The Cannabis Journal

By Danny Gagaoin

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24K (Kosher Kush x Tangie) from seed grown in no-till true living organics. Grown by the author and his good friend JacketGeorge. 2017 Outdoor full-term season.

This book and journal is dedicated to humanity and to ending cannabis prohibition worldwide. For all the medical patients and activists behind the cannabis movement, the growers and industry colleagues, budtenders, and even street hustlers, for all the victims of the War on Drugs, and to all the doctors, scientists, and researchers who put their careers on the line in order to reinvestigate and scientifically examine the cannabis plant - thank you for making all this possible and for not letting the truth die out...

Introduction

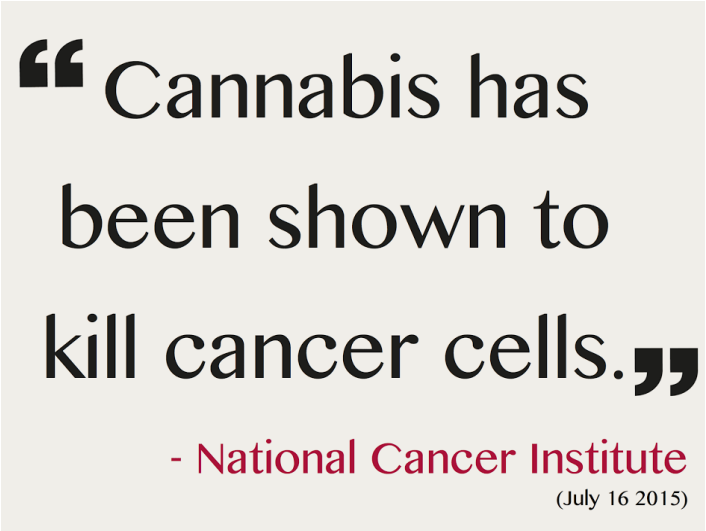
Statistics on Cancer:

- **In 2018 more than 1.6 million new cancer cases will be reported throughout the world. More than 600,000 cancer sufferers will die**.
    - Every month there will be 140,000+ new cases, and more than 50,000 deaths.
    - Every day there will be 4,000+ new cases, and more than 1600+ deaths.
    - Every minute there will be 3+ new cases, and at least 1 death.
    - This does indeed account for modern medical treatments and the current economic state of the world.

  (source: The American Cancer Society, www.cancerstatisticscenter.cancer.org)

- The number of new cases of cancer (cancer incidence) is 454.8 per 100,000 men and women per year (based on 2008-2012 cases). The number of cancer deaths (cancer mortality) is 171.2 per 100,000 men and women per year (based on 2008-2012 deaths).
    - **Approximately 39.6% of men and women will be diagnosed with cancer at some point during their lifetimes (based on 2010-2012 data)**.
    - In 2012 there were 14 million new cases and 8.2 million cancer-related deaths worldwide.
    - The number of new cancer cases will rise to 22 million within the next two decades.
    - National expenditures for cancer care in the United States totaled nearly $125 billion in 2010 and could reach $156 billion in 2020.

  (source: The National Cancer Institute, www.cancer.gov/about-cancer)



https://www.cancer.gov/about-cancer/treatment/cam/hp/cannabis-pdq

Statistics on the Opioid Overdose Crisis:

- "**Every day, more than 90 Americans die after overdosing on opioids. The misuse of and addiction to opioids - including prescription pain relievers, heroin, and synthetic opioids such as fentanyl - is a serious national crisis that affects public health as well as social and economic welfare**. The Centers for Disease Control and Prevention estimates that the total 'economic burden' of prescription opioid misuse alone in the United States is $78.5 billion a year, including the costs of healthcare, lost productivity, addiction treatment, and criminal justice involvement"

  (Source: The National Institute on Drug Abuse, www.drugabuse.gov/drugs-abuse/opiods/opiod-overdose-crisis)

- "Overdose deaths involving prescription opioids have quadrupled since 1999, and so have sales of these prescription drugs. **From 1999 to 2015, more than 183,000 people have died in the U.S. from overdoses related to prescription opioids. Opioid prescribing continues to fuel the epidemic**."

  (Source: The Center for Disease Control and Prevention, www.cdc.gov/drugoverdose/data/overdose.html)

- "We now know that overdoses from prescription opioids are a driving factor in the 15-year increase in opioid overdose deaths. The amount of prescription opioids sold to pharmacies, hospitals, and doctor's offices nearly quadrupled from 1999 to 2010, yet there had not been an overall change in the amount of pain that Americans reported. **Deaths from prescription opioids - drugs like oxycodone, hydrocodone, and methadone - have more than quadrupled since 1999**.

  (Source: The Center for Disease Control and Prevention, www.cdc.gov/drugoverdose/epidemic/index.html)

Statistics on Alzheimer's Disease:

- **More than 5 million Americans are living with Alzheimer's. By 2050 this number could be as high as 16 million.**
  - Every 66 Seconds someone in the United States develops the disease.
  - **1 in 3 seniors dies with Alzheimer's or another dementia. It is the 6th leading cause of death in the United States. It kills more than breast and prostate cancer combined**.

(Source: Alzheimer's Association, www.alz.org/facts)

Statistics on Autoimmune diseases which include but are not limited to - Crohn's Disease, Fibromyalgia, Juvenile Arthritis, Lupus, Multiple Sclerosis, Psoriasis, Rheumatoid Arthritis, Type 1 Diabetes, Ulcerative Colitis, and much more:

- "The National Institutes of Health (NIH) estimates up to 23.5 million Americans suffer from autoimmune disease and that the prevalence is rising. **We at AARDA say that 50 million Americans suffer from autoimmune disease**. Why the difference? The NIH numbers only include 24 diseases for which good epidemiology studies were available."

- "Researchers have identified 80-100 different autoimmune diseases and suspect at least 40 additional diseases of having an autoimmune basis. These diseases are chronic and can be life-threatening."

- "Autoimmune disease is one of the top 10 leading causes of death in female children and women in all age groups up to 64 years of age."

- "**Commonly used immunosuppressant treatments lead to devastating long-term side effects**."

  (Source: American Autoimmune Related Diseases Association, Inc. (AARDA), www.aarda.org /news-information/statistics)

Statistics on Anxiety, Depression, and Insomnia (otherwise known as the triple threat).

- **Anxiety disorders are the most common mental illness in the U.S., affecting 40 million adults in the United States age 18 and older, or 18.1% of the population every year**.

  - Anxiety disorders are highly treatable, yet only 36.9% of those suffering receive treatment.
  - People with an anxiety disorder are three to five times more likely to go to the doctor and six times more likely to be hospitalized for psychiatric disorders than those who do not suffer from anxiety disorders.

  (Source: Anxiety and Depression Association of America ADAA, https://adaa.org/about-adaa/press-room/facts-statistics)

- **The most commonly diagnosed form of depression is Major Depressive Disorder. Depression is the leading cause of disability in the United States among people ages 15-44.**

    - There are approximately 25 million Americans who suffer from depression every year.
    - Over 50 percent of all people who die by suicide suffer from major depression.
    - More Americans suffer from depression than coronary heart disease, cancer, and HIV/AIDS.

    (Source: American Foundation for Suicide Prevention, https://afsp.donordrive.com/index)

- **50-70 million US adults have a sleep disorder. Insomnia is the most common specific sleep disorder, with short term issues reported by about 30% of adults and chronic insomnia by 10%.**

    - 37% of 20-39 year-olds report short sleep duration.
    - 40% of 40-59 year-olds report short sleep duration.
    - Drowsy driving is responsible for 1,550 fatalities and 40,000 nonfatal injuries annually in the United States.
    - 100,000 deaths occur each year in US hospitals due to medical errors and sleep deprivation has been shown to make a significant contribution.

    (Source: American Sleep Association, www.sleepassociation.org/sleep/sleep-statistics/)

Statistics on Post Traumatic Stress Disorder:

- 70% of adults in the U.S. have experienced some type of traumatic event at least once in their lives. This equates to approximately 223.4 million people. Up to 20% of these people go on to develop PTSD. **As of today, that equates to approximately 44.7 million people who were or are struggling with PTSD**.

    - An estimated 8% of Americans - 24.4 million people - have PTSD at any given time. That is equal to the total population of Texas.
    - An estimated one out of every nine women develops PTSD, making them twice as likely as men.
    - PTSD is recognized as a psychobiological mental disorder that can affect survivors not only of combat experience, but also terrorist attacks, natural disasters, serious accident, assault or abuse, or even sudden and major emotional losses.

    (Source: PTSD United, www.ptsdunited.org/ptsd-statistics-2/)

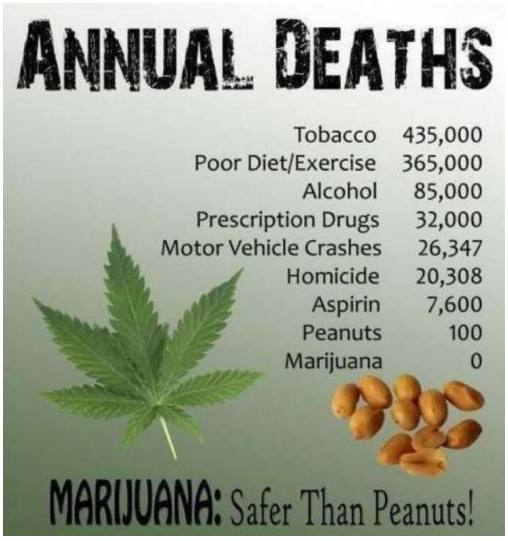
- **Roughly 20 veterans a day commit suicide nationwide, according to new data from the Department of Veteran Affairs**.
- In 2014, the latest year available, more than 7,400 veterans took their lives, accounting for 18 percent of all suicides in America.

(Source: MilitaryTimes.com, https://www.militarytimes.com/veterans/2016/07/07/new-va-study-finds-20-veterans-commit-suicide-each-day/)

Interesting intro you may be thinking, especially for a book about marijuana. And while it may be more fitting and entertaining for someone's weed book to be discussing fire dro, the latest High Times winning strains, the terpiest dabs, stoned tales from industry 'G's, or even cribs style featurettes of someone's bling grow and how to do it yourself, that's not what you'll find in this book unfortunately.

Instead, you'll find how cannabis can literally save lives, how it can help to safely treat a multitude of ailments and diseases, its long storied history, it's unjust status with the War on Drugs as well as vindication for prohibition's victims, and the truth behind this awesome plant's medical and textile potential. It's a deep rabbit hole to venture into, and this isn't just some simple stoner's fantasy, or an old tripped out hippy prophecy come true, but rather a relevant social matter that can significantly impact millions if not billions of people throughout the world.

Why the sobering statistics listed above? Because, cannabis, a non-lethal herbal plant remedy and the many therapeutic compounds it produces can have serious beneficial effects on all of the above listed ailments, diseases, societal issues, and much more! As you will discover from reading this book, the potential for this superplant as both a textile powerhouse and a safe yet versatile medicine is a subject that society worldwide needs to take a second look at. As a renewable resource that can be easily and rapidly grown, and upon further understanding of what the cannabis plant is actually capable of, the erroneously illegal and stigmatic perspective on a natural substance that has been grown for thousands of years in multiple countries and cultures desperately needs to be reconsidered and re-educated. It is hoped that the information presented here will help to serve that purpose.



Chapter 1 - A proposed redefinition of marijuana which goes by more than 1,200 slang terms including but not limited to: weed, herb, bud, ganja, grass, dro, dank, chronic, green, mary jane, reefer, and last but not least, it's real name - cannabis.

Photo from the Heaven Hill Project. Flower strain shown is Forbidden Fruit (Tangie x Cherry Pie) grown organically in no-till living soil. Grown by the author and his good friend Jacketgeorge

Cannabis: “A medicinal herbal plant that has a wide variety of industrial uses and potent therapeutic properties. It’s many strains and cultivars, including hemp, produce an array of powerful compounds known as cannabinoids and terpenoids, many of which have been studied by scientists and doctors for several decades for their very potent, versatile, yet nonlethal medical characteristics.

The therapeutic potential of cannabis includes but is not limited to: being able to safely kill cancer cells; acting as a powerful neuroprotectant to treat ailments such as Alzheimer’s, Parkinson’s disease, and Epilepsy; acting as a pain relieving analgesic without the user having to worry about a lethal overdose; safely aiding with sleep for insomnia (another symptom that a user does not have to worry about an overdose); being able to safely treat mood imbalances such as depression or severe anxiety, even in cases such as Post Traumatic Stress Disorder (PTSD); acting as a powerful immunosuppressant for autoimmune diseases such as Rheumatoid Arthritis, Lupus, Multiple Sclerosis, and more. Although this may already seem like an impressive and extensive list, these represent only a small example of cannabis’ medical potential.

This plant may indeed be processed, smoked, and consumed for recreational purposes with the simple intent of having a good time. In fact, smoking, vaping, dabbing, cooking and eating marijuana edibles have become more and more accepted in society with the advent of legalization in multiple states within the US and even other countries. What may not readily be known to people throughout the world, however, is the fact that the cannabis plant and its many amazing compounds can be put into pills and tinctures (they actually were in the latter half of the 1800s and early 1900s), be infused into virtually any food, be made into potent topicals, be formulated to be either psychoactive or non-psychoactive with CBD, even be extracted from specific strains or concocted with various cannabinoids and terpenoids in order to create a nuanced and specific kind of therapeutic effect! Furthermore, the plant can be consumed raw, either whole as a vegetable or juiced into a smoothie, without psychoactivity and with significant therapeutic benefits. Last but not least, it is also important to mention that smoking, vaping, dabbing, cooking and eating marijuana edibles do have legitimate medical use.

Cannabis is a genus of the flowering plant in the family Cannabaceae, with three species being universally recognized: Cannabis Sativa (which Hemp is a part of), Cannabis Indica, and Cannabis Ruderalis. These are horticulture terms to describe the various species of an herbal plant that should have never been made illegal. It’s many strains and cultivars have been used for thousands of years as a medicinal herb and as an extremely versatile textile in multiple cultures and societies. It was put into prohibition in the United States and throughout the rest of the world due to unjust misinformation, political, and economic reasons despite the fact that it is a powerful and much needed boon to the world.”

The previous page long redefinition of a notorious and infamous plant may seem like a wall of text for a simple description of a specific subculture's favorite type of flower at first glance, and even your average stoner may look at that and think to himself, "whoa that's a lot…," but all that it illustrates and describes is very real, very poignant, and represents only the tip of the iceberg of cannabis' potential to impact both the medical paradigm and the textile industries throughout the world.

Bold statements, but that's pretty much the point of this book and journal in a nutshell - to prove to you, whoever you are, of how very scientifically possible this all is.

In the coming pages and chapters, covered will be the following: medical patents filed with the US Government (including the one on killing cancer cells); the tens of thousands of peer reviewed scientific and medical articles on a multitude of ailments; a breakdown of the Endocannabinoid System, cannabinoids, and terpenoids - essentially the science behind cannabis; a historical timeline of cannabis' use throughout history including prohibition and the War on Drugs; how to actually process, make, and consume cannabis medicines to treat specific ailments; comparing cannabis to existing prescription drugs; some discussion on hemp; and even how recreational usage of cannabis can actually double as preventative care!

Finding all this interesting despite seeming just a little unbelievable? (You may or you may not depending on where you're from). Curious if you can be convinced? This book was intended to be read front to back to give you a somewhat comprehensive breakdown of cannabis, its medical use, history, and science behind it. You can of course skip ahead to chapters or areas you feel a need to reference or simply have that burning desire for an answer to a question. You can even show a specific section to a hater, prohibitionist, or even just the lay person to spark an informed discussion on "marijuana." It is hoped that the content here is as accessible as possible, easy to go through, and of course highly informative and helpful in reshaping yours and the rest of society's perception on the cannabis plant!

