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# CANNABINOID CHRONICLES

## Medical Cannabis News and Information

### Cannabis and Cancer

The term cancer refers to any of a large number of diseases that manifests itself because of uncontrolled cell growth. Different forms of cancer tend to require different treatments.

Cancer begins when healthy cells mutate into irregular cells that function improperly and divide more rapidly. They generate even more dysfunctional cells, crowding out and hindering the function of surrounding healthy cells. The growing clump of cells form a mass called a tumour. As tumours grow, they induce a variety of alterations and abnormalities in the way the body utilizes fats, carbohydrates and proteins. Tumours also suppress the immune system, making infections a leading cause of death in cancer patients. Some cancerous tumours may start in non-vital organs but they can spread and colonize other tissues or organs in a process called metastasis. Dependant upon the type of cancer, metastatic tumours may be found throughout the body; the most common sites are in bone, liver or lung.

Historically, cannabis was part of a pain-killing cocktail used for decades in a London hospital, starting in the 1950's, but has since been replaced by next-generation opioids. However, due to its powerful anti-emetic properties, cannabis has been successful in treating nausea and vomiting resulting from chemotherapy since the 1970's. Cannabis can have a synergistic effect with opioids to help treat pain and reduce opioid use. Cannabis can also promote sleep, and reduce anxiety and depression, all of which improves a patient's quality of life. There is epidemiological evidence that long-term cannabis users have a reduced risk of head and neck cancers.

But there are larger claims that cannabis has cancer-suppressing/killing qualities in humans, and that it can cure cancer. Anecdotally, patients have eaten, applied

topically or via suppository, the oil extracted from cannabis to kill their cancers. These claims are not yet backed by double-blind, peer-reviewed studies.

As a direct anti-cancer drug, the research doesn't yet support the human use of cannabis. Cannabinoids have been found to inhibit tumour growth in a wide array of animal models of cancer (and there are indications that they act similarly in patients with brain tumours), but it has not been consistently demonstrated in human clinical trials. Effects include inhibition of both blood vessel growth to the tumour and cancer cell migration, suppression of cancer signalling mechanisms, and stimulation of apoptosis (programmed cell death) in cancer cells. For example, a 2006 study found that cannabinoids induced apoptosis and reduced tumour growth in animal models of pancreatic cancer, and a 2008 study found that the activation of the CB1 and CB2 receptors produces apoptosis in colon cancer cells.

Given the variability between cancer types, research has found that high doses of THC may inhibit or stop the growth of some tumours, but lower doses appear to stimulate growth of the same tumours. Reports about the role of the endocannabinoid system in cancer (suppress or cause tumour growth) are also conflicting.

There is evidence that cannabinoids have the ability to identify a mutated cell and prevent them ...cont'd page 2

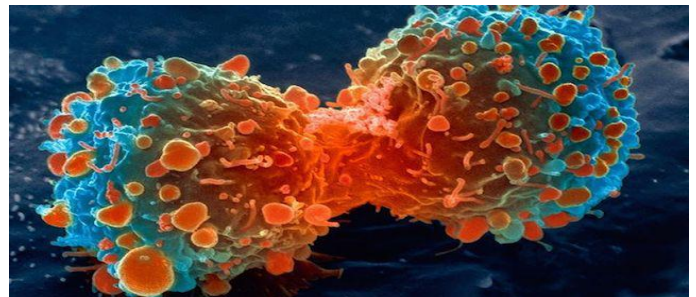


Image: <http://www.innovationtoronto.com/2015/12/new-way-to-find-cancer-hidden-amongst-billions-of-healthy-cells/>

## **International Association for Cannabinoid Medicines (IACM) Bulletin**

### ***Human: Medical cannabis laws in the USA are associated with a decline of absence from work due to sickness***

Utilizing the Current Population Survey, a study identified that absences from work due to sickness declined following the legalization of medical cannabis in the 24 states with medical cannabis laws analysed. The effect was stronger for full-time workers, and for middle-aged males, which is the group most likely to hold medical cannabis cards.

Those full-time employees between the ages of 50 and 59 were 13% less likely to report absences due to illness following medical cannabis legalization. Those ages 40 to 49 were 11% less likely to do so, and those ages 30 to 39 were 16% less likely to report a medical-related absence. "The results of this paper therefore suggest that medical marijuana legalization would decrease costs for employers as it has reduced self-reported absence from work due to illness/medical issues," Dr. Darin F. Ullman, of the University of Wisconsin in Milwaukee, USA, wrote. **Source:** <http://www.cannabis-med.org/index.php?lng=en>

### ***Human: Aggression decreases after cannabis use***

Using a validated behavioral measure of aggression in response to provocation, subjective aggression significantly increased after alcohol use and decreased after cannabis use. The study included heavy alcohol (n = 20) and regular cannabis users (n = 21), and controls (n = 20). Alcohol and cannabis users received single doses of alcohol and placebo or cannabis and placebo, respectively. They were subjected to certain tests, which allow measuring of aggression. Subjective aggression significantly increased following aggression exposure in all groups while being sober. Alcohol use increased subjective aggression whereas cannabis decreased the subjective aggression. Aggressive responses during the PSAP (point-subtraction aggression paradigm) increased following alcohol and decreased following cannabis relative to placebo. Authors concluded "that alcohol facilitates feelings of aggression whereas cannabis diminishes aggressive feelings in heavy alcohol and regular cannabis users, respectively."

