

CANNABIS AND CANCER, PT. 3: HOW THC AND CBD WORK ON CANCER CELLS

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More than a decade of research has shown that specific compounds in the cannabis plant – usually (though not exclusively) THC and CBD – exhibit marked anti-tumor properties.

When used together, these compounds, or cannabinoids, exert a synergistic effect on reducing and inhibiting tumor growth, especially in concert with conventional cancer treatments such as chemotherapy and radiation.

Scientists are delving deeper into understanding how exactly THC, CBD, and other cannabinoids act on cancer cells.

Cannabinoids Target Cancer Cells

The most remarkable feature of these cannabinoids is that they specifically target cancer cells while being harmless to normal healthy cells. This fact is dramatically demonstrated by a [time-lapse video](#) of THC killing human cancer cells while leaving normal cells alone.

The SETH Group, an interdisciplinary team of scientists focused on testing promising new therapies that can be integrated with conventional cancer treatment, created the time-lapse video as well as another video to explain [the action of cannabinoids on cancer](#):

“THC interacts with specific cell surface receptors. It is analogous to a key entering a lock. This triggers a reaction inside the cell. Unexpectedly, this reaction in normal cells is significantly different compared to the reaction in cancer cells. In cancer cells, these reactions lead to cell death. In normal cells, it doesn't. This surprising difference is likely due to two things: a greater number of receptors on the outside of the cancer cells and a different type of reaction inside the cancer cells as compared to the normal cells.”

According to [Dr. Cristina Sanchez](#), a cancer researcher from Spain who first stumbled upon the anti-cancer effects of THC and [wrote](#) about it in 1998, this ability to target only cancer cells is one of the

advantages of cannabinoids or cannabis-based medicine. The selective cell-killing action of cannabinoids is in contrast to chemotherapy, which is less discriminating.

Another advantage of cannabinoids, says Dr. Sanchez, is the “clean” way in which tumor cells die – through committing suicide. This is known as programmed cell death, or apoptosis.

Other Cancer Fighting Qualities of Cannabis

Inducing cell death is just one of many ways that THC and CBD have been observed to fight cancer. Other mechanisms of action include inhibiting cell growth and inhibiting the growth of new blood vessels (angiogenesis) that feed tumors and spread cancer (metastasis), according to a summary of anti-tumor effects reported by the [National Cancer Institute](#).

As Dr. Wai Liu, an oncologist from St. George’s University of London, told the [Huffington Post](#), “Cannabinoids have a complex action: it hits a number of important processes that cancers need to survive. For that reason, it has really good potential over other drugs that only have one function.”

In a 2013 [study](#) of six different cannabinoids and their effects on leukemia cells, Dr. Liu watched them “target and switch off” pathways that allow cancers to grow.

Here are two more recent reports about the actions of cannabinoids on cancer cells:

- A 2014 study in [Biochemical Pharmacology](#) showed that CBD enhanced the susceptibility of tumor cells to stick to killer white blood cells called lymphokine-activated killer (LAK) cells, leading to cell destruction (lysis). This was accomplished through a sticky protein called intercellular adhesion molecule 1 (ICAM-1), which increased with CBD. The ICAM-1 molecules on lung cancer cells were already known to decrease their invasiveness and ability to metastasize.
- A 2014 study in the [Journal of Biological Chemistry](#) revealed that two cannabinoid cell receptors – CB2 and GPR55 – are responsible for the anti-tumor effects of THC.

With more and more discoveries being made about the different anti-tumor effects of cannabinoids, Dr. Liu is optimistic about the future of cannabis-based medicine for treating cancer. As he told [U.S. News & World Report](#), “...you have something [cannabis] that is naturally produced which impacts the same pathways that these fantastic drugs that cost billions also work on.”

We are proud to say that Constance Pure Botanical Extracts has been oncologist-referred and followed since our beginning. Please read what [SF Weekly](#) has written about our work with cancer patients.

Also, be sure to check out our previous articles in the Cannabis and Cancer series ([Part I](#) and [Part II](#)).

Please [contact us](#) if you are interested in using THC and CBD-rich cannabis oils as part of your physician-recommended medical regimen. We would be happy to discuss different options and help you and your doctor create a specific science-based treatment protocol.