Photo from a High Tech Greenhouse Project in California. "A special type of OG" grown by the author and his good friend JacketGeorge.

2 Major Medical Patents Filed with the US Government

(12) **United States Patent**
Hampson et al.

(10) **Patent No.: US 6,630,507 B1**
(45) **Date of Patent: Oct. 7, 2003**

(54) **CANNABINOIDS AS ANTIOXIDANTS AND NEUROPROTECTANTS**

(75) Inventors: **Aidan J. Hampson**, Irvine, CA (US); **Julius Axelrod**, Rockville, MD (US); **Maurizio Grimaldi**, Bethesda, MD (US)

(73) Assignee: **The United States of America as represented by the Department of Health and Human Services**, Washington, DC (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/674,028**

(22) PCT Filed: **Apr. 21, 1999**

(86) PCT No.: **PCT/US99/08769**

§ 371 (c)(1),
(2), (4) Date: **Feb. 2, 2001**

(87) PCT Pub. No.: **WO99/53917**

PCT Pub. Date: **Oct. 28, 1999**

Related U.S. Application Data

(60) Provisional application No. 60/082,589, filed on Apr. 21, 1998, and provisional application No. 60/095,993, filed on Aug. 10, 1998.

(51) **Int. Cl.**[7] **A61K 31/35**
(52) **U.S. Cl.** **514/454**
(58) **Field of Search** 514/454

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(List continued on next page.)

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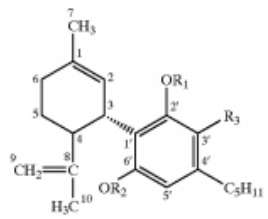
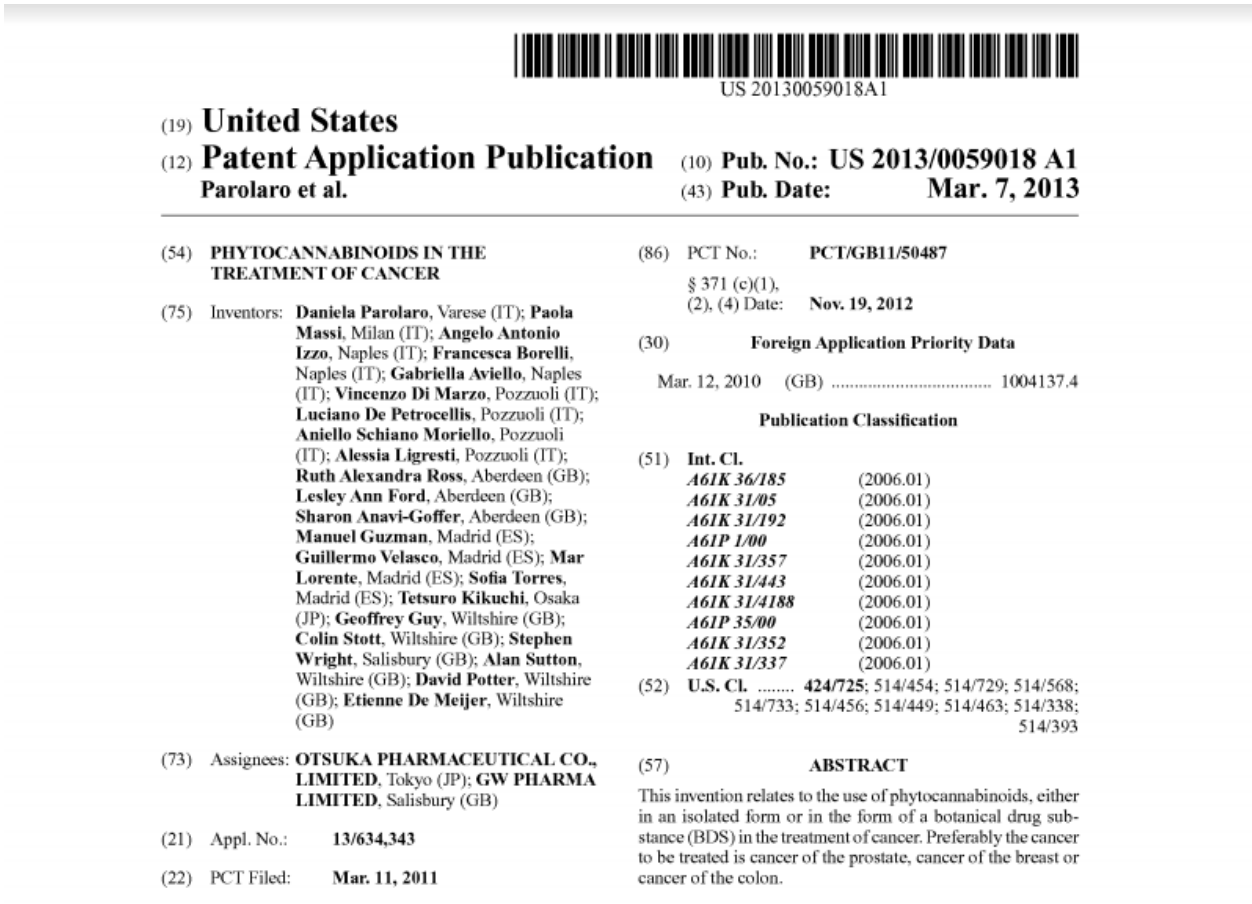
(57) **ABSTRACT**

Cannabinoids have been found to have antioxidant properties, unrelated to NMDA receptor antagonism. This new found property makes cannabinoids useful in the treatment and prophylaxis of wide variety of oxidation associated diseases, such as ischemic, age-related, inflammatory and autoimmune diseases. The cannabinoids are found to have particular application as neuroprotectants, for example in limiting neurological damage following ischemic insults, such as stroke and trauma, or in the treatment of neurodegenerative diseases, such as Alzheimer's disease, Parkinson's disease and HIV dementia. Nonpsychoactive cannabinoids, such as cannabidoil, are particularly advantageous to use because they avoid toxicity that is encountered with psychoactive cannabinoids at high doses useful in the method of the present invention. A particular disclosed class of cannabinoids useful as neuroprotective antioxidants is formula (I) wherein the R group is independently selected from the group consisting of H, CH_3, and $COCH_3$.

(I)



US Patent Filing US 6,630,507 B1 - Cannabinoids as Antioxidants and Neuroprotectants
Filed by the United States of America as Represented by the Department of Health and Human Services



US 20130059018A1

(19) **United States**

(12) **Patent Application Publication**
Parolaro et al.

(10) **Pub. No.: US 2013/0059018 A1**
(43) **Pub. Date: Mar. 7, 2013**

(54) **PHYTOCANNABINOIDS IN THE TREATMENT OF CANCER**

(75) Inventors: **Daniela Parolaro**, Varese (IT); **Paola Massi**, Milan (IT); **Angelo Antonio Izzo**, Naples (IT); **Francesca Borelli**, Naples (IT); **Gabriella Aviello**, Naples (IT); **Vincenzo Di Marzo**, Pozzuoli (IT); **Luciano De Petrocellis**, Pozzuoli (IT); **Aniello Schiano Moriello**, Pozzuoli (IT); **Alessia Ligresti**, Pozzuoli (IT); **Ruth Alexandra Ross**, Aberdeen (GB); **Lesley Ann Ford**, Aberdeen (GB); **Sharon Anavi-Goffer**, Aberdeen (GB); **Manuel Guzman**, Madrid (ES); **Guillermo Velasco**, Madrid (ES); **Mar Lorente**, Madrid (ES); **Sofia Torres**, Madrid (ES); **Tetsuro Kikuchi**, Osaka (JP); **Geoffrey Guy**, Wiltshire (GB); **Colin Stott**, Wiltshire (GB); **Stephen Wright**, Salisbury (GB); **Alan Sutton**, Wiltshire (GB); **David Potter**, Wiltshire (GB); **Etienne De Meijer**, Wiltshire (GB)

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(21) Appl. No.: **13/634,343**

(22) PCT Filed: **Mar. 11, 2011**

(86) PCT No.: **PCT/GB11/50487**
§ 371 (c)(1),
(2), (4) Date: **Nov. 19, 2012**

(30) **Foreign Application Priority Data**

Mar. 12, 2010 (GB) 1004137.4

Publication Classification

(51) **Int. Cl.**

A61K 36/185	(2006.01)
A61K 31/05	(2006.01)
A61K 31/192	(2006.01)
A61P 1/00	(2006.01)
A61K 31/357	(2006.01)
A61K 31/443	(2006.01)
A61K 31/4188	(2006.01)
A61P 35/00	(2006.01)
A61K 31/352	(2006.01)
A61K 31/337	(2006.01)

(52) **U.S. Cl.** **424/725**; 514/454; 514/729; 514/568; 514/733; 514/456; 514/449; 514/463; 514/338; 514/393

(57) **ABSTRACT**

This invention relates to the use of phytocannabinoids, either in an isolated form or in the form of a botanical drug substance (BDS) in the treatment of cancer. Preferably the cancer to be treated is cancer of the prostate, cancer of the breast or cancer of the colon.

US Patent filing US 2013/0059018 A1 - Phytocannabinoids in the Treatment of Cancer
Filed by scientists and doctors representing Otsuka Pharmaceutical Co and GW Pharma Limited
**note that "Phyto" means "plant".*

Full versions of the above patents can be found with a simple google search and it is encouraged that you, the reader, verify and check out any of the scientific references showcased in this book. Feel free, pull them up on your phone if you're curious. If you're reading a digital copy, here are some hyperlinks:

Cannabinoids as Antioxidants and Neuroprotectants:
https://www.google.com/patents/US6630507

Phytocannabinoids in the Treatment of Cancer:
https://www.google.com/patents/US20130059018

In discussing the medical efficacy and potential of cannabis, and to combat a lack of awareness surrounding the subject, it should be stressed that there are indeed medical institutions throughout the world (including the US Department of Health and Human Services) who have been filing patents on cannabis medicines for quite some time. This, all the while cannabis has remained in prohibition since 1937. In fact, at the time of this writing in 2018, the DEA still classifies Cannabis as a Schedule I Drug which “are defined as drugs with no currently accepted medical use and a high potential for abuse.” It is also considered by the DEA to be worse than cocaine, meth, fentanyl, and other opiate based drugs.

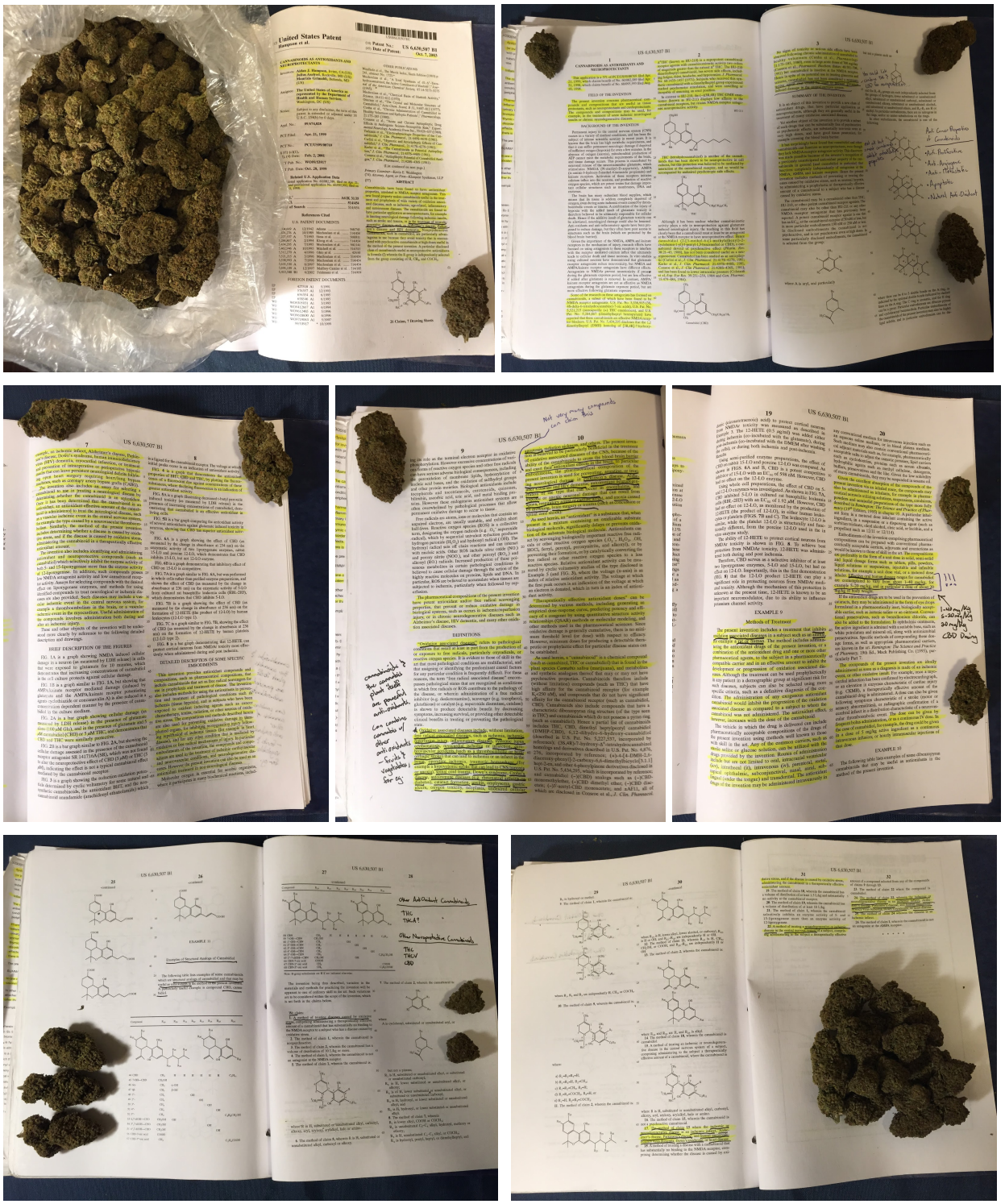
While the hypocrisy surrounding this may incite outrage in some, confusion and disbelief in others, or jaw dropping awe and wonder in the rest, the validity of cannabis as a medicine can no longer be denied if multi billion dollar big pharmaceutical companies not to mention the US Government are filing patents on the very real medical properties of the plant’s many chemical constituents. Although only 2 medical patents are listed here, rest assured that there are in fact several more that have been filed; each of them can be found with simple searches on the internet. More patents filed with the US Government and their respective hyperlinks will also be provided at the end of the chapter.

It is important to point out that much of the scientific and medical literature on cannabis focuses on two major key terms and subjects: 1) **Cannabinoids** such as **THC, CBD, CBN**, plus way more - essentially the chemical compounds that the plant produces; and 2) **The Endocannabinoid System (ECS)** that promotes homeostasis within each of our own bodies - the biological science behind how cannabis interacts with our health and how it is actually bigger than even our immune system. These subjects will be explained more in depth in the next chapter - “The Science Behind Cannabis.”

While it would be impossible to cover the two previously mentioned patents in their entirety within the scope of this book, a few key points for each (as well as other scientific articles in future sections and chapters) will be highlighted and discussed.

US Patent Filing US 6,630,507 B1 - Cannabinoids as Antioxidants and Neuroprotectants

Filed by the United States of America as Represented by the Department of Health and Human Services on Oct. 7, 2003.



Photos are from the author's personal compilation of research. Flower strain shown is Forbidden Fruit (Tangie x Cherry Pie) grown organically in no-till living soil. Grown by the author and his good friend jacketgeorge.

