What Have We Learned From The Use of Medical Cannabis in Cancer Patients?

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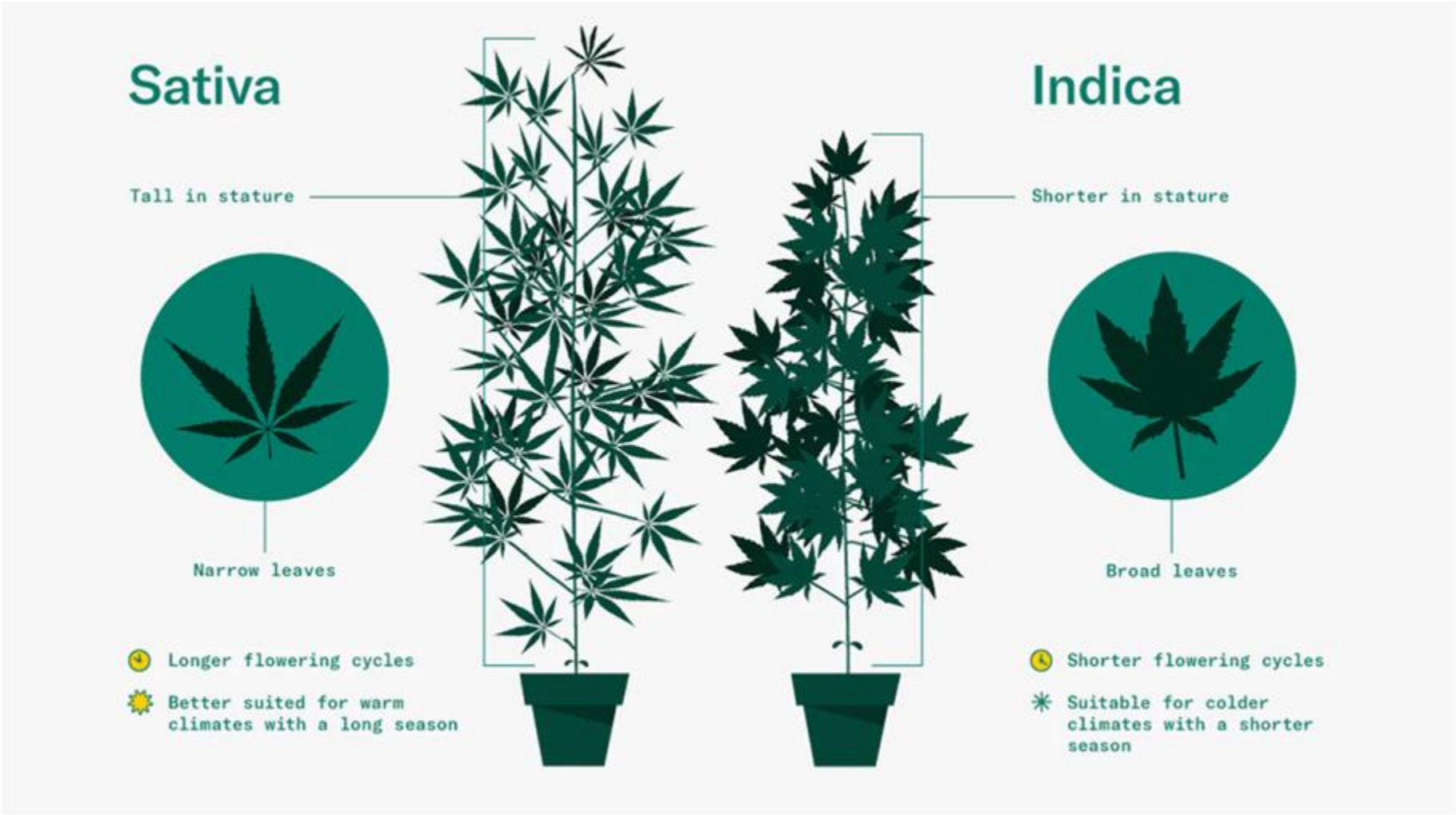
Board Certified Internal Medicine

AYSEV

COMPREHENSIVE CANNABINOID CARE

Goals

1. **Cannabis - a Brief Overview**
2. What makes Medical Cannabis Medical?
3. Medical Cannabis in Cancer Patients?



Sativa vs. Indica illustration (Leafly)

Depends on What's in the Cannabis?