### **Cannabis and Cancer continued...**

from page 1... from spreading. There is also evidence that cannabis prevents the formation of blood vessels (angiogenesis) by tumours. Cannabinoids do this by impairing the function of a required growth factor; without a blood supply, tumours cannot grow.

It has been shown that THC prevents aggressive breast cancers from proliferating, and induces cell death. CBD is also showing promise for preventing breast cancer.

Researching how cannabis can target glioma cells (brain cancer), it was discovered that in addition to cannabinoids destroying tumour cells, they leave the healthy ones intact. This is unlike chemotherapy that does not distinguish between healthy or unhealthy cells. At rational doses, cannabinoids have low toxicity and very little drug interaction with chemotherapy drugs.

THC can cause a sharp decline in the respiratory rate of oral cancer cells, basically suffocating them. Interestingly, an endogenous cannabinoid did not block the cell's respiration, suggesting that the effect of THC was not mediated by cannabinoid receptors.

Another study found that cannabinoids can communicate/exert an effect on receptors other than CB1 or CB2 receptors. CBD, for example, interacts with a wide range of receptors (more than THC) - this may explain its broad effects and remarkable anti-tumour

effect in various animal models of cancer. CBD might activate TRPV2 receptors to promote glioma cell death. A 2012 study demonstrated that CBD was effective in treating certain prostate cancer lines.

Research is also looking into combining cannabinoids in cancer therapies, such as with radiotherapy. Observations suggest that cannabinoids act synergistically with anti-cancer drugs. As well, combining THC and CBD enhances the anti-cancer properties of THC, and means that a lower dose of THC is needed to induce anti-tumour activity.

Cannabis is a powerful anti-inflammatory that may work to keep healthy cells from mutating in the first place. Cannabis is also an anti-viral, inhibiting the spread of at least one cancer-causing virus (gamma herpesvirus). This is important since gamma herpesvirus is implicated in the development of many malignancies. (i.e. Hodgkin's disease).

Given the safety profile of cannabis, clinical trials testing cannabinoids, whether separate or in combination with other therapies, are urgently needed.

**Sources:** Backes, Michael (2014). *Cannabis Pharmacy - The Practical Guide to Medical Marijuana*. NY, NY: Black Dog & Leventhal Publishers.

Velasco G., C. Sanchez, and M. Guzman. *Anticancer Mechanisms of Cannabinoids*. Current Oncology, Vol 23, Supp. 2, March 2016

Werner, Clint (2011). *Marijuana, Gateway to Health*. San Francisco, CA: Dachstar Press.

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**2016 VICS Annual General Meeting**

September 11 at 755 Pandora Ave., Victoria, BC  
11 am to 2 pm: Doors open 10:30 to 11:30 am

## Whole Plant Cannabis Dosing

What is the proper dose of whole-plant cannabis? The simple answer is that it is hard to quantify precisely for each individual at the present time. Fortunately, the relative safety of whole-plant cannabis allows us to titrate and experiment to determine what works (or doesn't).

We seem to have a handle on THC dosage but we are only starting to understand cannabidiol (CBD), the second-most prevalent cannabinoid in the non-hemp (drug) varieties; research into other cannabinoids is lacking. We are also just beginning to understand that the terpenes in the cannabis plant work synergistically with the cannabinoids to produce a range of effects even though some plant varieties share a similar cannabinoid profile.

But what dose should you use? It depends to some degree on one's preferred delivery system but the first rule is always **to start with a small amount and wait**.

**Novice users must go very slowly**, especially with edibles or concentrates, whereas daily, experienced users can ingest high levels with few, if any, problematic side effects. Depending upon one's level of tolerance, a person with high tolerance may be able to withstand a cannabis dose that is **100 times** greater than a novice.

With smoking, vaporization or sublingual tinctures, take a single inhale/spray and wait. The relatively quick blood plasma levels allow one to wait as few as several minutes before deciding that more may or may not be needed. Timing in the day can also affect dosing for smoking or vaporization. The first time in the day typically results in stronger or more profound effects. Cannabis derivatives, such as hash, kief, or cannabis oil, have much higher concentrations of cannabinoids, and thus much less is needed to achieve a similar effect. (This is the primary argument in favour of any concentrate.)

Dr. Jeffrey Raber and colleagues in Pasadena found that the average joint smoker inhales a little more than one third of the cannabinoids present in the plant material prior to burning, and that THC/CBD ratios remained constant upon combustion. Another study by California NORML found that a joint delivered roughly 27% of the available THC.

A lot of medical users find joints wasteful, and they will use a pipe, bong, or other one-hit device, to titrate finely. Pipes can approach 50% efficiency. Care should be taken not to incinerate the cannabis; gradually heat the cannabis in the bowl until the lighter terpenes begin to vaporize. It is not necessary to hold one's breath after inhaling cannabis smoke or vapour. In fact it is unhealthy for us to do so. Inhale deeply, pause briefly, and then exhale.