US Patent filing US 6,630,507 B1 was originally filed in 1999 and finally published in 2003 by the US Government as represented by the Department of Health and Human Services. As its name suggests, it investigates and "invents" a method of utilizing the primary cannabinoids of the cannabis plant , namely THC and CBD to help treat neurodegenerative diseases such as Alzheimer's disease, Parkinson's disease, and HIV Dementia. Additionally, due to these cannabinoids possessing powerful antioxidant properties, the patent also investigates their effectiveness in treating "Oxidative Associated disease" which include, but are not limited to: ischemia (irregular and inadequate blood flow), inflammatory diseases such as Rheumatoid Arthritis, systemic lupus, cerebrovascular accidents such as stroke, Crohn's disease, and even autoimmune diseases such as Type 1 Diabetes.

Some important quotes from the actual patent read:

Section 1 - Field of the Invention: *"The present invention concerns pharmaceutical compounds and compositions that are useful as tissue protectants, such as neuroprotectants and cardioprotectants.* ***The compounds and compositions may be used, for example, in the treatment of acute ischemic neurological insults or chronic neurodegenerative diseases****."*

Section 8 - Detailed Description of Some Specific Embodiments: "*This invention provides antioxidant compounds and compositions, such as pharmaceutical compositions, that include cannabinoids that act as free radical scavengers for use in prophylaxis and treatment of disease.* ***The invention also includes methods for using the antioxidants in prevention and treatment of pathological conditions such as ischemia (tissue hypoxia), and in subjects who have been exposed to oxidant inducing agents such as cancer chemotherapy, toxins, radiation, or other sources of oxidative stress.*** *The compositions and methods described herein are also used for preventing oxidative damage in transplanted organs, for inhibiting reoxygenation injury following reperfusion of ischemic tissues (for example in heart disease), and for any other condition that is mediated by oxidative or free radical mechanisms of injury. In particular embodiments of the invention, the compounds and compositions are used in the treatment of ischemic cardiovascular and neurovascular conditions, and neurodegenerative diseases. However, the present invention can also be used as an antioxidant treatment in non-neurological diseases."*

Section 9 - ***"The pharmaceutical compositions of the present invention have potent antioxidant and/or free radical scavenging properties, that prevent or reduce oxidative damage in biological systems, such as occurs in ischemic/reperfusion injury, or in chronic neurodegenerative diseases such as Alzheimer's disease, HIV dementia, and many other oxidation associated disease"***

The primary cannabinoid compounds investigated in this invention are again Tetrahydrocannabinol - THC (Δ9 THC to be exact) and the non-psychoactive Cannabidiol - CBD. Both were shown to have effectiveness in acting as neuroprotectants and antioxidants, and as you will read further, there are indeed recommended dosages for experimenting with medical cannabis despite the lack of sanctioned double blind clinical trials; unfortunately, the current drug scheduling of the plant makes having these much needed research studies illegal on the Federal level despite worldwide scientific interest into THC and CBD.

Section 16 - *"**These studies with the nonpsychotropic marijuana constituent, cannabidiol, demonstrate that protection can be achieved against both glutamate neurotoxicity and free radical induced cell death. THC, the psychoactive principle of cannabis, also blocked glutamate neurotoxicity with a potency similar to cannabidiol**. In both cases, neuroprotection is unaffected by the presence of a cannabinoid receptor antagonist. These results therefore surprisingly demonstrate that cannabinoids can have useful therapeutic effects that are not mediated by cannabinoid receptors, and therefore are not necessarily accompanied by psychoactive side effects. Cannabidiol also acts as an anti-epileptic and anxiolytic, which makes it particularly useful in the treatment of neurological diseases in which neuroanatomic defects can predispose to seizures (e.g. subarachnoid hemorrhage)."*

Interestingly enough, the inventors propose effective dosing for CBD in a human patient!

Section 20 - *"The compositions are preferably in the form of a unit dose in solid, semi-solid, and liquid dosage forms such as tablets, pills, powders, liquid solutions or suspensions, injectable and infusable solutions, for example, a unit dose vial, or a metered dose inhaler. **Effective oral human dosage ranges for cannabidiol are contemplated to vary from about 1-40 mg/kg, for example 5-20 mg/kg, and in particular, a dose of about 20 mg/kg of body weight.**"*

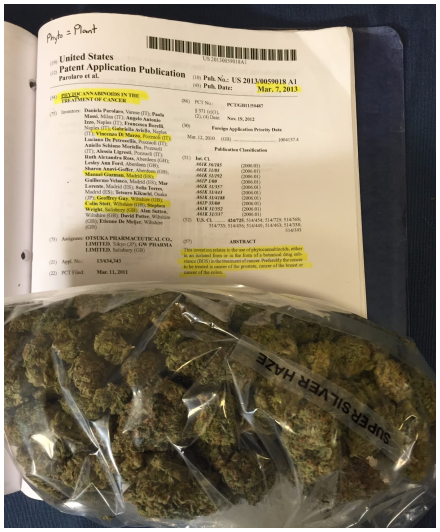
This particular patent and the information that can be drawn from it reveal a shocking number of things, many of which beg more questions! Medical cannabis does have very real potential in helping with diseases that have been previously difficult to treat, and you can experiment with dosing without having to worry about giving someone a lethal overdose - why hasn't society looked at this in more depth? If cannabis can act as a neuroprotectant, does that mean marijuana does not in fact kill brain cells, or make you dumber? If cannabis is so effective and has medical legitimacy, why are people going to jail for this and why is there a War on Drugs? Why is this particular patent filed by the US Government then? Why don't more doctors, teachers, scientists, and more people in general know about this?

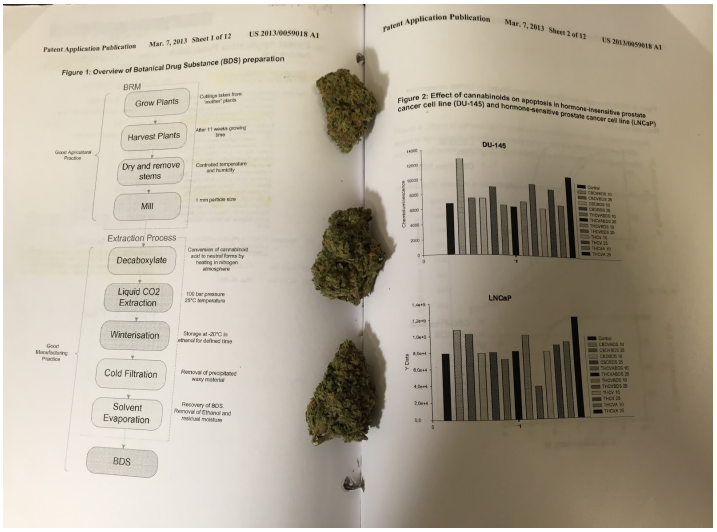
If this particular patent and first chapter of this book causes you to pause, scratch your head, and open up a can of worms of questions regarding what you may or may not know about cannabis - that was the intent. It will be further stressed and stated multiple times that the stigmatic perception of 'marijuana' is not an accurate one, and that it's continued prohibition is mind-blowingly senseless. In fact, many of the coming studies and articles showcased in this book may actually work to spark more research and interest into medical cannabis!

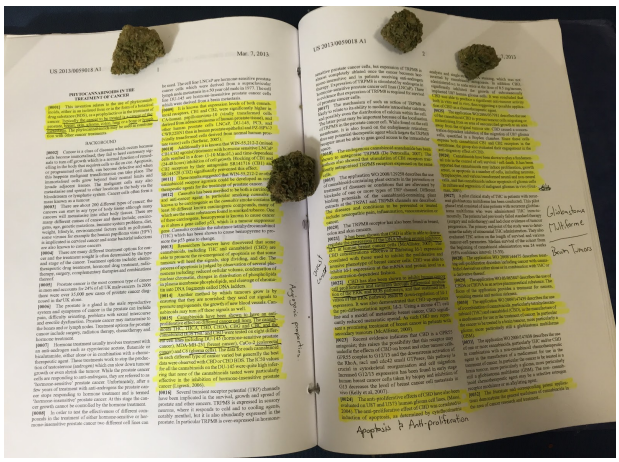
The next one is huge, it literally discusses safely killing various types of cancer - some of the most difficult diseases to treat worldwide that claims hundreds of thousands of lives every year.

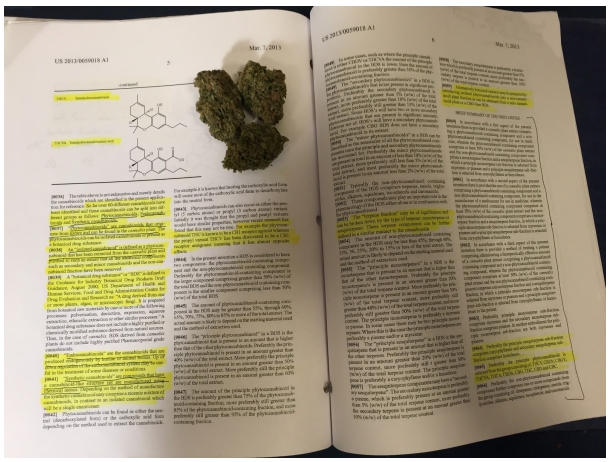
US Patent filing US 2013/0059018 A1 - Phytocannabinoids in the Treatment of Cancer

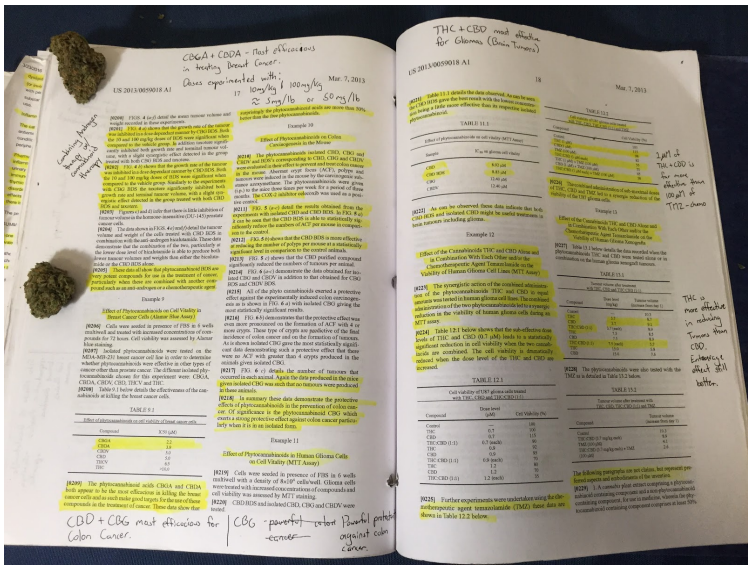
Filed by scientists and doctors representing Otsuka Pharmaceutical Co and GW Pharma Limited in 2013.











Photos are from the author's personal compilation of research. Flower strain shown is Super Silver Haze (Skunk x NL x Haze) from seed grown organically in no-till living soil. Grown by the author and his good friend jacketgeorge.

US Patent filing US 2013/0059018 A1 was originally filed in 2011 by various scientists and doctors represented by Otsuka Pharmaceutical Co. and GW Pharma Limited. It was published on Mar 7, 2013.

Before delving into specifics from the patent itself, a brief introduction into the 4 mechanisms by which cannabis safely kills cancer cells should be mentioned:

1. **Antiproliferation** - cannabinoids slow the growth of cancer by preventing them from reproducing and their numbers from growing.
2. **Antiangiogenesis** - cannabinoids prevent the formation of new blood vessels needed by cancer tumors to grow.
3. **Antimetastisis** - cannabinoids prevent various cancers from spreading to other organs.
4. **Apoptosis** - cannabinoids causes cancer cells to die. When they bind to the receptors of a cancer cell, a compound known as ceramide is produced within the cell which signals the cancer to shut off its own mitochondria, essentially causing the cancer tumor cell to commit programmed suicide.

All of this has been verified and confirmed in various lab tests, hundreds of medical studies, and of course the above mentioned patent. A specific and entire section of chapter 5 will be dedicated to a proposed methodology and treatment of cancer using cannabis, and there will be more in-depth information regarding the subject. This particular section aims to simply introduce you to the reality of cannabis' efficacy in combating cancer, and how this notion is far from a made up sensationalized hoax.

Some key quotes from the patent:

Page 1 Phytocannabinoids in the Treatment of Cancer paragraph 1 - *"This invention relates to the use of phytocannabinoids, either in an isolated form or in the form of a botanical drug substance (BDS), as a prophylactic or in the treatment of cancer.* ***Typically the cancer to be treated is a cancer of the prostate, breast, skin, glioma, lung, or a bone or lymph metastasis.*** *The phytocannabinoids may be used in combination with other cancer treatments."*

Page 1 paragraph 15 - *"Cannabinoids have been shown to have an antiproliferative effect on different cancer cell lines.* ***The cannabinoids THC, THCA, CBD, CBDA, CBG, and CBC and the cannabinoid BDS THC and CBD were tested on eight different cell lines*** *including DU-145 (hormone-sensitive prostate cancer), MDA-MB-231 (breast cancer), CaCO-2 (colorectal cancer), and C6 (glioma cells). The data for each cannabinoid in each different type of cancer varied but generally the best data were observed with CBD or CBD BDS"*

Page 2 paragraph 26 - *"Cannabinoids have been shown to play a fundamental role in the control of cell survival/cell death. It has been reported that cannabinoids may induce proliferation, growth arrest, or apoptosis in a number of cells, including neurons, lymphocytes, and various transformed neural and non-neural cells, and that* ***cannabinoids induce apoptosis of glioma cells in culture and regression of malignant gliomas in vivo*** *(Guzman, 2001)"*
Page 5 paragraph 37 - *"'****Phytocannabinoids' are cannabinoids that originate from nature and can be found in the cannabis plant****. The phytocannabinoids can be isolated cannabinoids or present as a botanical drug substance."*

Many of the different cannabinoids able to be produced by the cannabis plant were tested on various cancers; these respective compounds were extracted and isolated or (in the case of THC and CBD) were combined to see which of them were most effective for each line. Although CBD was found to be very versatile across many of the various cancers, and due to its non-psychoactive properties, which makes it touted as a cannabinoid of choice for medicine, it is important to note that these cannabinoids are actually produced together with each other in the natural plant. This is worth keeping in mind as a concept known as the “Entourage effect” of cannabinoids - where they work in concert together to provide a more potentiated and powerful therapeutic effect will be discussed in the third chapter, “The Science Behind Cannabis.” This patent does not, in fact, take this into account, and further hypothesis given what scientists now know of the plant suggest an even more potent and powerful possible treatment with various cancers than what this invention initially suggests!

There are a few more sections from the patent worth mentioning before a specific discussion on which cannabinoid combinations work best for which type of cancer is had. Notably, these are eye opening paragraphs that illustrate the scope of medical cannabis and how little the public actually knows…

> Page 14 paragraph 164 - ***“Patent application number PCT/GB2008/001837 describes the production of a ‘zero cannabinoid’ plant****. These plants were produced by selective breeding to produce a Cannabis sativa L plant that contained a generally qualitatively similar terpene profile as a Cannabis sativa L plant that produced cannabinoids yet it was devoid of any cannabinoids. These plants can be used to produce cannabinoid-free plant extracts which are useful control plants in experiments and clinical trials.”*

This paragraph essentially describes a placebo plant that was bred and invented to not produce cannabinoids. This can be used for double blind trials and experiments.

> Page 16 Example 8 - *“Effect of Phytocannabinoids Alone or in Combination With a Chemotherapeutic Agent or an Anti-androgen in Hormone-insensitive Prostate Cancer Cell Line (DU-145) and Hormone-sensitive Prostate Cancer Cell Line (LNCaP) in a Subcutanaeous Xenograft Model.*

There is also an entire section in the patent dedicated to observing how well certain cannabinoids work in conjunction with either Hormone Therapy or Chemotherapy.