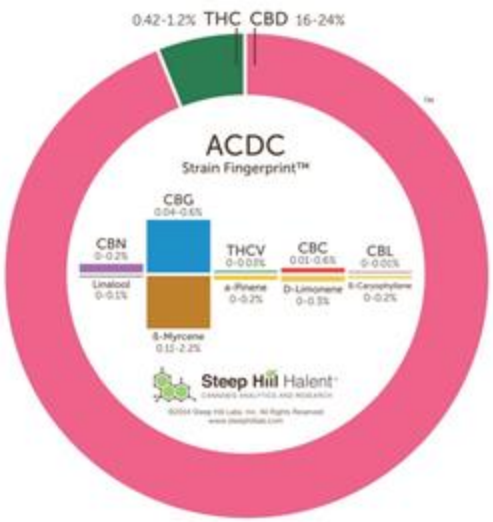
~489 Chemicals/Molecules

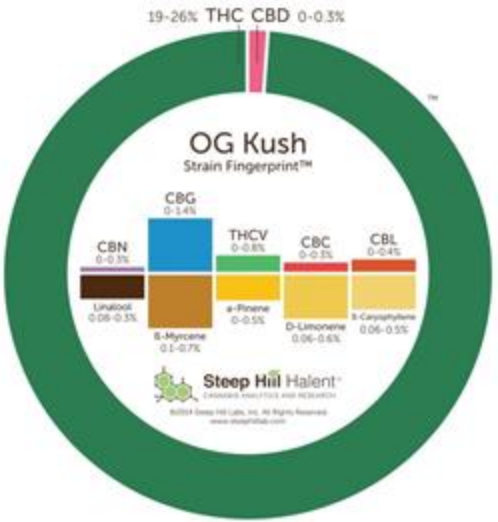
~113 Phytocannabinoids

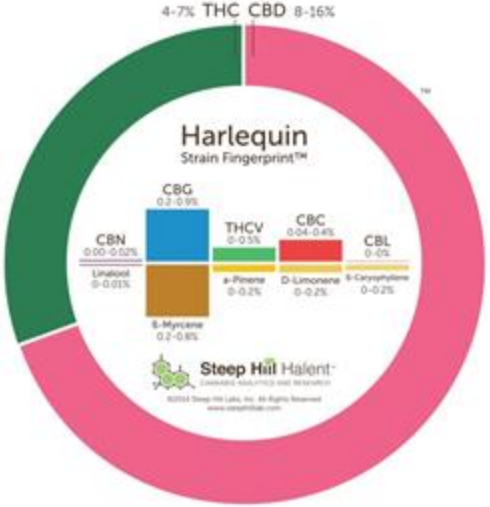
*Terpenes

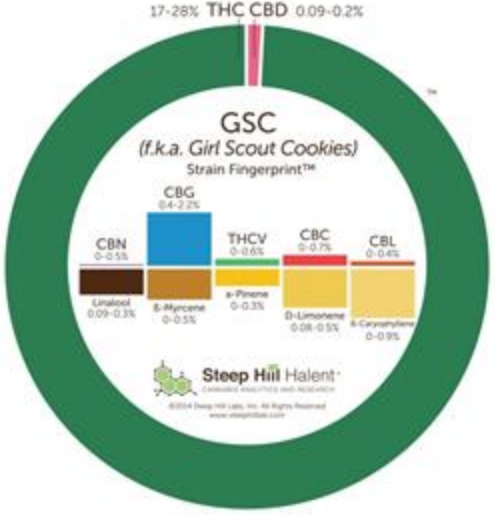
Flavonoids

www.LEAFLY.COM









Phytocannabinoid Cell Targets

PROF of POT

THC vs. **CBD**

Cannabinoid System

Partial Agonist	**CB1**	Negative Allo Modulator
Partial Agonist	**CB2**	Weak Antagonist
Not Tested	**FAAH**	Weak Inhibitor
Inhibitor	**FABP**	Inhibitor

Atypical Cannabinoid Receptors

Agonist	**GPR18**	Antagonist
Agonist	**GPR55**	Antagonist

Serotonin Receptors

No effect	**5-HT1A**	Full agonist
No effect	**5-HT2A**	Weak Partial Agonist
Negative Allo Modulator	**5-HT3A**	Negative Allo Modulator

Dopamine Receptors

Not Tested	**D2High**	Partial agonist

Opioid Receptors

Negative Allo Modulator	**uOR**	Negative Allo Modulator
Negative Allo Modulator	**δOR**	Negative Allo Modulator

Adenosine System

Inhibitor	**ENT1**	Inhibitor

Glycine Receptors

Positive Allo Modulator	**GlyR**	Positive Allo Modulator

GABA Receptors

Not Tested	**GABA-A**	Positive Allo Modulator

Acetylcholine Receptors

No Effect	**α7-AChR**	Negative Allo Modulator

TRP Channels

No Effect	**TRPV1**	Agonist
Agonist	**TRPV2**	Agonist
Agonist	**TRPV3**	Agonist
Agonist	**TRPV4**	Agonist
Agonist	**TRPA1**	Agonist
Antagonist	**TRPM8**	Antagonist

Nuclear Receptors

Agonist	**PPARγ**	Agonist

	THC	CBD	CBG	CBN	CBC	THCv	CBGA	CGCA	CBCA	THCA	CBDA
Relieves pain Analgensic	●	●		●	●		●				
Suppresses appetite/Helps with weight loss Anorectic						●					
Kills or slows bacteria growth Antibacterial		●	●						●		
Reduces blood sugar levels Anti-diabetic		●									
Reduces vomiting and nausea Anti-emetic	●	●									
Reduces seizures and convulsion Anti-epileptic		●				●					
Treats fungal infection Antifungal									●		
Reduces inflammation Anti-inflammatory		●	●		●		●	●		●	●
Aids sleep Anti-insomnia				●							
Reduces risk of artery blockage Anti-ischemic		●									
Inhibits cell growth in tumors/cancer cells Anti-proliferative		●	●		●					●	●
Treats psoriasis Anti-psoriatic		●									
Tranquilizing, used to manage psychosis Antipsychotic		●									
Suppresses muscle spasms Antispasmodic	●	●		●						●	
Relieves anxiety Anxiolitic		●									
Simulates appetite Appetite Stimulant	●										
Promotes bone growth Bone Stimulant		●	●		●	●					
Reduces function in the immune system Immunosuppressive		●									
Reduces contractions in the small intestines Intestinal Anti-prokinetic		●									
Protects nervous system degeneration Neuroprotective		●									

Goals

1. Cannabis - a Brief Overview
2. What makes Medical Cannabis Medical?
3. **Medical Cannabis in Cancer Catients**

The Efficacy of Cannabis in Oncology Patient Care and Its Anti-Tumor Effects

Shalata W, Et Al. Cancers (Basel). 2024 Aug 21;16(16):2909.
doi: 10.3390/cancers16162909. PMID: 39199679; PMCID: PMC11352579.

…. patients seeking to integrate cannabis into their treatment often encounter frustration when their oncologists lack adequate information to offer guidance. This knowledge gap is exacerbated by the scarcity of published literature on the benefits of medical cannabis, leaving oncologists reliant on evidence-based data disheartened.

…Regarding the medical use of cannabis, two opposing viewpoints emerge: one is supportive, sometimes regardless of clinical evidence, while the other is conservative, driven by preconceptions and concerns.

