

Study reveals how cannabinoids may be useful to prevent colon cancer

September 15 2020



Micrograph showing inflammation of the large bowel in a case of inflammatory bowel disease. Colonic biopsy. Credit: Wikipedia/CC BY-SA 3.0

Inflammatory bowel diseases (IBD) such as Crohn's disease and ulcerative colitis are caused by unrestrained inflammation of the gastrointestinal tract. Patients with IBD are at a higher risk of developing colorectal cancer. In a recent study published in *iScience* by authors from the University of South Carolina, it was shown that treatment with Δ^9 -tetrahydrocannabinol (THC), a cannabinoid found in the cannabis plant, prevented the development of colon cancers in mice. It was shown that THC suppressed inflammation in the colon, preventing the onset of cancers caused by a carcinogen.

This new paper is based on research studies from the laboratories of Prakash Nagarkatti, Ph.D., and Dr. Mitzi Nagarkatti, Ph.D., at the University of South Carolina (UofSC) School of Medicine Columbia, Department of Pathology, Microbiology and Immunology. The Nagarkattis published "Activation of cannabinoid receptor 2 prevents colitis-associated [colon cancer](#) through myeloid cell deactivation upstream of IL-22 production," with co-authors William Becker, Haider Alrafas, Kiesha Wilson, Kathryn Miranda, Courtney Culpepper, Ioulia Chatzistamou and Guoshuai Cai, who also work at the University of South Carolina. Prakash and Mitzi Nagarkatti have been studying the effects of botanicals, including cannabis, on inflammation for many years.

The incidence of IBD is increasing globally. This suggests that the risk of cancers that are linked to IBD also are going to increase. In fact, the risk of colon and rectal cancers is increasing at an alarming rate among

young and middle-aged adults in the United States and the cause remains unknown. Thus, understanding the mechanisms of IBD and developing effective drugs to prevent IBD and associated cancers are crucial.

"The fact that we were able to show that treatment with THC prevents inflammation in the colon and at the same time inhibits the development of colon cancer supports the notion that inflammation and colon cancer are closely linked. Thus, in patients who are at a higher risk of developing colon cancer, THC or other anti-inflammatory agents may be beneficial," says Prakash Nagarkatti.

The Nagarkattis are world-renowned for their work studying the anti-inflammatory properties of cannabinoids. The cannabinoids act through two receptors known as CB1 and CB2. The CB1 receptor is expressed in the brain where THC activation causes psychoactive effects. The second receptor, CB2, is expressed mainly on the [immune cells](#), meaning that activation of CB2 receptors does not trigger psychoactivity.

"Our results showed that THC was acting through CB2 receptors, which is exciting and suggests that compounds that activate CB2 and cause no psychoactive effects may be beneficial to prevent IBD and [colon cancer](#)," said Mitzi Nagarkatti.

More information: William Becker et al, Activation of Cannabinoid Receptor 2 Prevents Colitis-Associated Colon Cancer through Myeloid Cell De-activation Upstream of IL-22 Production, *iScience* (2020). [DOI: 10.1016/j.isci.2020.101504](https://doi.org/10.1016/j.isci.2020.101504)

Provided by University of South Carolina

Citation: Study reveals how cannabinoids may be useful to prevent colon cancer (2020,

September 15) retrieved 5 May 2024 from <https://medicalxpress.com/news/2020-09-reveals-cannabinoids-colon-cancer.html>

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