Although some individuals may look at this particular patent with cynicism or even understandable outrage (this effective and non-lethal approach to treating cancer is unfortunately not available or even known to the average doctor, scientist, or person), it does provide extremely useful information in regards to which cannabinoids are in fact specifically useful for a specific type of cancer - this begs for more research obviously, but the ‘inventors’ of this article discuss the following:

> Page 17 paragraph 209 - *“**The phytocannabinoid acids CBGA and CBDA both appear to be the most efficacious in killing the breast cancer cells and as such make good targets for the use of these compounds in the treatment of cancer**. These data show that surprisingly the phytocannabinoid acids are more than 50% better than free phytocannabinoids.”*

Page 17 paragraphs 217-218 - *"...the data produced in the mice given isolated CBG was such that no tumours were produced in these animals.* ***In summary these data demonstrate the protective effects of phytocannabinoids in the prevention of colon cancer****.* ***Of significance is the phytocannabinoid CBG which exerts a strong protective effect against colon cancer particularly when it is an isolated form.****"*

Page 18 paragraphs 223-226 - *"****The synergistic action of the combined administration of the phytocannabinoids THC and CBD in equal amounts was tested in human glioma cell lines. The combined administration of the two phytocannabinoids led to a synergistic reduction in the viability of human glioma cells during an MTT assay****. Table 12.1 below shows that the sub-effective dose levels of THC and CBD (0.7 μM) leads to a statistically significant reduction in cell viability when the two cannabinoids are combined. The cell viability is dramatically reduced when the dose level of the THC and CBD are increased. Further experiments were undertaken using the chemotherapeutic agent temazolamide (TMZ) these data are shown in table 12.2 below.* ***The combined administration of sub-maximal doses of THC, CBD, and TMZ led to a synergistic reduction of the viability of the U87 glioma cells****."*

This patent and many of the quotes and excerpts featured offer a very eye opening, telling, and indeed informative outlook on not just cannabis' future as a medicine, but also into its possible legitimate place in the cancer research and treatment world. While the plant is not an outright cure for cancer (or for any ailment), consider the fact that on a scientific level, cannabinoids are actually superior to chemotherapy, radiation therapy, or hormone therapy in that they can safely be incorporated as a treatment that causes zero harm to the other cells within one's body and that there is zero chance of lethality when using cannabis as a medication, even with prolonged use. Also consider that there have been countless case studies of individuals successfully beating cancer with cannabis! You are absolutely free to look this up! There are case articles, websites, video testimonials from various individuals with different cancers. Search for the following with Google and Youtube: "Cannabis and Cancer" and be amazed at what you find!

Cannabis - more than just a drug? Or an herbal superplant?

It will come as no surprise that for a vast majority of people, discussing weed, pot, and smoking herb will no doubt conjure in one's imagination scenes of passing a joint around in a smoke circle, taking lung busting bong rips, low temp dabbing maybe, or even taking a weekend off with that 1000mg edible; all sound like considerable good times if you ask me. Conversely, perhaps even a negative memory or fabricated reefer madness fantasy such as a bunch of teenage kids smoking dope and getting into too much trouble or crazed drug dealers getting high off their own supply to the point of insanity or maybe even some long winded lecture from a teacher, priest, or Nancy Reagan when she told everyone to just say 'no' - these scenarios might play out in your head upon first getting into a conversation concerning the green ganja.

Regardless of what initially pops into your mind when you first hear the word marijuana, chances are for the vast majority of people, even those who have been a part of the green movement for quite some time, the shocking reality is that most people do not have a correct, complete, and proper perspective on cannabis. Much of this erroneous point of view (or proper lack thereof) stems from looking at the cannabis plant only as a drug to be smoked for recreational purposes. While it is indeed consumed this way for personal pleasure, smoking the plant's flowers only represents a small fraction of its potential use - even with recreational intent! As you will find later on, you will learn about the many ways to prepare and consume cannabis for both medical and recreational purposes, and there will be an entire section dedicated to investigating hemp's many industrial uses.

With cannabis' wide range of medical use and its potential to produce so many various industrial goods that are comparable or even better than other products currently on the market, such as cotton, fiber, paper, and plastics as a few small examples, it becomes apparent when covering all of these other properties and potential uses that there is much much more than meets the eye when it comes to this plant.

In fact, many of the more informed botanists, horticulturists, farmers, historians, activists, and believe it or not, doctors, researchers, and scientists view and speak of the cannabis and hemp species as Herbal Superplants, not just drugs. Is this information causing some cognitive conflict in what you think you know about marijuana? Is this different from everything you were taught about dope? (It is and sadly you'll find that a lot of what you were taught in school about smoking pot is wrong...and no it is not a gateway drug).

Who am I and why did I write and share all this for free? I'm a medical cannabis scientific researcher, activist, professional grower, writer, and I've been heavily involved with the cannabis movement and industry since 2013. I was the medical research scientist for the renowned Elemental Wellness Cannabis Collective in San Jose for several years and I founded and helped to lead their medical private consultation team in helping real world medical patients to incorporate cannabis into their regiments. I have literally seen cannabis change, improve, and save numerous lives, and I know it continues to do so to this day. This book and journal is a current culmination of scientific research that I have been working on for the past several years. Whether you believe it or not, you will hear me state multiple times throughout these chapters that cannabis can change and impact the world for the better in so many ways. It can ease suffering and save lives across many ailments, be a major player in the sustainability movement, and help to revolutionize medicine and industrial goods throughout the world for the next several hundred years if not longer; humanity has in fact been utilizing the plant since agriculture was invented.

The question of why. Why? Because humanity deserves better, the world deserves better. I love cannabis, and I love humanity.

End of Chapter Addendum - Some Relevant Medical Patents Filed With the US Gov (feel free to look these up and research them yourself. Hyperlinks have been included for digital copies! Better yet, check out the US Patent Office website and do a search for cannabinoids or the endocannabinoid system!)

US Patent 20150005346 A1, Jan 31, 2017 - Allosteric modulators of CB1 cannabinoid receptors

US Patent 20170001949 A1, Jan 5, 2017 - Novel cannabinoid receptor 2 (cb2) inverse agonists and therapeutic potential for multiple myeloma and osteoporosis bone diseases

US Patent 20160376211 A1, Dec 29, 2016 - Cannabinoid derivatives

US Patent 20160374958 A1, Dec 29, 2016 - Anti-microbial composition comprising cannabinoids

US Patent 9526752, Dec 27, 2016 - Composition of cannabinoids, odorous volatile compounds, and emu oil for topical application, and a method for cannabinoid transdermal delivery

US Patent 20160367518 A1, Dec 22, 2016 - Methods of treating fibrotic diseases using tetrahydrocannabinol-11-oic acids

US Patent 20160257654 A1, Sep 8, 2016 - Cannabinoid receptor mediating compounds

US Patent 20160243075 A2, Aug 25, 2016 - Tetrahydrocannabivarin (THCv) for use in the protection of pancreatic islet cells

US Patent 20160243055 A1, Aug 25, 2016 - Cannabidiol For Treatment of Severe and Refractory Graft-Versus-Host Disease

US Patent 20160158299 A1, Jun 9, 2016 - Cannabidiol (CBD) Enriched Alcohol

US Patent 20160136128 A1, May 19, 2016 - The use of phytocannabinoids in the treatment of ovarian carcinoma

US Patent 20160136127 A1, May 19, 2016 - Use of tetrahydrocannabinol and/or cannabidiol for increasing radiosensitivity in the treatment of brain tumour

US Patent 9326927, May 3, 2016 - Use of cannabinoid compounds for stimulating melanogenesis

US Patent 20160089349 A1, Mar 31, 2016 - Cb2 Receptor Ligands for the Treatment of Psychiatric Disorders

US Patent 20160067235 A1, Mar 10, 2016 - Antagonists of the Cannabinoid Receptor CB1 for Use in the Treatment of Diseases Associated with Neuronal Dendritic Abnormalities

US Patent 20160058736 A1, Mar 3, 2016 - Cannabinoid receptor antagonists/inverse agonists useful for treating metabolic disorders, including obesity and diabetes

US Patent 20160010126 A1, Jan 14, 2016 - Production of cannabinoids in yeast

US Patent 20150342922 A1, Dec 3, 2015 - Cannabinoid formulation for the sedation of a human or animal

US Patent 9133127, Sep 15, 2015 - Cannabinoid Receptor antagonists/inverse agonists useful for treating disease conditions, including metabolic disorders and cancers

US Patent 9133128, Sep 15, 2015 - Pyrazole derivatives as cannabinoid receptor 1 antagonists

US Patent 9125859, Sep 8, 2015 - Use of the phytocannabinoid cannabidivarin (CBDV) in the treatment of epilepsy

US Patent 9095563, Aug 4, 2015 - Topical treatments incorporating Cannabis sp. derived botanical drug product

US Patent 9095555, Aug 4, 2015 - Cannabinoid formulations

US Patent 9095554, Aug 4, 2015 - Breeding, production, processing and use of specialty cannabis

US Patent 20150197484 A1, Jul 16, 2015 - Use of cannabidiol prodrugs in topical and transdermal administration with microneedles

US Patent 9066920, Jun 30, 2015 - Use of one or a combination of phyto-cannabinoid in the treatment of epilepsy

US Patent 9066910, Jun 30, 2015 - Methods and compositions of cannabis extracts

US Patent 9062004, Jun 23, 2015 - Cannabinoid-2 agonists

US Patent 9017737, Apr 28, 2015 - Use of cannabinoids in combination with an anti-psychotic medication

US Patent 9006442, Apr 14, 2015 - Cannabinoid receptor modulators

US Patent 9006275, Apr 14, 2015 - Compounds as cannabinoid receptor ligands and uses thereof

US Patent 8980942, Mar 17, 2015 - Prodrugs of tetrahydrocannabinol, compositions comprising prodrugs of tetrahydrocannabinol and methods of using the same

US Patent 8853252, Oct 7, 2014 - Cannabinoid receptor antagonists/inverse agonists useful for treating metabolic disorders, including obesity and diabetes

US Patent 8772541, Jul 8, 2014 - Cannabinoid receptor 2 (CB2) inverse agonists and therapeutic potential for multiple myeloma and osteoporosis bone diseases

US Patent 8735073, May 27, 2014 - Cannabinoid 2 (CB.sub.2) receptor gene promoter and unique RNA transcripts in B cells and methods of use

US Patent 8673368, Mar 18, 2014 - Cannabinoid-containing plant extracts as neuroprotective agents

US Patent 8648072, Feb 11, 2014 - Cannabinoid receptor antagonists/inverse agonists useful for treating metabolic disorders, including obesity and diabetes

US Patent 8642645, Feb 4, 2014 - Pharmaceutical composition comprising Cannabinoids

US Patent 8632825, Jan 21, 2014 - Anti-tumoural effects of cannabinoid combinations

US Patent 8546563, Oct 1, 2013 - Compounds which modulate the CB2 receptor

US Patent 8481085, Jul 9, 2013 - Pharmaceutical compositions comprising cannabigerol

US Patent 8449908, May 28, 2013 - Transdermal delivery of cannabidiol

US Patent Application 20130059018 A1, Mar 7, 2013 - Phytocannabinoids in the treatment of cancer

US Patent 8445034, May 21, 2013 - Systems and methods for producing organic cannabis tincture

US Patent 8337908 B2, Dec 25, 2012 - Plant Extract From Low-THC Cannabis for the Treatment of Disease

US Patent 8236763, Aug 7, 2012 - Use of antagonists of the CB1 receptor for the manufacture of a composition useful for the treatment of hepatic diseases

US Patent 8207230, Jun 26, 2012 - Functional role for cannabinoids in autonomic stability during sleep

US Patent 8119697, Feb 21, 2012 - Anti-nausea and anti-vomiting activity of cannabidiol compounds

US Patent 8106244, Jan 31, 2012 - Process for production of delta-9-tetrahydrocannabinol

US Patent 8084422, Dec 27, 2011 - Method of treating insulin resistance with a selective inhibitor of CB2 receptor activity

US Patent 8058264, Nov 15, 2011 - Pharmaceutical compositions comprising CB1 cannabinoid receptor antagonists and potassium channel openers for the treatment of obesity and related conditions

US Patent 7884133, Feb 8, 2011 - Pharmaceutical compositions containing (+) cannabidiol and derivatives thereof and some such novel derivatives

US Patent 7763607, Jul 27, 2010 - Pharmaceutical compositions comprising CBx cannabinoid receptor modulators and potassium channel modulators

US Patent 7749953, Jul 6, 2010 - Methods compositions and articles of manufacture for modulating bone growth

US Patent 7674922, Mar 9, 2010 - Process for production of delta-9-tetrahydrocannabinol

US Patent 7611858, Nov 3, 2009 - Detection of cannabinoid receptor biomarkers and uses therof

US Patent 7595339, Sep 29, 2009 - CB1 Modulator Compounds

US Patent 7183313, Feb 27, 2007 - Keto cannabinoids with therapeutic indications

US Patent 6995187, Feb 7, 2006 - Peripheral cannabinoid receptor (CB2) selective ligands

US Patent 6949582, Sep 27, 2005 - Method of relieving analgesia and reducing inflammation using a cannabinoid delivery topical liniment

US Patent 6939977, Sep 6, 2005 - Analgesic and immunomodulatory cannabinoids

US Patent 6903137, Jun 7, 2005 - Agonists specific for the peripheral cannabinoid receptor

US Patent 6630507 B1, Oct 7, 2003 - Cannabinoids as Antioxidants and Neuroprotectants

US Patent 6566543, May 20, 2003 - 2-arachidonylglycerl (2-AG) an inhibitor of tumor necrosis factor-alpha and neuroprotector of brain in closed head injury

US Patent 6328992 B1, Dec 11, 2001 - Cannabinoid Patch and Method for Cannabis Transdermal Delivery

Chapter 2 - A history of cannabis and a little about cannabis and religion.

Old Advertisement of "Fluid Extract Cannabis Americana" by the Parke, Davis & Company

"And God said, Behold, I have given you every herb bearing seed, which is upon the face of all the earth, and every tree, in the which is the fruit of a tree yielding seed; to you it shall be for meat."

- **Genesis 1:29 KJV**

Before we get into the meaty science of cannabis, a little background and history on the cannabis plant should be established. After all, the protagonist of this book's story - the plant itself, should have it's backdrop and origin tale told, even where the bible and various religions are concerned! Consequently, this chapter is divided into two respective parts - first, a chronological timeline of cannabis' usage throughout history and multiple cultures, and then an examination of how cannabis has been portrayed in the bible as well as various religions throughout the world. As with any and all material in this book, you the reader are encouraged to fact check and verify everything that is stated. Sources and references will be provided with hyperlinks at the end of the chapter instead of at the end of the book. Last but not least, Google searches are an amazing tool in the modern era!

Cannabis Throughout History

Despite cannabis' relatively recent status as a Schedule 1 Drug and even with the War on Drugs going on, it is important to remember that this powerful plant has actually had a long history with humans that dates back to ancient times. As you will find from reading several of the historical points listed further in this section, cannabis was indeed used as a versatile source of textile goods as well as medicine that was and still is useful for treating many ailments. It was also a legitimate part of the Western Pharmacopeia that was even produced by many farmers in America until racist driven propaganda drove hemp and the cannabis plant into unjust prohibition. Much of this will indeed be detailed.

It is also important to note that while the history of cannabis is fascinating unto its own, these clues and records from the past indeed served the scientists and researchers that continue to discover and spread knowledge on the medical potential of the plant itself. Much of these old findings from the ancient world actually give us the initial clues, ground, and frame from which we now build upon our overall understanding of cannabis.