The Efficacy of Cannabis in Oncology Patient Care and Its Anti-Tumor Effects

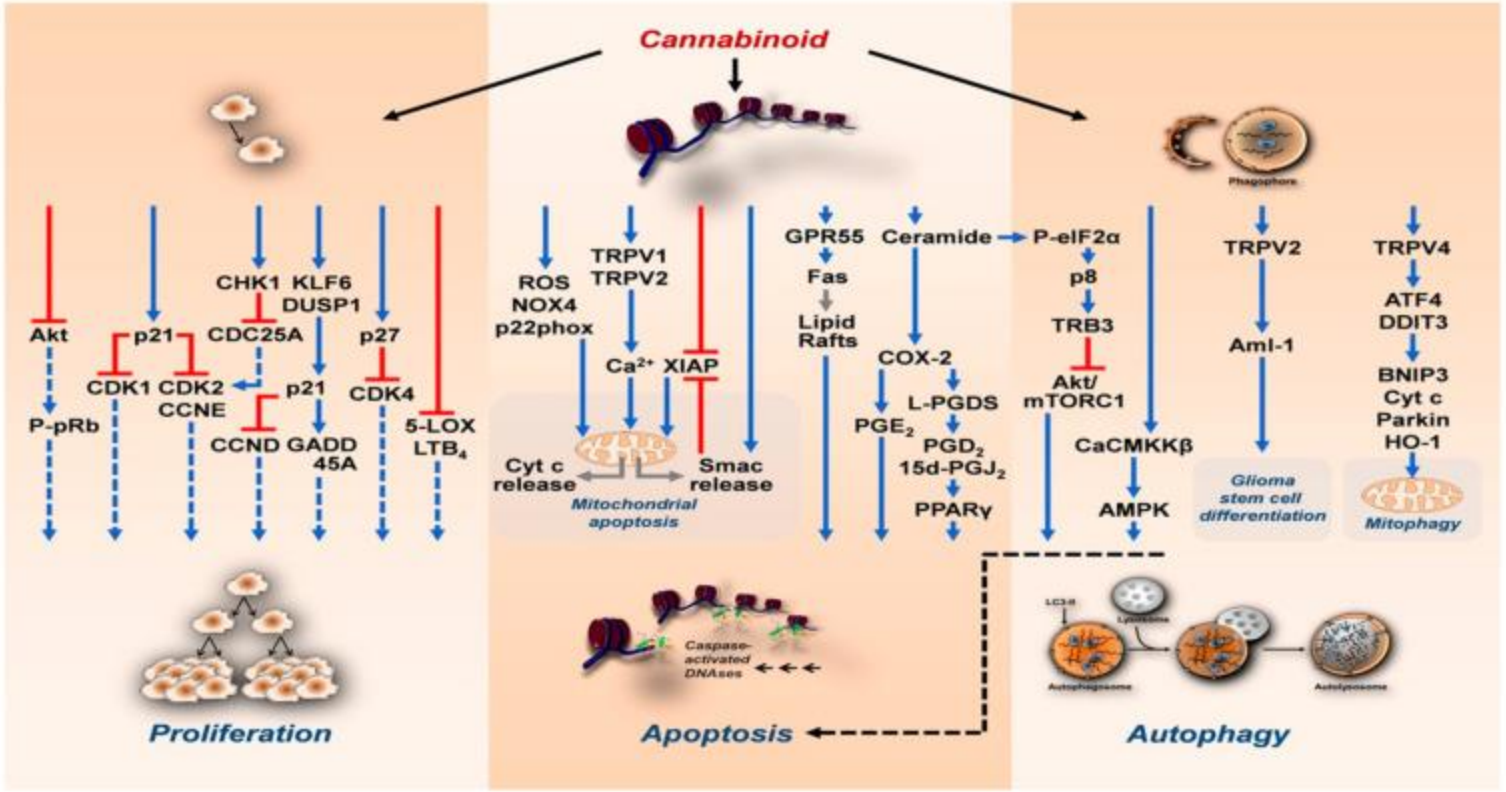
Shalata W, Et Al. Cancers (Basel). 2024 Aug 21;16(16):2909.
doi: 10.3390/cancers16162909. PMID: 39199679; PMCID: PMC11352579.

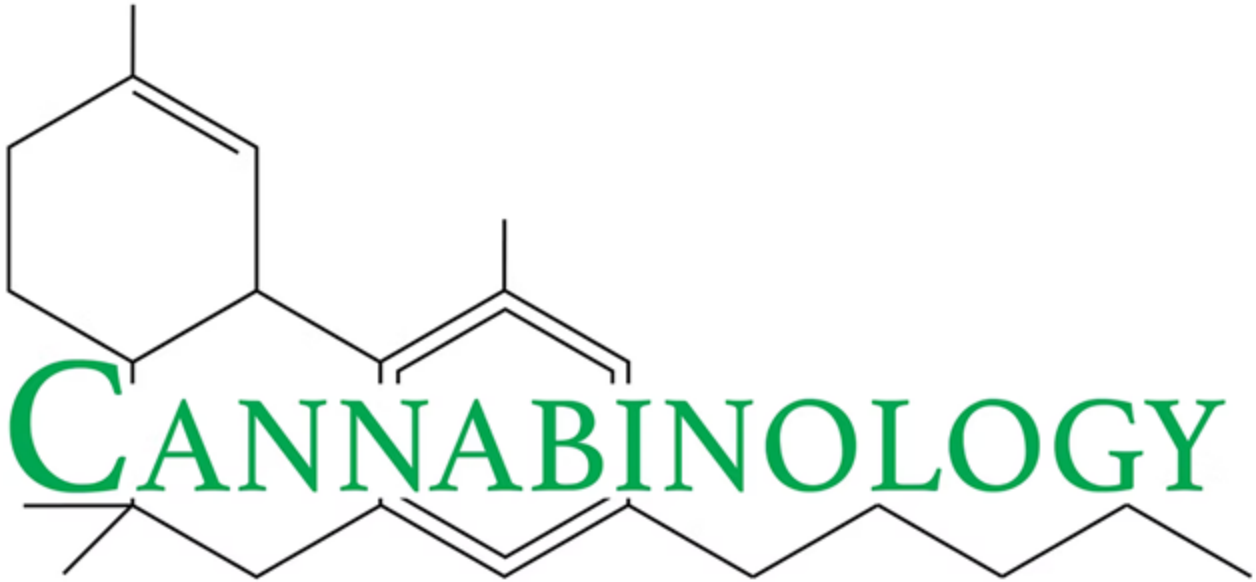
“Cannabis is comprised of over 500 compounds, with at least 100 identified as cannabinoids, known as phytocannabinoids, ... Among these, the most prevalent are **Δ-9-tetrahydrocannabinol (Δ9-THC)**, which is responsible for [some of the] psychoactive effects, and **cannabidiol [aka CBD]**, which lacks psychoactivity.

Additionally, cannabis contains **flavonoids and terpenes.**

These discoveries have led to the identification of **cannabinoid receptor 1**, predominantly found in the central nervous system (CNS), and **cannabinoid receptor 2**, primarily expressed in immune cells.

Furthermore, cannabinoids interact with these receptors, on immune and tumor cells, leading to various anti-cancer effects. These include inducing cancer cell death, inhibiting tumor growth, and suppressing metastasis. Cannabinoids also influence immune cells within the tumor microenvironment, a critical factor in cancer progression and spread.... Notably, CB1 and CB2 agonists (ACEA and JWH-133) selectively inhibit VEGF-A production, a potent angiogenic and vasoactive mediator, from LPS-activated human polymorphonuclear neutrophils, without altering the release of other angiogenic factors such as CXCL8 and HGF; consequently, this inhibition results in reduced angiogenesis and endothelial permeability, which are critical in the pathophysiology of sepsis and cancer. Therefore, understanding the role of CB1 and CB2 receptors on the immune cells could lead to the development of targeted cancer therapies.


Cannabinoid
Akt
P-pRb
p21
CDK1
CDK2
CCNE
CHK1
KLF6
DUSP1
CDC25A
p21
CCND
GADD
45A
p27
CDK4
5-LOX
LTB4
Proliferation
ROS
NOX4
p22phox
TRPV1
TRPV2
Ca2+
XIAP
Cyt c
release
Smac
release
Mitochondrial
apoptosis
Caspase-
activated
DNAses
Apoptosis
GPR55
Fas
Lipid
Rafts
Ceramide
COX-2
L-PGDS
PGE2
PGD2
15d-PGJ2
PPARγ
P-eIF2α
p8
TRB3
Akt/
mTORC1
CaCMKKβ
AMPK
Phagophore
TRPV2
Aml-1
Glioma
stem cell
differentiation
TRPV4
ATF4
DDIT3
BNIP3
Cyt c
Parkin
HO-1
Mitophagy
LC3-II
Lysosome
Autophagosome
Autolysosome
Autophagy



Difficulties:

