

Cancer: Cannabinoids and CBD Research Overview

By: www.echoconnection.org

Cancer is a potentially fatal disease caused by abnormal cells in the body that divide and spread into surrounding tissues. Studies have shown cannabinoids have the capability of helping cancer patients manage the nausea, pain, and weight loss related to cancer treatments, and even limit the growth or kill cancer cells.

Overview of Cancer

Cancer is a general name used to classify a large group of diseases that develop because of abnormal cells growing out of control. Normal body cells are continuously growing, dividing, and dying. When cells in a part of the body begin to grow out of control, it is diagnosed as cancer. Cancer cells will continue to grow, rather than die, and they can invade other tissues. Most of the time, cancer cells form a tumor, which can in turn invade nearby normal tissue and crowd it out or push it aside. The cancer cells will often travel to other parts of body, a process referred to as metastasis, through the bloodstream of lymph vessels. According to the American Cancer Society, there are over 1.6 million new cases in the United States every year, and if left untreated, cancers can cause serious illness and death.

Cancer is considered a genetic disease because it is caused by changes to the genes that control the way our cells function. Although these changes can be inherited, they can also arise during a person's lifetime. There are more than 100 different types of cancers, which are commonly named for the organs or tissues from where they form.

Treatment of cancer varies depending on the location of cancer and how far it's advanced. However, there are a number of primary types of cancer treatment include the following: surgery, which involves removing the cancerous tumor; radiation therapy, which uses high doses of radiation to kill cancer cells and shrink tumors; chemotherapy, which uses drugs to kill cancer cells; immunotherapy, which helps your immune system fight cancer; hormone therapy, which slows or stops the growth of cancer that uses hormones to grow; targeted therapy, which targets the changes in cancer cells that help them grow and divide; and stem cell transplant, which involves a procedure that

restores blood-forming stem cells in people who have had theirs destroyed by high doses of cancer treatments.

Findings: Effects of Cannabinoids and CBD on Cancer

Evidence suggests that cannabis has the potential of inhibiting the growth of and even killing cancer cells and can help patients manage symptoms associated with cancer treatments. After examining the available literature, a recent research review concluded that cannabis possesses anti-tumor properties and is effective at offering pain, nausea, and vomiting relief for patients with cancer¹⁹.

Two of the major cannabinoids found in cannabis, tetrahydrocannabinol (THC) and [cannabidiol \(CBD\)](#), activate the cannabinoid 1 (CB₁) and cannabinoid 2 (CB₂) receptors of the endocannabinoid system. Activation of the CB₁ and CB₂ receptors by cannabinoids can elicit antitumor effects in a number of aggressive cancers. THC and CBD have been shown to inhibit the progression of cancers located in the breast, lung, prostate, and colon in animal models, suggesting that the cannabinoids may also be effective at mediating cancer cell death in human subjects^{7,10,13}.

CBD acid (CBDA), the acidic precursor of CBD, has shown in one study to have the capability of down-regulating invasive human breast cancer cells and therefore preventing their growth¹⁵. In 2016, the same team of researchers found CBDA to effectively inhibit the migration of breast cancer cells and was able to identify the effect to be associated with the cannabinoid's downregulation of the proto-oncogene c-fos and the enzyme cyclooxygenase-2¹⁶.

Cannabinoids have long demonstrated it can provide relief for patients suffering from nausea related to [cancer treatments](#). Studies have found that CBD is effective at treating the more difficult to control symptoms of nausea, as well as preventing anticipatory nausea in chemotherapy patients^{9,14}. Another study found that THC was effective at reducing conditioned rejection and chemotherapy-induced nausea⁸.

Cannabis has also been shown to be effective at lowering neuropathic pain that traditional treatment was unable to manage²⁰. In one study, cancer patients with intractable pain who had previously and unsuccessfully tried to manage their discomfort with opioids saw significant reductions in pain levels after being treated with cannabis containing both THC and CBD for two weeks⁶.

Weight loss due to nausea and a loss of appetite are common side effects of cancer treatment. However, THC has shown to significantly stimulate appetite in patients that have cachexia related to cancer^{5,11,12}. In addition, patients treated with THC have a larger appetite and report that food "tastes better"¹. The ability to stimulate appetite in cancer patients is significant in helping to prevent wasting syndrome related to cancer treatments.