While much of what is listed below involves the plant's medical usage throughout the world, keep in mind that all the while it was used as a medicine, it's versatile hurd, pulp, and stock was utilized to make countless every day textile goods such as fiber for rope, clothing, and other cloths; food; building material (for Henry Ford's cars even), paper, and more! Eye opening stuff for sure, and the next few pages illustrate a comprehensive chronology of cannabis history!

- **8,000 BCE (probably even earlier):** Evidence of hemp's earliest mass cultivation comes from various parts of Asia and Mesopotamia (modern day Turkey). Ancient Taiwanese pottery suggests that humans used the hemp cord for various purposes including cloth as far back as this era. It has been suggested that Hemp was one of the first agricultural crops to be grown.
- **6,000 BCE:** The people of ancient China begin to process cannabis seeds and oil for food.
- **4,000 BCE:** Various hemp textile goods are produced and utilized in China, Turkestan, and Central Asia.
- **2700 BCE:** Chinese Emperor Shennong (considered the father of Chinese medicine) writes and experiments with cannabis (oftentimes on himself) for a variety of ailments. His findings would later be compiled into multiple herbal medicine compendiums throughout the history of mankind - cannabis was a significant component of these herbal practices.

- **2000 BCE:** People in India begin to mix cannabis and milk to make Bhang, a drink used as an anesthetic (pain reliever) and anti-phlegmatic (used to treat apathy and depression). The Atharva Veda of this culture which was later written several centuries later even states that cannabis is one of the five sacred plants of India. In addition to its medicinal use to help treat anxiety, it was also a ritual offering to the Hindu god Shiva.
- **1500 BCE:** Scythians cultivate hemp to make fine cloth.
- **1200 BCE:** Egyptians utilize cannabis to treat glaucoma and inflammation. Modern scientists have also found evidence of cannabis in the tomb of Ramesses II who died in 1213 BCE.
- **600 BCE:** People from what is now Southern Russia begin to use hemp.
- **500-400 BCE:** A Scythian Urn containing cannabis leaves and seeds dating back to this time was unearthed near Berlin; historians suggest that this is evidence that the Scythians introduced hemp products to Europe around or before this century. Also during this time, Herodotus the great historian reports that the Scythians used cannabis for both ritual and recreational purposes.

- **200 BCE:** Greeks begin to utilize hemp for rope and cannabis as a medicinal remedy for earache, edema (swelling), and inflammation.
- **100 BCE - 1 CE:** The first evidence of hemp paper comes from China in this era. The Pen Ts'ao Ching, a medical compilation of herbs, recipes, and remedies based off of the teachings and writings of Emperor Shennong is published. It names cannabis as one of the most useful and versatile medicines that may be utilized for hundreds of ailments and maladies including rheumatic pain, intestinal constipation, disorders of the female reproductive system, malaria, and more!
- **1-100 CE:** Pliny the Elder writes "The Natural History" and discusses hemp rope and cannabis as an analgesic (pain reliever). The Greek physician Discorides publishes the book, "De Materia Medica," or "On Medical Matters" and recommends cannabis to treat earache, amongst other ailments. In 79 CE, the historian Pliny the Elder writes that the roots of the cannabis plant, when boiled in water, may be used to ease cramped joints, gout, and violent pain.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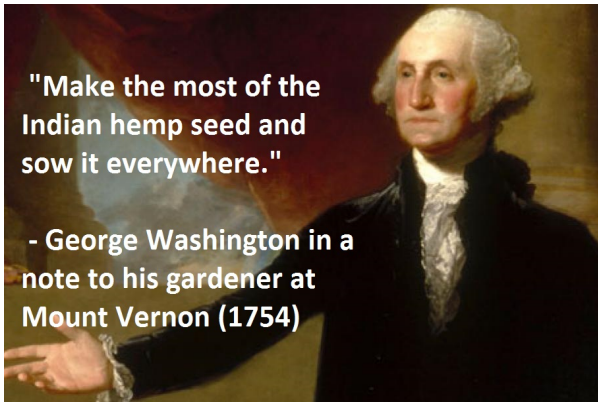
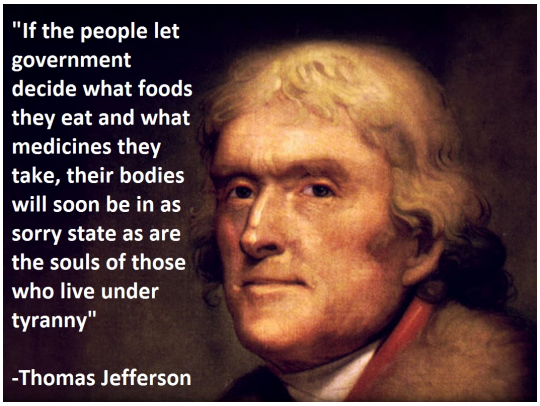
Enarratio CLXII. CLXIII.
Cannabis satiua.
CAnnabis satiua vulgaris est, excellens tamen apud Hollandos nascitur, ex qua linei panni Hollandiæ dicti, quos Itali, de renzo appellant, fiũt. Huius porro semen comestum, hominibus genituram extinguit, gallinis verò auget, videmus enim gallinas rigida hieme hoc semine pastas, oua parere, id quod aliis semẽ non comedentibus, nõ euenit: & vt tradit Gale. lib. vij. de Facultat. simplic. medic. cannabis semen adeo fatus discutit exiccatque, vt si argius edatur, genituram absumat. In fine vero libri j. de Facul. aliment. de illo quoq; ita tradit, multum autem calefacit, ideoq; sumptum paulo largius caput ferit, vaporẽ sursum ad ip sum mittens calidum simul ac medicamentosum. Ex quibus Galeni verbis, satis clarè liquet, quàm perperam agant ij, qui semen hoc cõtra epilepsiam, ac capitis affectiones dent. Cannabis sylvestris, sua spõte in aruis nascitur, nec enim est, vt multi rentur, ea herbá quam multi pro cuparorio hucusq; arripiebant.
Cannabis.
Cannabis syluestris.

- **200 CE**: It is reported that the Chinese surgeon Hua T'o used cannabis resin combined with wine as anesthetic for surgery.
- **500-600 CE:** Jews utilize cannabis for textile purposes; this is directly stated in the Shulchan Aruch (the Code of Jewish Law), and the Talmud.
- **800-900 CE:** Cannabis is used in the Arabic world to treat a variety of ailments including migraines, syphilis, and as an analgesic and anesthetic. Arabs also find it useful as a paper, and last but not least, for making and consuming hashish for recreational purposes. Vikings take the hemp rope and seeds to Iceland.
- **1000 CE:** Hemp rope begins to be utilized on Italian ships.
- **1100-1200 CE:** The practice of eating Hashish spreads throughout the Middle East - Iraq, Bahrain, Egypt, and Syria. In the collection "1,001 Nights," the "Tale of Two Hashish Eaters" is included and tells a story involving hash's intoxicating properties.
- **1300-1400 CE:** Cannabis is introduced to the Mozambique coast of Africa by Arab traders. Historians also state that evidence of cannabis use was found in Ethiopian pipes which suggest that the plant was also spread to the rest of Africa from Egypt.

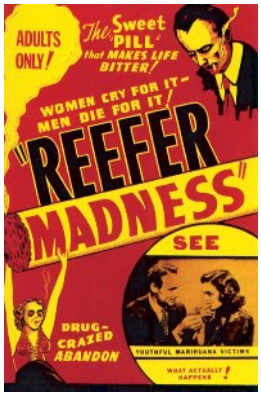
- **1500 CE:** In 1578, a medical text by Li Shizhen, “Bencao Gangmu Materia Medica” or the “Compendium of Materia Medica,” is published and considered to be the most complete and comprehensive medical book written in the history of traditional Chinese medicine up to then. In it, cannabis is described as versatile and useful for treating vomiting, parasitic infections, and hemorrhage. King Henry VIII of this century also fines farmers if they do not grow hemp for industrial use. In Brazil, Angolan slaves bring cannabis with them and are permitted to grow the plant amongst sugar canes in plantations. The Angolans smoked the plant in between harvests. The Portuguese physician Garcia da Orta also investigates and reports on cannabis’ medicinal effects.
- **1600 CE:** England begins to import hemp from Russia, and the French and British begin to cultivate cannabis for hemp in the American colonies of Port Royal, Virginia, and Plymouth. Jamestown settlers also begin to cultivate hemp for building purposes. “The Anatomy of Melancholy,” a medical textbook by English clergyman and scholar Robert Burton is published in 1621. He details cannabis’ potential use to treat depression. In 1652, the renowned herbalist Nicholas Culpeper publishes “The English Physitian.” In it, he states that hemp extract, “allayeth inflammations in the head...eases the pains of the gout...knots in the joynts, and the pains of the sinews and hips.” Hashish also becomes a major trade item between Central Asia and South Asia.
- **1700 CE:** Both US Presidents George Washington and Thomas Jefferson grow hemp for textile purposes at Mount Vernon and Monticello respectively.

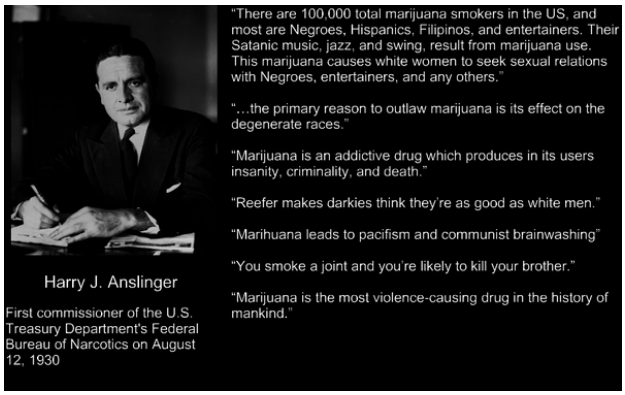




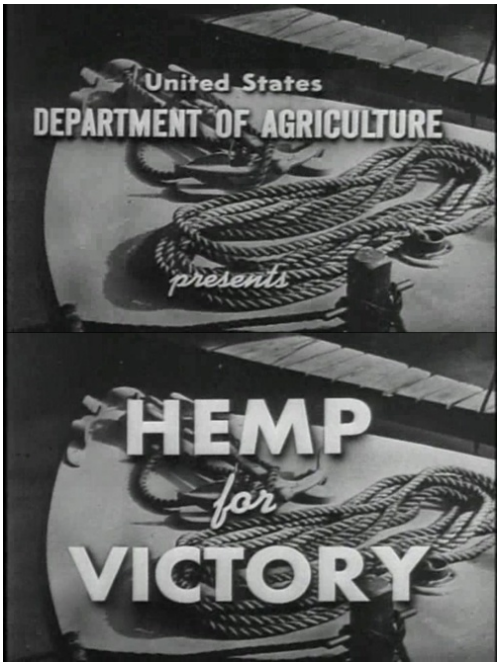
- **1800 CE:** Hemp plantations flourish across America. Early in this century, Sir William O’Shaughnessy MD serves in India as an army surgeon. He later introduces cannabis into British medicine in 1842 by publishing several papers on cannabis use as a medicine in several esteemed journals of the time. He details and practices it’s use to treat muscle spasms, rheumatism, convulsions from tetanus, rabies, and epilepsy. It was also used as a sedative for sleep, and it is even used by Queen Victoria to treat her menstrual cramps. Additionally, the French doctor Jacques-Joseph Moreau reports that cannabis suppresses headaches, increases appetites, and aids with sleep.
- **1850:** Cannabis, or hemp extract, is added to the US Pharmacopeia - then an official public standards-setting authority for prescription and over the counter medicines. The publication listed cannabis as useful for treating neuralgia, tetanus, typhus, cholera, rabies, dysentery, leprosy, incontinence, gout, convulsive disorders, tonsillitis, uterine bleeding, excessive menstrual bleeding, and more. Additionally, it suggests usefulness in treating alcoholism and opiate addiction. During this time, tinctures of cannabis extract were often utilized as a versatile medicine.

- **1850-1900:** In 1889, an article is published in The Lancet, one of the world's leading medical journals, by Dr E.A. Birch exploring cannabis as a possible medication for opium withdrawal. He also describes the anti-emetic, or anti-nausea effects of cannabis. At the end of the century, from 1893-1894, the Indian Hemp Commission is established to examine the use of cannabis in India. It finds and reports more beneficial effects when regarded as medicinal in character, and few negative effects when used in moderation.
- **1900-1930:** In 1916 the United States Department of Agriculture (USDA) chief scientists Jason Merrill and Lyster Dewey develop hemp paper. They concluded it was favorable than paper made from wood. In 1919 the 18th Amendment to the US Constitution put Alcohol into prohibition until 1933. Coincidentally, interest into smoking both cannabis and hashish began to grow in the US. Even jazz musicians and performers embraced its use in the nightlife. By the 1930s the US pharmaceutical firms Parke-Davis, Eli Lilly, Grimault & Company, and more, were marketing cannabis extracts and cigarettes as useful for being analgesic (pain relieving), anti-spasmotic, and sedative. By 1936, however, new medications such as aspirin, morphine, and other opium-derived drugs began to replace cannabis for various medical conditions in Western pharmacopeia. Additionally, some states begin to ban the recreational use of cannabis as well. In other parts of the world, Greece, Lebanon, Britain, and Yarkand China begin to crack down on the hashish trade and ban it's use. Last but not least, Harry J Anslinger becomes appointed to be the first commissioner of the Federal Bureau of Narcotics - he was pivotal in helping to bring about prohibition as his mission was to rid the US of all drugs, cannabis included.
- **1936, 1937:** In 1936 the anti-marihuana morality and propaganda film, "Reefer Madness" is shown in theaters across the US. With the combination of yellow journalism spread by William Randolph Hearst in his newspaper (whose lumber investments were threatened by the Hemp plant), the propaganda spread by the aforementioned film, alongside racist Mexican and Black associations with the drug, hemp and cannabis became associated with a type of wild Mexican tobacco and labeled the word Marihuana. In 1937 the Marihuana Tax Act is passed despite opposition by the American Medical Association (who to this day supports research on medical cannabis). Dr William C. Woodward, testifying on behalf of the AMA stated that "The American Medical Association knows of no evidence that marijuana is a dangerous drug," and furthermore warns that prohibition "loses sight of the fact that future investigation may show that there are substantial medical uses for cannabis." Despite this, the tax act criminalized the possession and sale of marihuana, which included cannabis extracts and even hemp derived products. This same year the first "criminal" marihuana seller, Samuel Caldwell (58 at the time) was convicted and sentenced to four years of hard labour in prison for selling two cannabis cigarettes. He died a year after release.