Goals, Preconceptions, Metrics, confounding variables

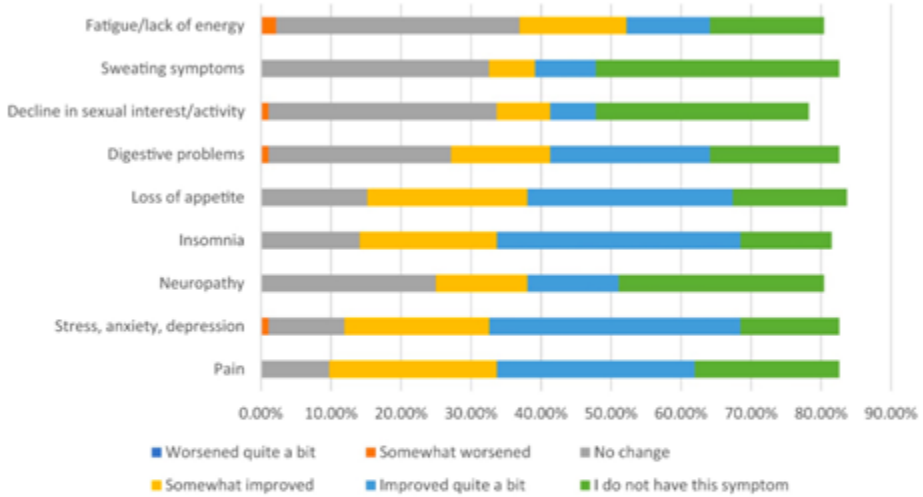
A survey of patients with cancer and oncology health-care professionals about cannabis use during treatment

JNCI Monographs, Volume 2024, Issue 66, August 2024, Pages 290–29

Among respondents, nearly half (41%) had previously used cannabis, one-quarter (26%) had used cannabis since their cancer diagnosis, and about 1 in 6 (17%) were currently using cannabis. The health-care professionals estimated that 10% of patients with cancer overall were using cannabis and that 1 in 4 patients (23%) were using cannabis during cancer treatment.

When all patients were asked whether cannabis had any benefits, even if they had never used it, the majority (84%) replied yes and stated that the perceived benefits of cannabis were for pain management (64%); mood, such as stress or anxiety (59%); poor sleep (43%); poor appetite (40%); and nausea/vomiting (35%).

Figure 2. Patients' perceptions of the effects of cannabis use on their symptoms.



J Natl Cancer Inst Monogr, Volume 2024, Issue 66, August 2024, Pages 290–297, https://doi.org/10.1093/jncimonographs/lgae007

Cannabis use among adults undergoing cancer treatment

Azizoddin DR, Et Al. Cancer. 2023 Nov 1;129(21):3498-3508.
doi: 10.1002/cncr.34922. Epub 2023 Jun 24. PMID: 37354093; PMCID: PMC11070130.

- Those who used cannabis reported more severe symptoms and perceived cannabis as less harmful than those who did not use cannabis. The most common medical reasons for cannabis use were pain, cancer, sleep problems, anxiety, nausea/vomiting, and poor appetite. Participants reported the greatest cannabis-related symptom relief from sleep problems, nausea/vomiting, headaches, pain, muscle spasms, and anxiety.

- **Conclusions:** Patients with cancer who used cannabis perceived benefits for many symptoms, although they showed worse overall symptomatology.

critique

[Azzodian] Participants (N = 267) were 58 years old on average, primarily female (70%), and predominantly White (88%). Over a quarter of respondents (26%) reported past 30-day cannabis use, and among those, 4.5% screened positive for cannabis use disorder. Participants who used cannabis most often used edibles (65%) or smoked cannabis (51%), and they were younger and more likely to be male, Black, and disabled, and to have lower income and Medicaid insurance than participants who did not use cannabis.

Compared to:

[JNCI] A total of 313 patients with cancer (mean [SD] age = 60.7 [12.8] years) completed the survey (43% response rate) between 2021 and 2022. Of the respondents, 58% were female; identified as White (61%) and Black (23%); and had diverse cancer diagnoses. Nearly half of respondents (43%) had previously used cannabis, one-quarter (26%) had used cannabis since their cancer diagnosis, and almost 1 in 6 (17%) were actively using cannabis at the time of survey completion.

The experts' overall benefit assessments are already reported elsewhere (14). Figure 7 shows the user assessments. The strongest benefits/utilities were attributed to methadone, buprenorphine, and cannabis by the users. Synthetic cannabinoids were rated to have the smallest benefits (Figure 7).

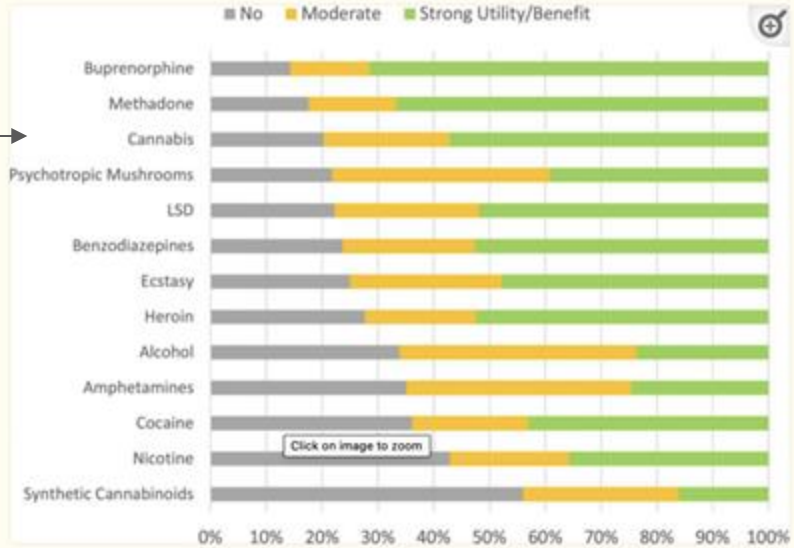


FIGURE 7

Distributions of benefits categories (cohort 1). The substances are ranked according to proportions of "no benefit" ratings. Supplementary Figure 21 shows also the ratings for the excluded substances.

Front Psychiatry. 2022; 13: 1041762.
Published online 2022 Nov 16. 10.3389/fpsyt.2022.1041762

Differences between users' and addiction medicine experts' harm and benefit assessments of licit and illicit psychoactive drugs: Input for psychoeducation and legalization/restriction debates

Udo Bonnet, 1 , 2 , * Michael Specka, 2 Ann-Kristin Kanti, 3 and Norbert Scherbaum 2


A positive attitude does not cure cancer, any more than a negative one causes it.
Siddhartha Mukherjee
quotefancy

J Natl Cancer Inst. 1975 Sep;55(3):597-602.

Antineoplastic activity of cannabinoids.

Munson AE, Harris LS, Friedman MA, Dewey WL, Carchman RA.