A survey study analyzing the effects of cannabis in 131 cancer patients after six to eight weeks of treatment found significant improvements in all of the measured cancer-related symptoms, which included nausea, vomiting, mood disorders, fatigue, weight loss, anorexia, constipation, sexual function, sleep disorders, itching, and pain². Patients treated with THC also experience higher quality sleep and relaxation¹. The National Cancer Institute, an organization run by the U.S. Department of Health and Human Services, currently recognizes cannabis as an effective treatment for providing relief of a number of symptoms associated with cancer, including [pain](#), [nausea and vomiting](#), [anxiety](#), and loss of appetite³.

States That Have Approved Medical Cannabis for Cancer

Nearly all states with medical cannabis laws have approved cannabis specifically for the treatment of cancer. These states

include: [Alaska](#), [Arizona](#), [Arkansas](#), [California](#), [Colorado](#), [Connecticut](#), [Delaware](#), [Florida](#), [Georgia](#), [Hawaii](#), [Illinois](#), [Louisiana](#), [Maine](#), [Massachusetts](#), [Michigan](#), [Minnesota](#), [Montana](#), [Nevada](#), [New Hampshire](#), [New Jersey](#), [New Mexico](#), [New York](#), [North Dakota](#), [Ohio](#), [Oregon](#), [Pennsylvania](#), [Rhode Island](#), [Vermont](#), [Washington](#), and [West Virginia](#).

Although the state of [Maryland](#) hasn't approved medical cannabis to treat tumors or cancer, it has approved it for the treatment of [nausea](#) and [chronic pain](#), two symptoms commonly associated with cancer treatment.

In [Washington D.C.](#), any condition can be approved for medical cannabis as long as a DC-licensed physician recommends the treatment.

Recent Studies on Cannabinoids and CBD's Effect on Cancer

CBDA inhibits the migration of breast cancer cells.

Cannabidiolic acid-mediated selective down-regulation of c-fos in highly aggressive breast cancer MDA-MB-231 cells: possible involvement of its down-regulation in the abrogation of aggressiveness.

(<http://www.ncbi.nlm.nih.gov/pubmed/27530354>)

Research review concludes cannabis has anti-tumor effects and is effective at reducing pain, nausea, and vomiting induced by chemotherapy.

Cannabinoids Use in Oncology: A Review

(<http://www.ncbi.nlm.nih.gov/pubmed/25916739>)

Animal studies have shown that the cannabis-derived cannabinoid, CBD, inhibits the progression of many types of cancer (glioblastoma, breast, lung, prostate, colon).

The Anti-tumor Activity of Plant-Derived Non-Psychoactive Cannabinoids.
(<http://www.ncbi.nlm.nih.gov/pubmed/25916739>)

Cannabis causes significant improvement in nausea, vomiting, mood disorders, fatigue, weight loss, anorexia, constipation, sexual function, sleep disorders, itching, and pain, in cancer patients after six to eight weeks of use.

The Medical Necessity for Medicinal Cannabis: Prospective, Observational Study Evaluating the Treatment in Cancer Patients on Supportive or Palliative Care.
(<http://www.ncbi.nlm.nih.gov/pubmed/23956774>)

Resources:

1. Brisbois, T.D., de Kock, I.H., Watanabe, S.M., Mirhosseini, M., Lamoureux, D.C., Chasen, M., MacDonald, N., Baracos, V.E., and Wismer, W.V. (2011, February 22). Delta-9-tetrahydrocannabinol may palliate altered chemosensory perception in cancer patients: results of a randomized-double-blind, placebo-controlled pilot trial. *Annals of Oncology*, 22, 2086-2093.
2. Bar-Sela, G., Vorobeichik, M., Drawsheh, S., Omer, A., Goldberg, V., and Muller, E. (2013). The Medical Necessity for Medicinal Cannabis: Prospective, Observational Study Evaluating the Treatment in Cancer Patients on Supportive or Palliative Care. *Evidence-Based Complementary and Alternative Medicine*, 2013, 510392. Retrieved from <http://www.hindawi.com/journals/ecam/2013/510392/>.
3. Cannabis and Cannabinoids (PDQ). (2015, July 15). *National Cancer Institute*. Retrieved from <http://www.cancer.gov/about-cancer/treatment/cam/patient/cannabis-pdq>.
4. Estimated Number of New Cancer Cases and Deaths by Sex, US, 2015. (2015). *American Cancer Society*. Retrieved from <http://www.cancer.org/acs/groups/content/@editorial/documents/document/acspc-044514.pdf>.
5. Jatoi, A., Windschitl, H.E., Loprinzi, C.L., Sloan, J.A., Dakhil, S.R., Mailliard, J.A., Pundaleeka, S., Kardinal, C.G., Fitch, T.R., Krook, J.E., Novotny, P.J. and Christensen, B. (2002). Dronabinol versus megestrol acetate versus combination therapy for cancer-associated anorexia: a North Central Cancer Treatment Group study. *Journal of Clinical Oncology*, 20(2), 567-73.
6. Johnson, J.R., Burnell-Nugent, M., Lossignol, D., Ganae-Motan, E.D., Potts, R., and Fallon, M.T. (2010, February). Multicenter, double-blind, randomized, placebo-controlled, parallel-group study of the efficacy, safety, and tolerability of THC: CBD extract and THC extract in patients with intractable cancer-related pain. *Journal of Pain and Symptom Management*, 39(2), 167-79.
7. Ligresti, A., Moriello, A.S., Starowicz, K., Matias, I., Pisanti, S., De Petrocellis, L., Laezza, C., Portella, G., Bifulco, M., and Di Marzo, V. (2006, September). Antitumor activity of plant cannabinoids with emphasis on the effect of cannabidiol on human breast carcinoma. *Journal of Pharmacology and Experimental Therapeutics*, 318(3), 1375-87.
8. Limebeer, C.L., and Parker, L.A. (1999, December 16). Delta-9-tetrahydrocannabinol interferes with the establishment and the expression of conditioned rejection reactions produced by cyclophosphamide: a rat model of nausea. *Neuroreport*, 10(19), 3769-72.