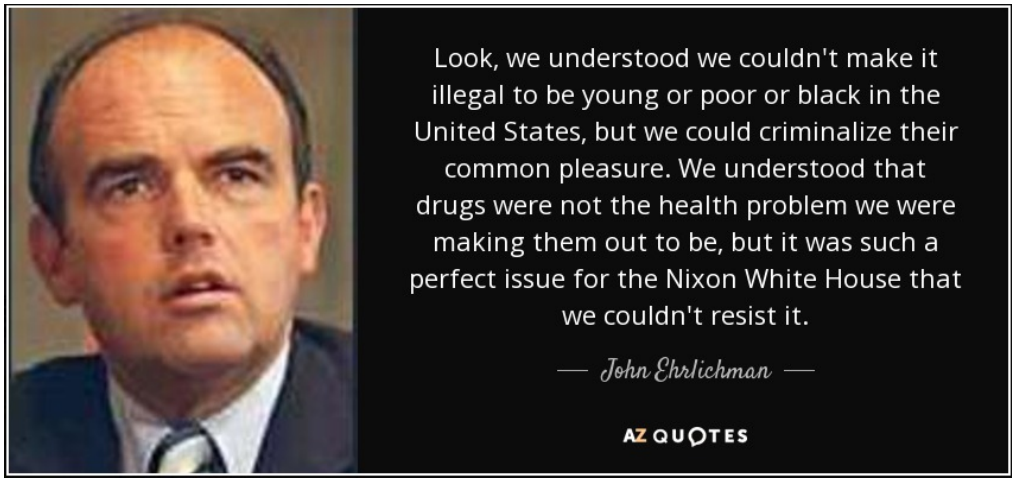


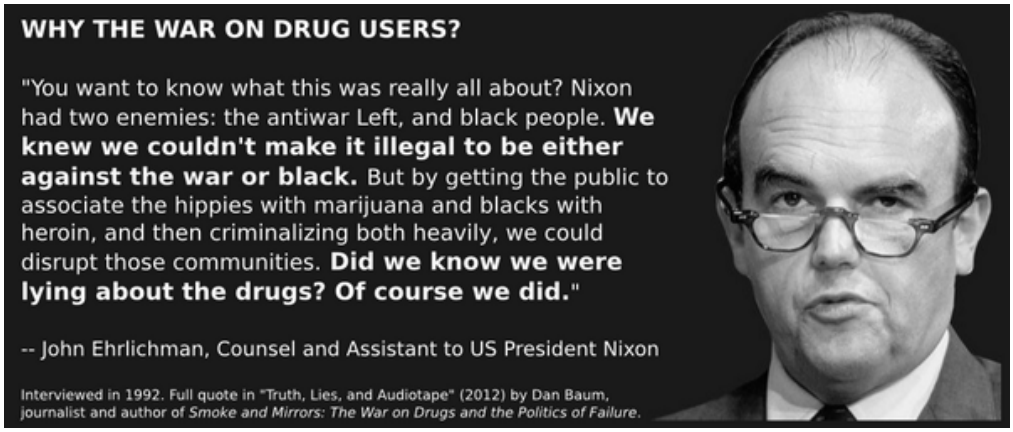
- **1938:** New York City Mayor Fiorello LaGuardia assigns the New York Academy of Medicine to investigate the claims on which the prohibition of marihuana is founded on. The “LaGuardia Commission Report” is subsequently published and finds that marihuana is not addictive and does not lead to insanity or violent crime. The Federal Bureau of Narcotics at the time confiscated mass amounts of the reports and destroyed them.
- **1942:** Cannabis and Marijuana are officially removed from the US Pharmacopeia thus removing it from therapeutic legitimacy in the accepted medical community. Despite this, due to a WWII wartime need for hemp rope and various other hemp products, the United States Department of Agriculture released the short film “Hemp for Victory” which called upon farmers in America to grow as much as possible in order to help the war effort. More bizarre, US scientists working at the Office of Strategic Services (OSS), the CIA’s wartime predecessor, begins work on a chemical substance that could work as a pseudo-truth serum by breaking down the mental defences of enemy spies and POWs. Their research included potent marijuana extract and this concoction was given the code name TD - Truth Drug.



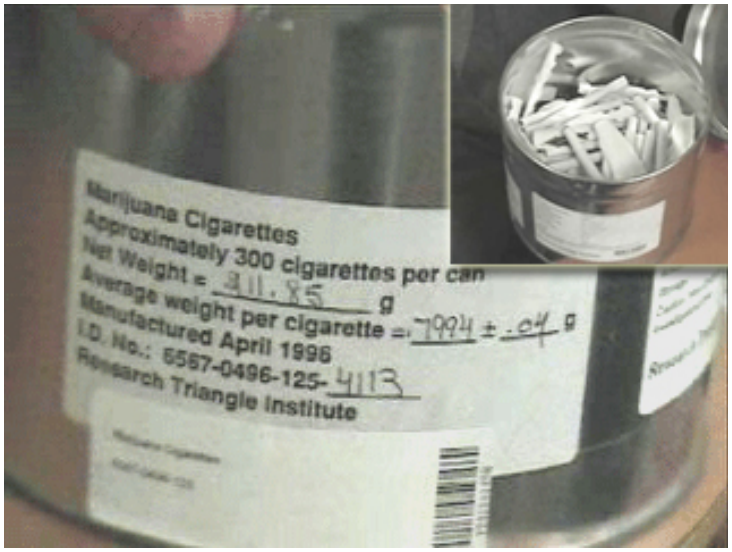
- **1951:** US Congress passes the Boggs Act (named after the sponsor Rep. Hale Boggs (D)); this law established mandatory 2-5 year minimum prison sentences for simple possession of drugs on a first offense (this was later reduced decades later). Marijuana was at the top of the list of offending drugs. During the 50s decade, the “Beat generation” embraced smoking cannabis as a recreational pastime. Writers of this movement Jack Kerouac and Allen Ginsberg make multiple references to it in their works.
- **1960:** College kids of the 60s as well as “Hippies” explore and embrace marijuana for recreational use and adopt it as a counter culture symbol. Even American soldiers in Vietnam would later embrace smoking cannabis for recreational purposes. Additionally, Czech researchers investigate and document the antibiotic and analgesic effects of cannabis.
- **1964:** Delta-9-Tetrahydrocannabinol (Δ9-THC) is first identified, isolated, and synthesized by Dr Raphael Mechoulam, Professor of Medicinal Chemistry at the Hebrew University of Jerusalem, alongside his team. The discovery was described as “Isolation, structure, and partial synthesis of an active constituent of hashish.” Their team primarily experimented with monkeys throughout the 60s and this research led to a publication, “Marijuana Chemistry” by Dr Mechoulam in 1970.

- **1968:** The University of Mississippi becomes the first official cannabis grower for the Federal Government. As the only Federally registered cultivator of marijuana in the US, the University of Mississippi supplies marijuana to researchers for studies ranging from chemical research, preclinical toxicology in animals, and even to clinical work on humans. This same year, the Wootton Report, written by the UK government's advisory committee on drug dependence, finds that "the long term consumption of cannabis in moderate doses has no harmful effects," and that "Cannabis is less dangerous than opiates, amphetamines, and barbiturates, and also less dangerous than alcohol."
- **1970:** US Congress passes the Controlled Substances Act and the law is signed in by President Nixon. This places cannabis into Schedule I drug classification with "No accepted medical use" amongst heroin, lysergic acid diethylamide (LSD), 3,4-methylenedioxymethamphetamine (ecstasy), methaqualone, and peyote. This scheduling categorizes cannabis as worse than cocaine, methamphetamine, and morphine. This same year, the National Organization for the Reform of Marijuana Laws (NORML) is formed. Huge fields of cannabis are cultivated for hash production in Afghanistan. Unregulated and uncontrolled, Afghan law enforcement begins to crack down on farmers.
- **1971:** Following the passing of the Controlled Substances Act, President Nixon declares the infamous and ongoing "War on Drugs."
- **1972:** The National Commission on Marijuana and Drug Abuse, also known as the "Shafer Commission" recommends decriminalizing marijuana. Angered by the findings of the commission, Nixon has copies of it destroyed and decides to go full forward with his War on Drugs.





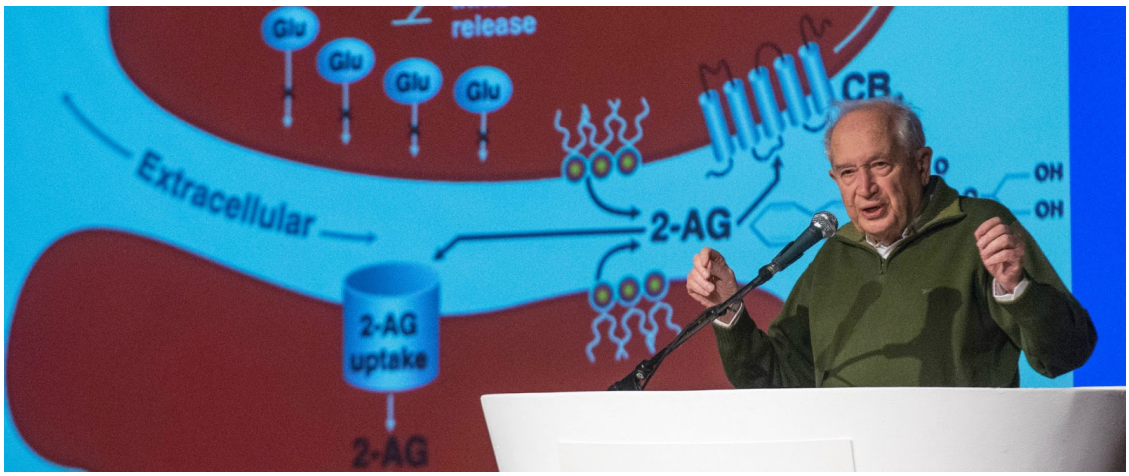
- **1973:** The Drug Enforcement Agency (DEA) is established. They are formed with the merging of the Bureau of Narcotics and Dangerous Drugs (BNND) and the Office of Drug Abuse Law Enforcement (ODALE). Nepal bans cannabis shops and hashish exports. The Afghanistan government also makes hashish production and sales illegal.
- **1974:** The National Institute on Drug Abuse (NIDA) becomes the only administrator of a contract to grow cannabis for research purposes; they work closely with the University of Mississippi to cultivate cannabis for the US Government. The aim of their research was primarily to study the negative effects of marijuana. Additionally, the pharmaceutical company Eli Lilly produces a synthetic cannabinoid called Cesament (which would later be renamed to Nabilone) for the treatment of nausea and vomiting in chemotherapy. Pfizer would also begin production of CP-55940, another synthetic cannabinoid which was used to study a variety of THC's therapeutic and protective effects on the brain.
- **1976:** Judge James Washington rules that a Washington DC man, Robert Randall's use of cannabis for his glaucoma constituted a medical necessity and that he was free of criminal charges in the court case US vs Randall. The US Federal government creates the Investigational New Drug (IND) Compassionate Use research program to allow medical patients to receive cannabis from the Federal government, paid for by federal tax dollars, and Robert Randall is the first recipient of government grown cannabis. At the same time, the US FDA and DEA continues to list marijuana as a schedule I drug with no accepted medical use. Cannabis is also decriminalized in the Netherlands which leads to a mini boom of cannabis cafes in Amsterdam.



- **1977:** In his book, "The Dragons of Eden, Speculations on the Origin of Human Intelligence," the renowned scientist Carl Sagan suggests that cannabis may have been the world's first agricultural crop and writes, "It would be wryly interesting if in human history the cultivation of marijuana led generally to the invention of agriculture, and thereby to civilization."
- **1978:** The US Federal Government and NIDA begin to supply medical cannabis to seven patients under the Investigational New Drug Applications (IND) Compassionate Use Program as part of a lawsuit settlement by the Department of Health and Human Services. During President Carter's administration, he and his assistant for drug policy, Dr Peter Bourne, push for the decriminalization of marijuana, with the president himself asking Congress to abolish federal criminal penalties for those caught with less than one ounce of marijuana.

- **1980:** A drug mimicking THC known as Marinol (Dronabinol) is synthesized and used to experiment on patients with various cancers. Its purpose is to treat the nausea and vomiting associated with cancer and cancer chemotherapy. Over the next five years, experiments across six states find that smoking marijuana is still superior to marinol in terms of relief and efficacy. Within this time, UniMed purchases the patent to Marinol for the treatment of nausea. By this time, Morocco and Pakistan had grown into two of the largest hashish producing and exporting countries.
- **1985:** Marinol is approved by the FDA for the purposes of treating nausea. In 1992 it would also later be approved for anorexia associated with HIV/AIDS Wasting syndrome.
- **1986:** President Ronald Reagan signs the Anti-Drug Abuse Act which reinstated mandatory minimums for possession and distribution and launches an “International War on Drugs.”
- **1988:** DEA Judge Francis Young makes the recommendation that marijuana be rescheduled to Schedule II, which would allow doctors to prescribe smoked marijuana to patients in need. The following year, the DEA administrator Jack Lawn overrules Judge Francis Young and denies the rescheduling of marijuana. This year, the first evidence of cannabinoid receptors is discovered - unique receptors that respond to endogenous cannabinoids (compounds produced within our own bodies) is discovered by researcher William Devane working in the lab of Alynn Howlett at St Louis University. He would later work with Dr Mechoulam and his team over many years to help map out these complex set of receptors.
- **1990:** Scientists at the National Institute of Mental Health, lead by Miles Hirkenham, heavily study cannabinoid receptors in several mammals including humans. This major breakthrough would inevitably lead to a storm of research that would begin to explain how cannabis works on a molecular level. Scientists were able to clone these receptors in both cell culture dishes (*in vitro)* and in mammalian models (*in vivo)* in order to further study and test how they work. Over the next few years, CB1 receptors located in the brain, spine, central nervous system, lungs, vascular systems, the muscles, gastrointestinal tract, and reproductive organs; and CB2 receptors located in the immune system, one’s spleen, bones, and on the surface of the skin - these would all be mapped out.

- **1991:** San Francisco passes the first medical marijuana initiative in the US with an overwhelming 79% vote on November 5, 1991. Proposition P called for the state of California's Medical Association to restore hemp medical preparations to the list of available medicines in the state, and to not penalize physicians from prescribing hemp preparations for medical purposes.
- **1992:** Dr Raphael Mechoulam, in collaboration with the National Institute on Mental Health (NIMH) discover a special internal naturally occurring neurotransmitter that mimics THC and that also binds to the cannabinoid receptors - described as an almost inner cannabis produced within one's own body and subsequently classified as an "endocannabinoid." Responsible for helping to produce "feel good" compounds within one's body such as dopamine; Mechoulam and his group call this compound "anandamide," derived from the Sanskrit word meaning bliss. This same year, the IND Compassionate Use program is cancelled due to a major surge of applicants from the growing number of HIV/AIDS patients. 13 patients were grandfathered into the service and would continue to receive government grown cannabis.



- **1995:** The second petition to reschedule marijuana is filed by Jon Gettman, former director of NORML. The 275 page petition is filed with the DEA and requests that marijuana and THC be moved from Schedule I of the Controlled Substances Act because neither has the high potential for abuse required under the law for its prohibited status. This same year, Dr Mechoulam and his group discover the second major endocannabinoid, 2-arachidonoylglycerol or 2AG for short; this compound binds to both the CB1 and CB2 receptors to help trigger a cascade of physiological responses.
- **1996:** Voters in California pass the very first state medical marijuana initiative by 56%. Officially known as Proposition 215 The Compassionate Use Act, it permitted patients and their primary caregivers, with a doctor's recommendation, to possess and cultivate cannabis for the treatment of AIDS, cancer, muscular spasticity, migraines, and several other disorders. It also protected these individuals from punishment if they recommended marijuana to the patients.
- **1997:** The National Institute of Health (NIH) calls for more research into medical cannabis. They concluded at the time that scientific evidence was insufficient to definitively assess cannabis' therapeutic potential and advised that the traditional scientific process should be allowed to evaluate the drug's use for certain disorders. The American Office of National Drug Control Policy commissioned the Institute of Medicine (IOM) to conduct a comprehensive study on the medical efficacy of cannabis. They concluded that the plant is a safe and effective medicine and that the government should expand research into it and for its development into a drug. The Federal government ignores the recommendation and the Clinton Administration continues the ongoing War on Drugs.