Abstract

Lewis lung adenocarcinoma growth was retarded by the oral administration of delta9-tetrahydrocannabinol (delta9-THC), delta8-tetrahydrocannabinol (delta8-THC), and cannabinol (CBN), but not cannabidiol (CBD). Animals treated for 10 consecutive days with delta9-THC, beginning the day after tumor implantation, demonstrated a dose-dependent action of retarded tumor growth. Mice treated for 20 consecutive days with delta8-THC and CBN had reduced primary tumor size. CBD showed no inhibitory effect on tumor growth at 14, 21, or 28 days. Delta9-THC, delta8-THC, and CBN increased the mean survival time (36% at 100 mg/kg, 25% at 200 mg/kg, and 27% at 50 mg/kg, respectively), whereas CBD did not. Delta9-THC administered orally daily until death in doses of 50, 100, or 200 mg/kg did not increase the life-spans of (C57BL/6 times DBA/2)F1 (BDF1) mice hosting the L1210 murine leukemia. However, delta9-THC administered daily for 10 days significantly inhibited Friend leukemia virus-induced splenomegaly by 71% at 200 mg/kg as compared to 90.2% for actinomycin D. Experiments with bone marrow and isolated Lewis lung cells incubated in vitro with delta9-THC and delta8-THC showed a dose-dependent (10(-4)-10(-7)) inhibition (80-20%, respectively) of tritiated thymidine and 14C-uridine uptake into these cells. CBD was active only in high concentrations (10(-4)).

PMID: 1159836

[Indexed for MEDLINE]

Publication types, MeSH terms, Substances

Cancer Epidemiol Biomarkers Prev. Author manuscript; available in PMC: 2016 Jan 1.

Published in final edited form as: Cancer Epidemiol Biomarkers Prev. 2015 Jan;24(1):15–31. doi: 10.1158/1055-9965.EPI-14-1026

An epidemiologic review of marijuana and cancer: an update

Yu-Hui Jenny Huang [1], Zuo-Feng Zhang [2], Donald P Tashkin [3], Bingjian Feng [4], Kurt Straif [5], Mia Hashibe [1]

Author information Copyright and License information

PMCID: PMC4302404 NIHMSID: NIHMS635296 PMID: 25587109

Abstract

Marijuana use is legal in two states and additional states are considering legalization. Approximately 18 million Americans are current marijuana users. There is currently no consensus on whether marijuana use is associated with cancer risk. Our objective is to review the epidemiologic studies on this possible association. We identified 34 epidemiologic studies on upper aerodigestive tract cancers (n=11), lung cancer (n=6), testicular cancer (n=3), childhood cancers (n=6), all cancers (n=1), anal cancer (n=1), penile cancer (n=1), non-Hodgkin's lymphoma (n=2), malignant primary gliomas(n=1), bladder cancer (n=1), and Kaposi's sarcoma (n=1). Studies on head and neck cancer reported increased and decreased risks, possibly because there is no association, or because risks differ by HPV status or geographic differences. The lung cancer studies largely appear not to support an association with marijuana use, possibly because of the smaller amounts of marijuana regularly smoked compared to tobacco. Three testicular cancer case-control studies reported increased risks with marijuana use (summary odds ratios 1.56 (95%CI=1.09-2.23) for higher frequency; 1.50 (95%=1.08-2.09) for ≥10 years). For other cancer sites, there is still insufficient data to make any conclusions. Considering that marijuana use may change due to legalization, well-designed studies on marijuana use and cancer are warranted.

Article | Open access | Published: 18 March 2024

Anti-proliferative and apoptotic effect of cannabinoids on human pancreatic ductal adenocarcinoma xenograft in BALB/c nude mice model

Trung Quang Le, Nuntana Meesiripan, Suleeporn Sanggrajang, Nuntakan Suwanpidokkul, Piyaporn Prayakprom, Chatchada Bodhibukkana, Vipada Khaowroongrueng, Kankanit Suriyachan, Somchai Thanasitthichai, Attasit Srisubat, Pattamaporn Surawongsin, Anudep Rungsipipat, Siriwan Sakarin ✉ & Kasem Rattanapinyopituk ✉

Scientific Reports **14**, Article number: 6515 (2024) | Cite this article

Abstract

Human pancreatic ductal adenocarcinoma (PDAC) is a highly malignant and lethal tumor of the exocrine pancreas. Cannabinoids extracted from the hemp plant *Cannabis sativa* have been suggested as a potential therapeutic agent in several human tumors. However, the anti–tumor effect of cannabinoids on human PDAC is not entirely clarified. In this study, the anti–proliferative and apoptotic effect of cannabinoid solution (THC:CBD at 1:6) at a dose of 1, 5, and 10 mg/kg body weight compared to the negative control (sesame oil) and positive control (5-fluorouracil) was investigated in human PDAC xenograft nude mice model. The findings showed that cannabinoids significantly decreased the mitotic cells and mitotic/apoptotic ratio, meanwhile dramatically increased the apoptotic cells. Parallelly, cannabinoids significantly downregulated Ki-67 and PCNA expression levels. Interestingly, cannabinoids upregulated BAX, BAX/BCL-2 ratio, and Caspase-3, meanwhile, downregulated BCL-2 expression level and could not change Caspase-8 expression level. These findings suggest that cannabinoid solution (THC:CBD at 1:6) could inhibit proliferation and induce apoptosis in human PDAC xenograft models. Cannabinoids, including THC:CBD, should be further studied for use as the potent PDCA therapeutic agent in humans.

3. CB1 and CB2 Mediated Anti-proliferative and Apoptotic Effects of Cannabinoids

3.1 Cannabinoid Modulation of Cell Cycle Regulation

Cannabinoids have been shown to cause cell cycle arrest in various cancer cell lines. AEA arrests the proliferation of MDA-MB-231 human breast cancer cells in the S phase of the cell cycle through a loss in Cdk2 activity, up-regulation of p21waf, and a reduced formation of the active complex cyclin E/Cdk2 [67]. AEA arrests cells in S phase through activation of Chk1 and Cdc25A proteolysis, which prevents activation of Cdk2 through dephosphorylation of Thr14/Tyr15, critical inhibitory residues on Cdk2 [67]. THC inhibits breast cancer cell proliferation by blocking the progression of the cell cycle in the G2/M phase through the down-regulation of Cdc2 in a CB2 receptor-dependent manner [68]. However, CB2-selective antagonists significantly, but not totally, prevent these effects, suggesting a contribution of a CB2 receptor-independent mechanism [68]. The CB1 and CB2 agonist WIN-55,212-2 causes LNCaP human prostate cancer cell arrest in the G0/G1 phase of the cell cycle [69]. Activation of ERK1/2, induction of p27/KIP1, and inhibition of cyclin D sustain the arrest [69].