Vaporizers are easy to titrate, and are very effective tools for ingesting the valuable chemicals, in vapour form, without the products of combustion created by burning. Depending upon what one wishes to extract, different temperatures can be dialed in to vaporize different chemicals i.e. delta 9 THC vaporizes at 155°C, CBD vaporizes at 165°C, and delta-8 THC vaporizes at 175°C. One source suggests temperatures no higher than 200°C.

Numbers don't always tell you everything, and this is certainly true for whole-plant cannabis. But for the sake of argument, here is a simple calculation to derive what you may be ingesting. One gram of cannabis with 15% THC contains 150 mg THC. Using a match head-sized piece of flower, roughly 1/20 of a gram, equates to (150 mg THC / 20) 7.5 mg THC. Smoking through a pipe at approximately 50% efficiency translates into inhaling just under 4 mg THC, near a threshold where people may feel the dose (2.5 mg).

Fat-based oral products are much harder to titrate and one may need to wait two or more hours to determine if the dose is appropriate - **you can't take it back so go very slow**. The digestion of cannabis results in an alkaline product (11-hydroxy THC) which is strongly psychoactive. An overdose can prompt a racing heart rate, panic attack, or extreme fear reactions; they will pass but the experience can be so negative that people never go back. An empty or full stomach can affect the rate of absorption, the former having the fastest effect. Tolerance can be seen as overmedication, and recent studies suggest that consistently high doses of cannabis cause the brain to reduce the number of cannabinoid receptors in the body. Since the endocannabinoid system primary function is homeostasis, or balance, the body will adjust by reducing cannabinoid receptor density. Thus the smallest dose may be more effective than a larger dose. Below are some rough guidelines for minimum oral dosing.

Oral (natural or synthetic) THC Dosages (milligrams)			
Effect Level	No Tolerance	Some Tolerance	High Tolerance
Appetite stimulant	2.5		
Appetite stimulant w/ chemotherapy	2 (3x day)	5 (3x day)	10 (3x day)
Light	2 - 4	3 - 7	4 - 10
Medium	3 - 8	4 - 12	6 - 15
Strong	4 - 15	10 - 20	15 - 30

(From [www.erowid.org/plants/cannabis/cannabis\\_dose.shtml](http://www.erowid.org/plants/cannabis/cannabis_dose.shtml))

Sources: Backes, Michael (2014). **Cannabis Pharmacy - The Practical Guide to Medical Marijuana**. NY, NY: Black Dog & Leventhal Publishers.

## Legalization Task Force Seeks Public Input: Open until August 29, 2016

The government is seeking the public's opinion on cannabis legalization. One can provide feedback directly via an online consultation, via an email ([cannabis@canada.ca](mailto:cannabis@canada.ca)), or by sending a letter (Cannabis Legalization and Regulation Secretariat, Address locator 0602E, Ottawa, ON K1A 0K9).

Visit: <http://healthycanadians.gc.ca/health-system-systeme-sante/consultations/legalization-marijuana-legalisation/index-eng.php>



## Researcher Explores High Blood Pressure and Cannabinoids

Andrei Derbenev, associate professor of physiology at Tulane School of Medicine in New Orleans, is investigating the role of the brain in hypertension and the possible mitigating effects of cannabis for hypertension treatment. He recently received a four-year, \$1.5 million research grant from the US National Institutes of Health to study how cannabinoids - both exogenous and endogenous - affect a brain stem area involved in blood pressure control.

Abnormally high pressure, aka hypertension, is a long-term, high-risk condition for millions of people globally. The most common drugs used to this condition are synthetic beta blockers (work by blocking the effects of adrenaline, causing the heart to beat slower and with less force).

Derbenev is identifying the cells in the sympathetic nervous system linked to the kidneys, a key organ in hypertension. (The sympathetic nervous system is the part of the autonomic nervous system that stimulates the body's "fight or flight" response. Over-activity of the sympathetic nervous system is a cause of high blood pressure.)

Roughly 10 years ago, Derbenev led a study about the effect of cannabinoids on the parasympathetic nervous system, the part of the autonomic nervous system that stimulates the body to "rest and digest." In that investigation, his team showed the mechanism by which cannabis can reduce digestive spasms and thus decrease vomiting. It's a finding of great interest to cancer patients experiencing nausea while undergoing chemotherapy.

Source: <https://tulane.edu/researcher-explores-effects-cannabinoids-blood-pressure>

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**DrugSense**  
[www.drugsense.org](http://www.drugsense.org)

**BC Coalition of People With Disabilities**  
1-800-663-1278

**Health Canada**  
<http://www.hc-sc.gc.ca/dhp-mps/marihuana/index-eng.php>

**Drug Policy Alliance**  
[www.drugpolicy.org](http://www.drugpolicy.org)

**Media Awareness Project**  
[www.mapinc.org](http://www.mapinc.org)

**Together Against Poverty Society**  
302-895 Fort Street, Victoria  
250-361-3521

**"The arc of the moral universe is long, but it bends towards justice."**

**-- Martin Luther King, Jr.**