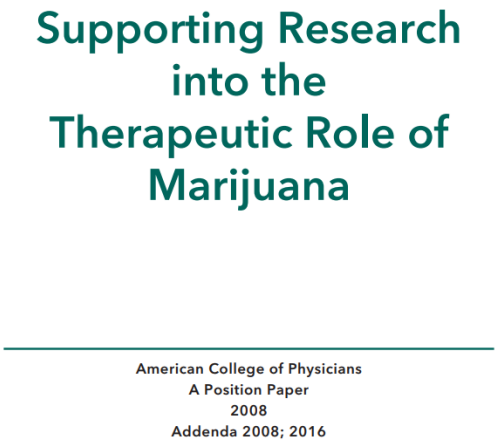
- **1998:** Voters in Alaska, Oregon, and Washington legalize cannabis for medical use. The UK House of Lords Committee also recommends legalizing medical cannabis. Lord Perry Walton, chairman of the inquiry stated, “We have seen enough evidence to convince us that a doctor might legitimately want to prescribe cannabis to relieve pain, or the symptoms of Multiple Sclerosis (MS), and that criminal law ought not to stand in the way. Far from being a step towards general legislation, our recommendation would make the ban on recreational use easier to enforce. Above all, it would show compassion to patients who currently risk prosecution to get help.” The UK’s GW Pharmaceuticals company receives the license to produce Sativex, a near 1:1 ratio of CBD and THC plant extract spray for the treatment of pain and spasticity in Multiple Sclerosis (MS). The medicine begins production the following year.

- **1999:** Initiatives in Hawaii and North Dakota to legalize hemp farming fail to go through. Voters in Maine make it the fifth state to legalize medical cannabis. Additionally, Health Canada announces official funding for research into medical cannabis. Marinol is also reclassified to Schedule III in order to increase its availability to patients despite the marijuana plant itself remaining in Schedule I with no accepted medical use. Last but not least, the US Department of Health and Human services files the patent US 6630507 B1 - “Cannabinoids as antioxidants and neuroprotectants.”
- **2000:** Voters in Hawaii, Colorado, and Nevada legalize medical cannabis.
- **2001:** The UK’s Home Secretary, David Blunkett proposes relaxing the classification of cannabis from Class B to Class C. Canada adopts federal laws in support of medical marijuana, and by 2003 would become the first country in the world to approve cannabis for medical use nationwide. The Bush Administration intensifies the War on Drugs and focuses on California and other states that passed medical marijuana laws.
- **2002:** The only study conducted on the IND Compassionate Use Program finds that marijuana improves the quality of life for medical patients and concluded that, “cannabis smoking, even of a crude, low-grade product, provides effective symptomatic relief of pain, muscle spasms, and intraocular pressure elevations…” and that “clinical cannabis patients are able to reduce or eliminate other prescription medicines and their accompanying side effects.” Additionally, in the court case Conant v. Walters, the US Court of Appeals prohibited, “the federal government from either revoking a physician’s license to prescribe controlled substances or conducting an investigation of a physician that might lead to such revocation, where the basis for the government’s action is solely the physician’s professional ‘recommendation’ of the use of medical marijuana.”

- **2003:** Jari Dvorak, a Canadian HIV patient, 62 at the time, became the first Canadian patient to receive government supplied cannabis. The program was created in response to an Ontario court order for the Canadian government to have a legal supply of cannabis available to authorized patients.
- **2004:** Voters in Montana and Vermont legalize cannabis for medical use. Cannabis in the UK is moved to Class C which carries lower penalties for possession.
- **2005:** Cannabis seed distributor and activist Marc Emery, who had been on the FBI's most wanted drug list for years, is indicted by the US Government. Under their pressure, Canada would later have to extradite Mr Emery in 2010 where he would be sentenced to five years in prison for "conspiracy to manufacture marijuana." Federal agents would also execute one of the most widespread state raids and would shut down 11 medical cannabis dispensaries in San Diego, and 2 in San Marcos. No arrests were made, but an undisclosed amount of money and cannabis was seized without return or compensation. Authorities stated that the investigation was aimed at determining how much marijuana was being sold and who was supplying it. In Canada, GW Pharmaceuticals' Sativex wins conditional approval from Health Canada for the treatment of MS, and qualified patients throughout the nation would be allowed to obtain a prescription for the medicine.

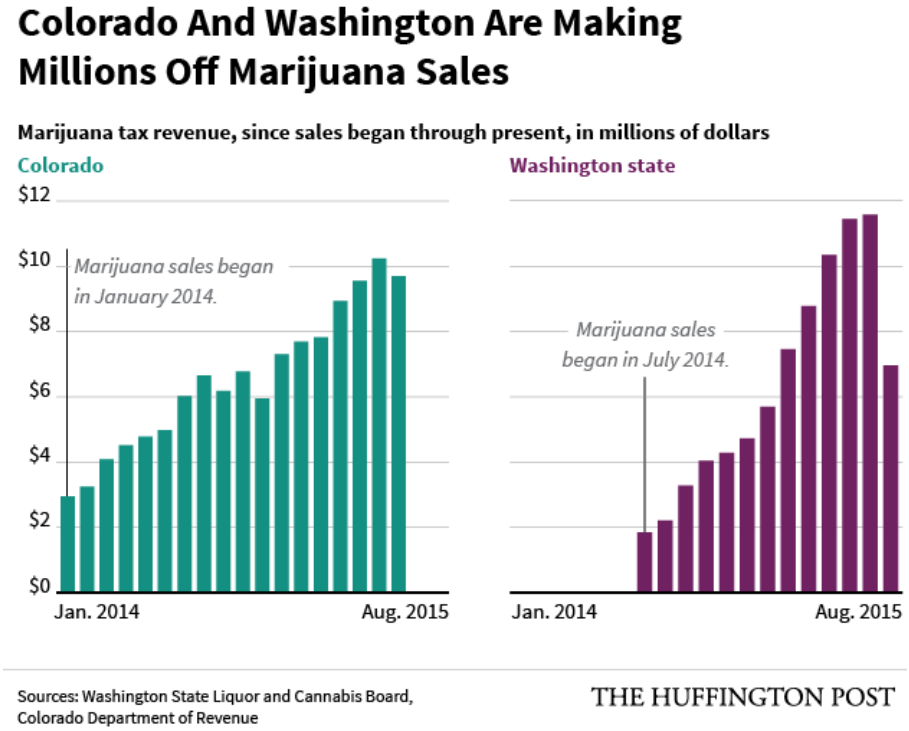
- **2006:** Voters in Rhode Island legalize medical cannabis despite opposition from their state governor; the state legislature overrode Governor Carcieri's veto against the measure. This same year the FDA confirms opposition to medical marijuana and issues a statement, "there is currently sound evidence that smoked marijuana is harmful. A past evaluation by several Department of Health and Human Services (HHS) agencies concluded that "no sound scientific studies supported medical use of marijuana for treatment in the United States, and no animal or human data supported the safety or efficacy of marijuana for general medical use…"
- **2007**: Voters in New Mexico legalize cannabis for medical use. Mary Ellen Bittner, then the Administrative Law Judge of the DEA, issues a ruling that stated Professor Lyle E Craker PhD should be allowed to cultivate medical cannabis at the University of Massachusetts for research purposes.

- **2008:** The American College of Physicians (ACP) publishes the paper, “Supporting Research Into the Therapeutic Role of Cannabis,” and makes official their stance on medical marijuana. Dr Ethan B Russo also publishes his article, “Phytocannabinoids and Genetic Analyses of Ancient Cannabis from Central Asia,” in the Journal of Experimental Botany; in it he describes and discusses the discovery of more than 2lbs of cannabis found buried in the tomb of an ancient Chinese shaman, as well as the use and application of cannabis as a medicine in ancient cultures. Voters in Michigan would also make it the 13th state to legalize cannabis for medical use. Interestingly, the UK reschedules cannabis from Class C to Class B, increasing penalties for possession - under Class B, offenders could face up to 5 years in prison for simple possession.



- **2009:** Then US Attorney General Eric Holder announces that DEA raids on legitimate state approved medical marijuana dispensaries would stop. The US Department of Justice (DOJ) issues what is known as the Ogden memo, which intended to “provide clarification and guidance to federal prosecutors in States that have enacted laws authorizing the medical use of marijuana.” This memo stated that legal medical marijuana patients would not be prioritized for prosecution. Despite this, the number of raids on cannabis dispensaries and collectives would rise. Also this year, the American Medical Association (AMA) would make clear it’s position on medical marijuana in a policy statement that read, “Our AMA urges that marijuana’s status as a federal Scheduled I controlled substance be reviewed with the goal of facilitating the conduct of clinical research and development of cannabinoid-based medicines, and alternate delivery methods.”
- **2010:** Voters in New Jersey, Arizona, and Washington DC legalize cannabis for medical use. Voters in South Dakota, however, reject a measure to legalize medical cannabis in their state. This year, the California Supreme court affirms their ruling that possession limits on cannabis are unconstitutional. The US Department of Veteran Affairs also relaxes their marijuana rules. In the Veteran’s Health Administration (VHA) directive, they state that vets who participate in legal medicinal marijuana programs will not be disqualified from, “substance abuse programs, pain control programs, or other clinical programs.”

- **2011:** Voters in Delaware legalize cannabis for medical use. The Drug Enforcement Agency (DEA) rejects a request to reclassify marijuana out of Schedule I; it was ruled that, “marijuana has no accepted medical use,” and that it should remain illegal under federal law - regardless of conflicting state legislation allowing medical marijuana. In Israel, the government arranges to cultivate and supply medical cannabis for research purposes.
- **2012:** Voters in Colorado and Washington make them the first states in the US to allow the recreational usage of cannabis. Voters in Connecticut and Massachusetts also legalize cannabis for medical use. Last but not least the country of Uruguay legalizes cannabis for recreational use.



- **2013:** Voters in New Hampshire and Illinois legalize cannabis for medical use. CNN airs Dr Sanjay Gupta’s Weeds which focuses on the medical effects of cannabis - in it, the story of an epileptic infant child named Charlotte Figi is told, and it depicts her use of Cannabidiol (CBD) to significantly reduce her seizures and save her life. The Justice Department announces that it will no longer challenge state marijuana laws.
- **2014:** Voters in Maryland, Minnesota, and New York legalize cannabis for medical use, making them the respective 21st, 22nd, and 23rd states to do so. The US territory in the Pacific ocean, Guam, also legalizes medical cannabis. Federal guidelines to allow banks to provide financial services to legal marijuana sellers would be issued. The Obama administration also includes a provision, known as the Cole Memo, in the nation’s spending bill that prevents the Justice Department from interfering in states that have legalized medical cannabis.
- **2015:** The Governor of Puerto Rico, Alejandro Garcia Padilla, signs an executive decision to legalize medical cannabis. The Obama administration makes research into cannabis easier by redefining complex review processes involved with the FDA and the Department of Health and Human Services.
- **2016:** California voters pass Proposition 64 legalizing the recreational use of cannabis. Voters in Nevada, Maine, and Massachusetts, also legalize the recreational usage of cannabis while voters in Florida, North Dakota, and Arkansas legalize cannabis for medical use.

- **2017:** DEA head Jeff Sessions of the Trump administration attempts to revitalize the War on Drugs and denies the medical efficacy of cannabis. Congress would initially block attempts to remove patient protections for cannabis users (the Cole memo) but would later rescind it in 2018. Medical patients from various states, including an epileptic 11 year old girl, a former NFL New York Jets player, and more, file to sue the Federal Government for blocking safe access to life-saving medicine.

2018 and On…

Forbidden Fruit in No Till Organics. Grown by DannyG, JacketGeorge, and WarlockGlass

The future of cannabis remains to be written and the wild journey of the plant continues to be just that - an exciting and turbulent hot topic throughout the world. It continues to carry an air of infamy and notoriety with the ongoing worldwide prohibition as its supporters are fueled by misinformation and a lack of attention and education by the mainstream media - most people's conventional understanding of this powerful herb is consequently flatout wrong. It is the hope of the author that this chapter and section serves to provide an eye opening and educational reference to help combat the ignorance surrounding cannabis that is hurting society in ways that it doesn't even perceive.

Cannabis and Religion

Sisters of the Valley - a private organization of nuns who cultivate and manufacture medical cannabis products.

This topic constitutes an interesting discussion especially considered that the various religious traditions around the world each have a unique take and perspective with how to approach the cannabis plant. While most, if not all of them would never deny the usefulness of hemp, and some would even praise them; there is no real universal consensus as to whether consumption and intoxication is a good or a bad thing where their respective beliefs are concerned. Indeed some of them even incorporated, or still do, the practice of smoking or consuming the plant for its psychoactive effects.

In the following pages, we'll first cover the Indian Hindu perspective with cannabis, which dates back to ancient times. Afterwards, the major religions - Christianity, Judaism, Islam, Buddhism, Taoism, and more will be covered as much of the world has some sort of view of the herb related to one of these traditions. Last but not least, some of the other more accepting religions such as Rastafarian, Hinduism, and even modern communities such as the First Church of Cannabis, THCMinistries, the Sisters of the Valley - these fascinating takes on cannabis usage will be detailed.

Cannabis and Hinduism

The first evidence of cannabis' use for its psychoactive effects in a religious context go back as far as this tradition began utilizing the plant as a medicine and evidence of this dates back to one of their holy books, the Atharva Veda which was written between 1200-1000 BCE. As was briefly noted in the above historical chronology, hemp was considered one of the sacred plants and it was used medicinally for anxiety, as well as mixed with milk to make the Bhang drink which was used to treat pain and depression. It was also prepared for spiritual practices and offered up to the god Shiva, and peoples of this tradition still drink it ritually in festivals to cleanse sins while sages use it in rites in association with their gods. Legends from this religion also suggest that Shiva himself created cannabis from the amrita (elixir of life) which he produced from his own body.

It should be noted that when it comes to foolish consumption of cannabis for non medical or non spiritual purposes without rites, it is considered a sin and even illegal in Nepal. Despite this, hashish and even certain strains of cannabis indigenous to the area are popular and carry their own infamy and notoriety.

Sula Benet, the Old Testament Scriptures, and the Bible.

Before getting into the the specifics of Christianity, Judaism and the Hebrew traditions, the Polish anthropologist Sula Benet deserves special mention as part of her lifelong work strongly suggests that the calamus plant which is made reference to in several parts of the bible, is actually the hemp plant.

Benet makes the claim that in the Old Testament scriptures, the original Hebrew translations of the plant/spice “kaneh,” “kaneh ha-tob,” and “kaneh-bosem” which was was an ingredient in the holy anointing oil, all of these referred to cannabis instead of the common translation “calamus” or “sweet cane.” Her work points to the passages of Ezekiel 27:19, Isaiah 43:24, Song of Songs 4:14, Jeremiah 6:20, and especially Exodus 30:22-25:

> “30:22 Moreover the Lord spake unto Moses, saying, 30:23 Take thou also unto thee principal spices of pure myrrh five hundred shekels, and of sweet cinnamon half so much, even two hundred and fifty shekels, and of sweet calamus (*the original Hebrew word was Kaneh-Bosem*) two hundred and fifty shekels, 30:24 And of cassia five hundred shekels, after the shekel of the sanctuary, and of oil olive an hin: 30:25 And thou shalt make it an oil of holy ointment, an ointment compound after the art of the apothecary: it shall be an holy anointing oil.”
>
> -Exodus 30:22-25, King James Version.

It was important to introduce this notion before delving into the actual views of Christians and Jews where cannabis consumption is concerned, primarily because the above passage, as it comes directly from the Bible, carries quite a bit of weight where conflicting opinion is involved. It should also be noted that various parts of the Bible and old testament Hebrew scriptures do recommend against intoxication and that those particular passages point to why supporters of prohibition within these religious communities hold a negative view of smoking marijuana. This is understandable, and this particular topic of debate - whether cannabis consumption for recreational purposes constitutes a sin - will more than likely continue to be a subject of discussion in the years to come, especially as legal access to the plant grows.

Cannabis in Christianity

In both Catholicism and Christian Protestantism, avoidance of becoming intoxicated and abstinence from all alcohol, tobacco, and narcotics is often preached as bible passages recommending respect for one’s body is often cited and espoused. However, the bible does not explicitly state that smoking marijuana or using cannabis constitutes a direct sin, and it is actually unclear and unstated whether medical usage of the plant is allowed or is a taboo.