Importantly, G0/G1 arrest enhances the Bax/Bcl-2 ratio and activates caspases, resulting in an induction of apoptosis. WIN-55,212-2 treatment of LNCaP cells also causes a dose-dependent decrease in the expression of cyclin D1, cyclin D2 and cyclin E, as well as cdk2, cdk4 and cdk6, pRb and its molecular partner, the transcription factor E2F [69]. WIN-55,212-2 causes a dose-dependent decrease in the protein expression of DP-1 and DP-2, which form heterodimeric complexes with E2F essential for activity [69]. THC administration also elicits G0/G1 cell cycle blockade in glioblastoma cells through the suppression of E2F1 and Cyclin A and the up-regulation of the cell cycle inhibitor p16(INK4A) [70].

3.2 Induction of Apoptosis by Cannabinoids

THC has been shown to induce apoptosis via CB1 inhibition of RAS-MAPK and PI3K-AKT survival signaling and induction of BAD-mediated apoptosis in colorectal cancer cells [71]. CB1 also reduces cyclic AMP-dependent protein kinase A signaling leading to down-

ON THIS PAGE

Hermanson DJ, Marnett LJ. Cannabinoids, endocannabinoids, and cancer. Cancer Metastasis Rev. 2011 Dec;30(3-4):599-612. doi: 10.1007/s10555-011-9318-8. PMID: 22038019; PMCID: PMC3366283.

Cannabis Use and Head and Neck Cancer

Gallagher TJ, Et Al. JAMA Otolaryngol Head Neck Surg. 2024 Dec 1;150(12):1068-1075.
doi: 10.1001/jamaoto.2024.2419. PMID: 39115834; PMCID: PMC11310842.

The cannabis-related disorder cohort included 116 076 individuals (51 646 women [44.5%]) with a mean (SD) age of 46.4 (16.8) years. The non-cannabis-related disorder cohort included 3 985 286 individuals (2 173 684 women [54.5%]) with a mean (SD) age of 60.8 (20.6) years.

The rate of new HNC diagnosis in all sites was higher in the cannabis-related disorder cohort.

After matching (n = 115 865 per group), patients with cannabis-related disorder had a higher risk of any HNC (RR, 3.49; 95% CI, 2.78-4.39) than those without HNC. A site-specific analysis yielded that those with cannabis-related disorder had a higher risk of oral (RR, 2.51; 95% CI, 1.81-3.47), oropharyngeal (RR, 4.90; 95% CI, 2.99-8.02), and laryngeal (RR, 8.39; 95% CI, 4.72-14.90) cancer. Results were consistent when stratifying by older and younger age group.

Key insights into cannabis-cancer pathobiology and genotoxicity

Reece, Et Al. Addiction Biology. Vol 29. 13 November 2024
https://doi.org/10.1111/adb.70003

The literature on cannabis and testicular cancer is almost uniformly positive and has a relative risk of around 2.6-fold [Gurney J, *BMC Cancer*. 2015]

Recent papers in Science provide penetrating and far-reaching insights into the mechanisms underlying micronuclear rupture a key genotoxic engine identified in many highly malignant tumours.[1, 2] Reactive oxygen species (ROS) generated either by damaged mitochondria or the hypoxic tumour microenvironment were shown to damage micronuclear envelopes, which made them more sensitive to membrane rupture. Damage occurred by both increased susceptibility to membrane rupture and impaired membrane repair. Micronuclear rupture is known to be associated with downstream chromosomal shattering, pan-genome genetic disruption by chromothripsis, widespread epigenetic dysregulation and cellular ageing. Clinical expressions of genotoxicity are expected to appear as cancer, birth defects and ageing.

it can be said that the evidence for cannabinoid genotoxicity is at once so clinically significant, ….a resounding clarion call to action: The only outstanding question is ‘Will we rise to the challenge?’


WHAT
CAN
WE
DO?

Cannabis and Cannabinoids in Adults with Cancer: ASCO Guideline

J Clin Onc 42:1575-1593 Mar 2024

- Clinicians should recommend against the use of cannabis and/or cannabinoids to augment cancer directed treatment unless in the context of clinical trial.
- Clinicians should recommend against use of cannabis and/or adenoids in place of cancer directed treatment.
- Adult with cancer who receive moderately or highly emetogenic antineoplastic agents with guideline-concordant, antiemetic prophylaxis and experience for nausea or vomiting may augment their regimen with Dronabinol, Nabilone or quality controlled oral 1:1 THC: CBD extract.
- Outside of a clinical trial, clinician should not recommend that adults with cancer use 300 mg or more per day of oral CBD to manage symptoms burden due to lack of proven efficacy, and risk of reversible, liver damage enzyme abnormalities.

Just because cannabis may not help the cancer

doesn't mean it wont help the patient.

Oral Cannabis Extract for Secondary Prevention of Chemotherapy-Induced Nausea and Vomiting: Final Results of a Randomized, Placebo-Controlled, Phase II/III Trial

Peter Grimison, PhD, MPH, MBBS, BSc, FRACP[1,2]; Antony Mersiades, MBBS[2,3]; Adrienne Kirby, MSc, BSc (Hons I)[2]; Annette Tognela, MBBS[4]; Ian Olver, MD, PhD, AM[5]; Rachael L. Morton, PhD, MSc(Med)(Clin Epi)(Hons)[2]; Paul Haber, PhD, MBBS, BMedSci, FAChAM[6]; Anna Walsh, BPharm(Hons)[2]; Yvonne Lee, PhD[2]; Ehtesham Abdi, MBBS (Adel), AFRACMA, FRACP, FACP[7]; Stephen Della-Fiorentina, OAM, MBBS (Hons), FRACP[8]; Morteza Aghmesheh, MD, PhD[9]; Peter Fox, MBBS[10]; Karen Briscoe, MBBS[11]; Jasotha Sanmugarajah, MBBS[12]; Gavin Marx, MBBS[13]; Ganessan Kichenadasse, MBBS[14]; Helen Wheeler, MBBS[15]; Matthew Chan, MBBS[16]; Jenny Shannon, MBBS[17]; Craig Gedye, MBBS[18]; Stephen Begbie, MBBS[19]; R. John Simes, MD, PhD[2]; and Martin R. Stockler, MBBS[2]

DOI: https://doi.org/10.1200/JCO.23.01836

ABSTRACT

PURPOSE The aim of this randomized, placebo-controlled, two-stage, phase II/III trial was to determine the efficacy of an oral cannabis extract in adults with refractory nausea and/or vomiting during moderately or highly emetogenic, intravenous chemotherapy despite guideline-consistent antiemetic prophylaxis. Here, we report results of the prespecified combined analysis including the initial phase II and subsequent phase III components.

PATIENTS AND METHODS Study treatment consisted of oral capsules containing either tetrahydrocannabinol 2.5 mg plus cannabidiol 2.5 mg capsules (THC:CBD) or matching placebo, taken three times a day from days −1 to 5, in addition to guideline-consistent antiemetics. The primary measure of effect was the difference in the proportions of participants with no vomiting or retching and no use of rescue medications (a complete response) during hours 0-120 after the first cycle of chemotherapy on study (cycle A).

