (Russo, 2016, p. 155).

Research published in 2012 explained that one of the defining characteristics of IBS is low-grade inflammation of the intestine. It is this persistent level of inflammation and the presence of pro-inflammatory cytokines that could explain the “development of diarrhoea-predominant IBS” also known as IBS-D (Rana et al., 2012, para. 1). Lucas, Galettis, and Schneider (2018) note that CBD is a non-psychoactive cannabinoid “reported to have analgesic [and] anti-inflammatory properties” (p. 3).

The consensus within all of the research articles reviewed is that the anti-inflammatory effects of CBD could be the fundamental reason why people with IBD and IBS

are finding success when introducing a CBD regimen into their daily routine. More research is needed to fully determine how CBD can help to alleviate the symptoms experienced by those with IBD and IBS.

## References

- Alger, B. E. (2013). Getting high on the endocannabinoid system. *Cerebrum*, *14*, 1-14.
- Couch, D. G., Tasker, C., Theophilidou, E., Lund, J. N., & O'Sullivan, S. E. (2017). Cannabidiol and palmitoylethanolamide are anti-inflammatory in the acutely inflamed human colon. *Clinical Science*, *131*(21), 2611-2626. Abstract obtained from PubMed database.
- Fine, P. G., & Rosenfeld, M. J. (2013). The endocannabinoid system, cannabinoids, and pain. *Rambam Maimonides Medical Journal*, *4*(4), 1-15.
- Irving, P. M., Iqbal T., Nwokolo, C., Subramanian, S., Bloom, S., Prasad, N., et al. (2018). A randomized, double-blind, placebo-controlled, parallel-group, pilot study of cannabidiol-rich botanical extract in the symptomatic treatment of ulcerative colitis [Abstract]. *Inflammatory Bowel Disease*, *24*(4), 714-724. doi.org/10.1093/ibd/izy002
- Izzo, A. A., Muccioli, G. G., Ruggieri, M. R., & Schicho, R. (2015). Endocannabinoids and the Digestive Tract and Bladder in Health and Disease. In: Pertwee R. (eds) *Endocannabinoids. Handbook of Experimental Pharmacology*, vol 231. Springer, Cham
- Lu, H., & Mackie, K. (2016). An introduction to the endogenous cannabinoid system. *Biological Psychiatry*, *79*(7), 516-525. doi:10.1016/j.biopsych.2015.07.028.
- Pagano, E., Capasso, R., Piscitelli, F., Romano, B., Parisi, O. A., Finizio, S., et al. (2016). An orally active cannabis extract with high content in cannabidiol attenuates chemically-induced intestinal inflammation and hypermotility in the mouse. *Frontiers in Pharmacology*, *7*(341), 1-10. doi:10.3389/fphar.2016.00341.
- Rana, S. V., Sharma, S., Sinha, S. K., Parsad, K. K., Malik, A., & Singh, K. (2012). Pro-inflammatory and anti-inflammatory cytokine response in diarrhoea-predominant irritable bowel syndrome patients. *Tropical Gastroenterology*, *33*(4), 251-256. Abstract obtained from PubMed database.

Russo, E.B. (2016). Clinical endocannabinoid deficiency reconsidered: current research supports the theory in migraine, fibromyalgia, irritable bowel, and other treatment-resistant syndromes. *Cannabis and Cannabinoid Research*, 1(1), 154-165.