9. Machado Rocha, F.C., Stefano, S.C., De Cassia Haiek, R., Rosa Oliveira, L.M., and Da Silveira, D.X. (2008, September). Therapeutic use of Cannabis sativa on chemotherapy-induced nausea and vomiting among cancer patients: systematic review and meta-analysis. *European Journal of Cancer Care*, 17(5), 431-43.
10. McAllister, S.D., Soroceanu, L., and Desprez, P.Y. (2015, June). The Antitumor Activity of Plant-Derived Non-Psychoactive Cannabinoids. *Journal of Neuroimmune Pharmacology*, 10(2), 255-67.
11. Nauck, F., Klaschik, E. (2004, June). Cannabinoids in the treatment of the cachexia-anorexia syndrome in palliative care patients. *Schmerz*, 18(3), 197-202.
12. Nelson, K., Walsh, D., Deeter, P., and Sheehan, F. (1994). A phase II study of delta-9-tetrahydrocannabinol for appetite stimulation in cancer-associated anorexia. *Journal of Palliative Care*, 10(1), 14-8.
13. Orellana-Serradell, O., Poblete, C.E., Sanchez, C., Castellon, E.A., Gallegos, I., Huidobro, C., Llanos, M.N., and Contreras, H.R. (2015, April). Proapoptotic effect of endocannabinoids in prostate cancer cells. *Oncology Reports*, 33(4), 1599-608.
14. Parker, L.A., Rock, E.M., and Limbeer, C.L. (2011, August). Regulation of nausea and vomiting by cannabinoids. *British Journal of Pharmacology*, 163(7), 1411-22.
15. Takeda, S., Okazaki, H., Ikeda, E., Abe, S., Yoshioka, Y, Watanabe, K., and Aramaki, H. (2014). Down-regulation of cyclooxygenase-2 (COX-2) by cannabidiolic acid in human breast cancer cells. *The Journal of Toxicological Sciences*, 39(5), 711-6.
16. Takeda, S., Himeno, T., Kakizoe, K., Okazaki, H., Okada, T., Watanabe, K., and Aramaki, H. (2016, August 16). Cannabidiolic acid-mediated selective down-regulation of c-fos in highly aggressive breast cancer MDA-MB-231 cells: possible involvement of its down-regulation in the abrogation of aggressiveness. *Journal of Natural Medicines*, [Epub ahead of print], doi: 10.1007/s11418-016-1030-0.
17. What Is Cancer? (2015, April 15). *American Cancer Society*. Retrieved from <http://www.cancer.org/cancer/cancerbasics/what-is-cancer>.
18. What Is Cancer? (2015, February 9). *National Cancer Institute*. Retrieved from <http://www.cancer.gov/about-cancer/what-is-cancer>.
19. Wilkie, G., Sakr, B., and Rizack, T. Cannabinoids Use in Oncology. *JAMA Oncology*, 2(5), 670-675.
20. Wilsey, B., Marcotte, T., Deutsch, R., Gouaux, B., Sakai, S., and Donaghe, H. (2013, February). Low-dose vaporized cannabis significantly improves neuropathic pain. *The Journal of Pain*, 14(2), 136-48.