RESULTS We recruited 147 evaluable of a planned 250 participants from 2016 to 2022. Background antiemetic prophylaxis included a corticosteroid and 5-hydroxytryptamine antagonist in 97%, a neurokinin-1 antagonist in 80%, and olanzapine in 10%. THC:CBD compared with placebo improved the complete response rate from 8% to 24% (absolute difference 16%, 95% CI, 4 to 28, $P = .01$), with similar effects for absence of significant nausea, use of rescue medications, daily vomits, and the nausea scale on the Functional Living Index—Emesis quality-of-life questionnaire. More frequent bothersome adverse events of special interest included sedation (18% v 7%), dizziness (10% v 0%), and transient anxiety (4% v 1%). There were no serious adverse events attributed to THC:CBD.

CONCLUSION THC:CBD is an effective adjunct for chemotherapy-induced nausea and vomiting despite standard antiemetic prophylaxis, but was associated with additional adverse events. Drug availability, cultural attitudes, legal status, and preferences may affect implementation. Future analyses will evaluate the cost-effectiveness of THC:CBD.

ACCOMPANYING CONTENT

Editorial, p. 4008

Appendix

Protocol

Accepted June 12, 2024
Published August 16, 2024

J Clin Oncol 42:4040-4050

View Online Article

INTRODUCTION

Chemotherapy-induced nausea and vomiting (CINV) remain feared complications of anticancer therapy that are associated with worse quality of life, increased use of health care resources, and reduced adherence to chemotherapy.[1] Corticosteroids, 5-hydroxytryptamine (5-HT3) antagonists, and neurokinin-1 (NK-1) antagonists mitigate CINV in many patients.[2] However, one third or more of patients treated with moderately or highly emetogenic chemotherapy report

What are the best marijuana strains for nausea in 2024?

- **Northern Lights**: An indica-dominant strain known for its relaxing effects and ability to ease nausea symptoms, making it a popular choice for evening use.
- **Sour Diesel**: A sativa-dominant strain that offers uplifting effects and quick nausea relief, perfect for daytime use.
- **Blue Dream**: This hybrid strain strikes a balance between relaxation and euphoria, providing relief from an upset stomach without heavy sedation.
- **OG Kush**: Known for its high THC content and earthy aroma, this strain is effective for nausea relief and chronic pain management.
- **Durban Poison**: A pure sativa strain with a high CBD ratio, offering energetic and uplifting effects that can help counteract feelings of nausea.
- **Super Lemon Haze**: With its citrusy terpene profile, this strain not only combats nausea but also offers a refreshing and uplifting experience.
- **Granddaddy Purple**: This indica strain is excellent for nighttime use, providing muscle relaxation and easing nausea symptoms.
- **White Fire OG**: A hybrid strain with a balanced cannabinoid profile ideal for both nausea relief and pain relief.
- **Blueberry Diesel**: Combining the best of indica and sativa strains, this hybrid offers quick symptom relief for nausea and an overall sense of well-being.
- **Girl Scout Cookies**: Known for its high THC content and versatile effects, this strain is a good choice for various causes of nausea, including food poisoning and irritable bowel syndrome.

Choosing the right strain often depends on individual needs and personal preferences. Consulting with a healthcare provider can help you navigate the various strains of marijuana and determine what works best for your specific symptoms. For more guidance, check out our How to Obtain Your Marijuana Card: A Step-by-Step Guide.

Key Takeaway: Selecting the right marijuana strain for nausea in 2024 can significantly enhance relief and improve quality of life.

Changes in health-related quality of life over the first three months of medical marijuana use

Lent *et al. Journal of Cannabis Research (2024) 6:36*

https://doi.org/10.1186/s42238-024-00245-9

This prospective, observational, longitudinal study followed adults newly recommended for medical marijuana by a physician for any of the more than 20 qualifying medical conditions in Pennsylvania.

Participants (*M* age = 46.4 years [15.6]; 66.4% female) were mostly commonly referred for medical marijuana to treat anxiety disorders (61.9%) or severe chronic or intractable pain (53.6%). Participants reported rapid and significant improvements in all of the domains of HRQoL from baseline to three months after initiating medical marijuana use (physical functioning, role limitations due to physical health problems, emotional well-being, role limitations due to emotional problems, bodily pain, social functioning, energy/fatigue and general health, $P < .001$ for all). Age was negatively predictive of level of improvement over time for the physical functioning ($P < .0001$), role limitations due to physical health problems ($P < .001$), and pain ($P < .0001$) domains after controlling for baseline, with older participants displaying less improvement than younger participants.

This cohort study of New York State Prescription Monitoring Program data from 2017 to 2019 included patients receiving MC [Medical Cannabis] for chronic pain while also receiving opioid treatment. Of these, patients receiving LOT [long-term opioid therapy] prior to receiving MC were selected. Individuals were studied for 8 months after starting MC [medical cannabis]. … The daily MME [morphine milligram equivalent] for the last month of the follow-up period among patients receiving longer MC was **reduced by 48% in the lowest stratum, 47% in the middle stratum, and 51% in the highest stratum compared with the baseline dosages**. … In this cohort study of patients receiving LOT, receiving MC for a longer duration was associated with reductions in opioid dosages. … These findings contribute robust evidence for clinicians regarding the potential benefits of MC in reducing the opioid burden for patients receiving LOT and possibly reduce their risk for overdose.
Changes in prescribed opioid dosages among patients receiving medical cannabis for chronic pain, New York State, 2017-2019, JAMA Network Open, 2023

"Patients (n = 2,183) recruited from medical dispensaries across Florida completed a 66-item cross-sectional survey that included demographic, health, and medication usage items, along with items from the Medical Outcomes Survey to assess health functioning before and after cannabis initiation. … The majority of participants (79%) reported either cessation or reduction in pain medication use following initiation of medical cannabis."
Medical cannabis patients report improvements in health functioning and reductions in opiate use, Substance Use & Misuse, 2022

> Eur J Intern Med. 2018 Mar:49:44-50. doi: 10.1016/j.ejim.2018.01.019.

Epidemiological characteristics, safety and efficacy of medical cannabis in the elderly

Ran Abuhasira [1], Lihi Bar-Lev Schleider [2], Raphael Mechoulam [3], Victor Novack [4]

Affiliations + expand

PMID: 29398248 DOI: 10.1016/j.ejim.2018.01.019

Abstract

Introduction: There is a substantial growth in the use of medical cannabis in recent years and with the aging of the population, medical cannabis is increasingly used by the elderly. We aimed to assess the characteristics of elderly people using medical cannabis and to evaluate the safety and efficacy of the treatment.

Methods: A prospective study that included all patients above 65 years of age who received medical cannabis from January 2015 to October 2017 in a specialized medical cannabis clinic and were willing to answer the initial questionnaire. Outcomes were pain intensity, quality of life and adverse events at six months.

Results: During the study period, 2736 patients above 65 years of age began cannabis treatment and answered the initial questionnaire. The mean age was 74.5 ± 7.5 years. The most common indications for cannabis treatment were pain (66.6%) and cancer (60.8%). After six months of treatment, 93.7% of the respondents reported improvement in their condition and the reported pain level was reduced from a median of 8 on a scale of 0-10 to a median of 4. Most common adverse events were: dizziness (9.7%) and dry mouth (7.1%). After six months, 18.1% stopped using opioid analgesics or reduced their dose.

Conclusion: Our study finds that the therapeutic use of cannabis is safe and efficacious in the elderly population. Cannabis use may decrease the use of other prescription medicines, including opioids. Gathering more evidence-based data, including data from double-blind randomized-controlled trials, in this special population is imperative.

Keywords: Aged; Elderly; Medical cannabis; Medical marijuana; Opioids.

Similar articles

RESEARCH PAPER

Terpenes from *Cannabis sativa* induce antinociception in a mouse model of chronic neuropathic pain via activation of adenosine A_{2A} receptors

Schwarz, Abigail M.[a]; Keresztes, Attila[a]; Bui, Thai[a]; Hecksel, Ryan[a]; Peña, Adrian[a]; Lent, Brianna[a]; Gao, Zhan-Guo[b]; Gamez-Rivera, Martín[a]; Seekins, Caleb A.[a]; Chou, Kerry[a]; Appel, Taylor L.[a]; Jacobson, Kenneth A.[b]; Al-Obeidi, Fahad A.[a]; Streicher, John M.[a,c,*]

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PAIN 165(11):p e145-e161, November 2024. | DOI: 10.1097/j.pain.0000000000003265

Abstract

Terpenes are small hydrocarbon compounds that impart aroma and taste to many plants, including *Cannabis sativa*. A number of studies have shown that terpenes can produce pain relief in various pain states in both humans and animals. However, these studies were methodologically limited and few established mechanisms of action. In our previous work, we showed that the terpenes geraniol, linalool, β-pinene, α-humulene, and β-caryophyllene produced cannabimimetic behavioral effects via multiple receptor targets. We thus expanded this work to explore the potential antinociception and mechanism of these *Cannabis* terpenes in a mouse model of chronic pain. We first tested for antinociception by injecting terpenes (200 mg/kg, IP) into male and female CD-1 mice with mouse models of chemotherapy-induced peripheral neuropathy (CIPN) or lipopolysaccharide-induced inflammatory pain, finding that the terpenes produced roughly equal antinociception to 10 mg/kg morphine or 3.2 mg/kg WIN55,212. We further found that none of the terpenes produced reward as measured by conditioned place preference, while low doses of terpene (100 mg/kg) combined with morphine (3.2 mg/kg) produced enhanced antinociception vs either alone. We then used the adenosine A_{2A} receptor ($A_{2A}R$) selective antagonist istradefylline (3.2 mg/kg, IP) and spinal cord–specific CRISPR knockdown of the $A_{2A}R$ to identify this receptor as the mechanism for terpene antinociception in CIPN. In vitro cAMP and binding studies and in silico modeling studies further suggested that the terpenes act as $A_{2A}R$ agonists. Together these studies identify *Cannabis* terpenes as potential therapeutics for chronic neuropathic pain and identify a receptor mechanism for this activity.

Vaporized D-limonene selectively mitigates the acute anxiogenic effects of Δ9-tetrahydrocannabinol in healthy adults who intermittently use cannabis

Drug and Alcohol Dependence V257, 1 Apr 2024, 111267
https://doi.org/10.1016/j.drugalcdep.2024.111267

D-limonene selectively attenuated THC-induced anxiogenic effects, suggesting this terpenoid could increase the therapeutic index of THC.

To be a Careful and Correct Conscientious Cannabis Consumer remember to Query the Quintessential Quattro Questions:

1. What is the treatment Goal?
   - (What are we aiming to treat/achieve?)
2. What is the right Strain?
   - (What are we treating it with?)
3. What is the right Route?
   - (How do we get “it” into you?)
   - (Stomach, Lung, Mucosa, Skin)
4. What is the right Dose?
   - (How much? How often?)

#CannabisIsComplicated #EducatedChoices

Who should say something first: “My patients know about cannabis”

Cancer. 2017 Nov 15;123(22):4488-4497. doi: 10.1002/cncr.30879. Epub 2017 Sep 25.

Cannabis use among patients at a comprehensive cancer center in a state with legalized medicinal and recreational use.

Pergam SA[1,2,3,4], Woodfield MC[1], Lee CM[5,6], Cheng GS[2,3], Baker KK[2], Marquis SR[1], Fann JR[2,5].

Author information

Abstract

BACKGROUND: Cannabis is purported to alleviate symptoms related to cancer treatment, although the patterns of use among cancer patients are not well known. This study was designed to determine the prevalence and methods of use among cancer patients, the perceived benefits, and the sources of information in a state with legalized cannabis.

METHODS: A cross-sectional, anonymous survey of adult cancer patients was performed at a National Cancer Institute-designated cancer center in Washington State. Random urine samples for tetrahydrocannabinol provided survey validation.

RESULTS: Nine hundred twenty-six of 2737 eligible patients (34%) completed the survey, and the median age was 58 years (interquartile range [IQR], 46-66 years). Most had a strong interest in learning about cannabis during treatment (6 on a 1-10 scale; IQR, 3-10) and wanted information from cancer providers (677 of 911 [74%]). Previous use was common (607 of 926 [66%]); 24% (222 of 926) used cannabis in the last year, and 21% (192 of 926) used cannabis in the last month. Random urine samples found similar percentages of users who reported weekly use (27 of 193 [14%] vs 164 of 926 [18%]). Active users inhaled (153 of 220 [70%]) or consumed edibles (154 of 220 [70%]); 89 (40%) used both modalities. Cannabis was used primarily for physical (165 of 219 [75%]) and neuropsychiatric symptoms (139 of 219 [63%]). Legalization significantly increased the likelihood of use in more than half of the respondents.

CONCLUSIONS: This study of cancer patients in a state with legalized cannabis found high rates of active use across broad subgroups, and legalization was reported to be important in patients' decision to use. Cancer patients desire but are not receiving information about cannabis use during their treatment from oncology providers. Cancer 2017;123:4488-97. © 2017 The Authors. Cancer published by Wiley Periodicals, Inc. on behalf of American Cancer Society. This is an open access article under the terms of the Creative Commons Attribution-NonCommercial-NoDerivs License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

KEYWORDS: cancer; cannabis; marijuana; pain; supportive care

PMID: 28944449 PMCID: PMC5698756 DOI: 10.1002/cncr.30879

[Indexed for MEDLINE] Free PMC Article

“Cancer patients desire but are are not receiving information about cannabis during the treatment from oncology providers.”

Thanks

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