Again, cannabis consumption for intoxication is generally discouraged and even Pope Francis recommends against recreational legalization. His view is also shared by the Christian Orthodoxy and many Protestant churches. However, there are some Christian organizations such as the Sisters of the Valley (who cultivate cannabis and manufacture medical goods on their farm in Merced, California), the Presbyterian Church, the United Methodist Church, the Christian Cannabis Fellowship, and the Episcopal church, who all support the legalization of medical cannabis. It remains to be seen in the coming years and decades if these views and opinions will change as we collectively find out and learn more about the cannabis plant and its full potential.

Cannabis and Judaism

In the Hebrew tradition the act of becoming intoxicated by any narcotic is recommended against, however it has been recently declared by Rabbi Chaim Kanievsky that medical cannabis usage was kosher. This sentiment was echoed by the Orthodox Union when they endorsed several medical cannabis products as kosher, and even the Jewish Social Policy Action Network in Philadelphia have publicly supported medical legalization efforts in Pennsylvania. It should also be noted that much of the scientific research on cannabis in the world comes from Israel and Dr Raphael Mechoulam's group (considered the grandfather of THC and cannabis science).

It is interesting to mention that Doctor and former IDF lieutenant Yosef Glassman states that there is a surprising history between the faith of Judaism and the cannabis plant. One quote he refers to from the Shulchan Aruch (the Code of Jewish Law) reads, "Also, one will beautify [Shabbat candle lighting] when the wick is made from cotton, flax, or cannabis." Ironically, this passage led him to further investigate cannabis' textile and medical uses throughout his religions history, and he has become an advocate and supporter of cannabis legalization as a result. Furthermore, the work of Sula Benet, which was covered previously also applies to Jewish tradition as the book of Exodus constitutes an important scripture that followers of Judaism refer to. As it currently stands, most Jews who practice and stay in line with the teachings of their tradition seem to be in favor of accepting the cannabis plant for what it is - a versatile plant while recommending against intoxicating recreational abuse.

Cannabis and Islam

Much like the various Christian churches, the various Islamic sects each have different and opposing degrees of tolerance towards the cannabis plant. The primary concern where consuming the plant in this religious tradition is what is the intent? Is recreational intoxication the reason one is consuming or is it for a medical purpose? Most muslims would be tolerant towards the latter but when it comes to smoking cannabis for pleasure, even the prophet Muhammed states, "If much intoxicates, then even a little is haraam," with the word haraam meaning "forbidden."

Despite this, the practice of smoking hashish was and still is popular throughout the history of the Middle East and the Islamic world, and even the Sufi mystics of this tradition consumed cannabis for its psychoactive effects in both medicinal and ritual settings.

With this said, it has been made clear by some Muslim leaders that proper medical use of cannabis is permitted, while smoking marijuana for fun is a sin.

Cannabis and Buddhism

Legend speculates that the great Gautama Buddha consumed only hemp seed and rice during a massive fast - this is speculated by historians to come from the Lalita Vistara sutra in which a passage reads, "he ate grain and hemp seed, subduing pain, and subduing pleasure." Obviously this constitutes a more food use from the hemp seed and does not suggest that the Buddha consumed cannabis for intoxicating purposes, but it deserves mention as it is clear that the cannabis plant and hemp has had its place in Buddhist history throughout India and much of Asia.

There is a medical text within Buddhist tradition, the Mahakala Tantra, in which cannabis, as well as other psychoactive plants, can be utilized to great effect for medicine.

Currently, modern Buddhists frown upon the recreational usage of marijuana, with even the respected Dalai Lama recommending against intoxication, but there is tolerance and acceptance towards medical use - a sentiment shared by many religions as you may have observed by now.

Cannabis and Taoism

The ancient Chinese Taoist traditions provide an interesting perspective on cannabis in that practitioners throughout the 4th, 5th, and 6th centuries of the common era actually utilized the plant for both medical and ritualistic purposes. In fact some of their ancient texts directly point to experimenting with the psychoactive effects and “hallucinogenic smokes” of cannabis and as early as 400 CE, practices of burning cannabis in an urn or incense burner was common in Taoism. Some of these passages come from the Taoist encyclopedia, the “Wushang Biyao” and the “Yuanshi Shangzhen Zhongxian Ji,” or the Records of the Assemblies of the Perfected Immortals. Other references to hemp and the cannabis plant are further made in the texts, “Mingyi Bielu,” or the Supplementary Records of Famous Physicians, and the “Wuzangjing,” the Five Viscera Classic.

While it is unclear in the tradition as to whether intoxication for recreational purposes is acceptable or not, there is a yearly festival in Taoist communities even to this day that practice gathering cannabis and hemp on the 7th day of the 7th month of every year which marks a day of seance banquets.

Cannabis and the Rastafarian Tradition

Popularized and practiced by a number of Reggae musicians (as well as cultural members of the movement) over the past several decades, the religious Rastafari movement originated in Jamaica and openly incorporates cannabis use into their religious practices. While it is not a requirement to smoke marijuana in order to be a part of this religion, practitioners and supporters regularly smoke with each other in “reasoning and discussion” in order to reach higher states of consciousness. They also ritualistically rub the ashes on one’s skin which is thought to be a healthy practice. The cannabis plant is considered by the Rastafari to be a holy plant, and artists such as Peter Tosh have quoted the bible in reference to the plant saying:

> “Revelations 22:2 - In the midst of the street of it, and on either side of the river, was there the tree of life, which bare twelve manner of fruits, and yielded her fruit every month: and the leaves of the tree were for the healing of the nations.”

While many would speculate and argue that this does not directly refer to cannabis, it cannot be argued or debated that those of this belief system maintain a reverent perspective towards the plant. This tradition celebrates and even encourages the cultivation of cannabis, its use as both a medicine and a social communal tool.

Cannabis Centric Religions

In the United States of America, the First Amendment guarantees Freedom of Religion. This protected opportunity has given rise to many varied perspectives and religious organizations forming over the past two centuries. More recently, with the advent and popularization of cannabis use, either as a medicine or as a recreational pastime, there have been cannabis centric belief systems and traditions popping up and these deserve special mention as many members of groups such as the THC Ministry, the Cannabis Assembly, the Church of the Universe, the Church of Higher Consciousness, and even nuns within the Sisters of the Valley, which is a Christian organization - many of these individuals swear by the life changing and quality of life giving properties of the cannabis plant. Again these organizations are recent incarnations, but their valid opinions and beliefs are spreading and becoming more tolerated and accepted.

Cannabis Around The World Throughout History, Time, And In our Religious Traditions

Having read this chapter despite wherever you come from and what you believe in, you will no doubt have a more well rounded perspective on how you as an individual should wish to view the topic of cannabis and marijuana. We all possess varying opinions concerning the controversial plant and even after discovering and understanding the herb's medical and textile potential, approaches to recreational consumption for pleasure will still prove to be a hot topic of debate especially where people of religious backgrounds are concerned. While many pragmatic atheists or individuals who simply don't have a heavy religious belief system to draw upon may have a very open approach to cannabis in society, this isn't always the case with everyone and those opposed to recreational legalization or even normalization (regardless of religious background) do have their fair share of concerns, hesitations and reservations, and their views deserve to be discussed.

However it should be stressed that many of the negative connotations with cannabis consumption - killing one's brain cells, that it makes you dumb and stupid, and that it is a gateway drug are simply false and inaccurate from a pure scientific sense. Only through hard empirical evidence and scientific study should it be determined how academic communities should look at the plant, not propaganda driven views, passionate opinions, and especially false claims made even by government agencies. The aim of the next chapter is to give a comprehensive accurate breakdown for the science behind cannabis to help clear things up.

We live in an amazing and interesting era, one in which near instant access to information around the world can help to correct, debunk, and even change past views. The chronology presented in this chapter, and the various religious opinions investigated would not have been possible to write just several decades ago. Without the advent of the internet, fact checking, and without the work of those awesome activists who kept the historical truth about the cannabis plant alive, we may still hold a dangerously erroneous opinion on marijuana as a drug, not cannabis as the powerful and versatile superplant it is.

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Chapter 3 - The science behind cannabis: Cannabinoids, Terpenoids, Flavonoids, the Endocannabinoid System, the Entourage Effect, Clinical Endocannabinoid Deficiency, and tens of thousands of medical studies over several decades investigating all of this.

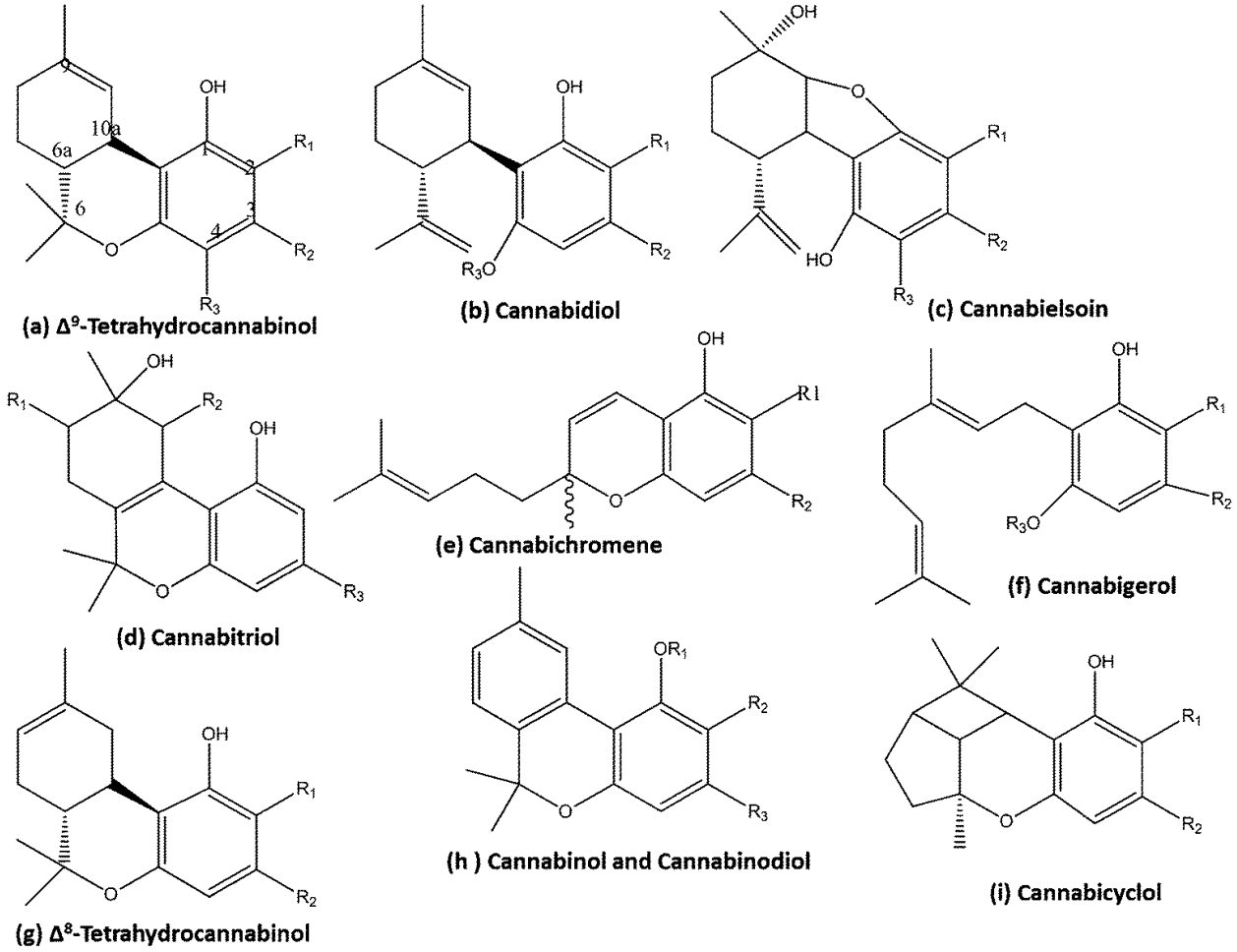


Image borrowed from the Royal Society of Chemistry.

It is indeed easy to be confused with or disbelieve the fact that cannabis can have such widespread utility when it comes to treating illness and easing suffering. This notion goes against what many people have been taught in school and its growing reputation among not just hippies and stoners anymore, but now the news and medical professionals raises several blaring questions: Is cannabis too good to be true? How is it even possible that marijuana can help with so many ailments? How can we be so sure, there isn't enough research and science into this? First, no it's not too good to be true, it literally is saving lives as you read this. Second, this is all possible due to the Endocannabinoid System, a growing field of research that encompasses a system of receptors that is actually bigger than your immune system - cannabis actually interacts with this system to help with a multitude of biological functions within your own body. And three, the mantra of "there isn't enough science and research into marijuana" is a flat out lie - scientists throughout the world have been studying the cannabis plant and its many compounds of interest for decades, since even before the War on Drugs! We've talked about this before in the first chapter, and the US Government's Department of Health and Human Services even filed a patent concerning the plant, and to this day the scientific body of research into cannabis grows and evolves - this chapter of this book helps to catch you up to the modern world.

Now, the fascinating science behind cannabis actually spreads across many exciting fields: chemistry when discussing the many compounds that the plant produces, biology and physiology when discussing how these compounds actually interact with our own bodies, medicine and herbalism when investigating how to effectively utilize the plant for treating a multitude of diseases, even botany and horticulture when it comes to producing quality medicinal grade marijuana. Needless to say, the science driving cannabis has indeed evolved in just a short amount of time and more and more professionals are taking a second look at a plant we were grossly miseducated about.

This chapter has been divided into several subsections in order to deconstruct this diverse scientific field of study, and it will help to make understanding cannabis easier to grasp. Although this chapter has a lot of technical information, the legitimate biological explanation of which molecules in the plant get you high, why, and how they actually interact with your body will be explained. Furthermore, there will be discussions of how CBD, THC, or any of the more than 100 other natural cannabinoid compounds really work will be detailed. Terpenes, or "terps" for short, is another subject even heady stoners and cannabis connoisseurs might appreciate. Essentially, this discusses the botanical breakdown of how the cannabis plant acts like a diverse superplant - capable of mimicking and producing many of the distinct aromas and smells from various flowers, plants, and even fruits throughout the world; herbalists would definitely appreciate looking at a "terpene therapeutic approach" and how cannabis shares many of the properties their familiar healing herbs possess. We will indeed cover the fascinating Endocannabinoid System, whose functions play a huge part of our health, and its rapidly growing field of study in the scientific world. These are just a few of the subjects coming up.

Without making this introductory primer too long, it will last be noted that this chapter can be read in entirety from start to end, or in individual sections starting from whichever section interests you first. There will be a lot of topics and information over many pages, but covering them all will literally provide you a comprehensive understanding of how and why this awesome plant is awesome on several levels and how more and more needed research will indeed reveal cannabis as a scientific and medical phenomenon!

The Chemical Constituents of Cannabis - Cannabinoids, Terpenoids, Flavonoids

One of the most novel characteristics of cannabis is the plant's powerful and even diversifiable ability to produce several hundreds of natural organic compounds (with cannabinoids, terpenoids, flavanoids, combined) which can have serious medical applications across many ailments, diseases, and symptoms and it does this in a relatively safe and non-lethal manner. While it is true that the side effects of cannabis psychoactivity may indeed involve and range from mild discomfort such as short bouts of headache and nausea, all the way to full on disorientation, panic attacks combined with anxiety, and even day long disablement especially where edible Delta-9-THC toxicity is concerned (even the science behind this will be covered) - it should be noted that this herb and the many compounds within the plant, even the non-psychoactive ones, are still nonlethal and that it's usage has never killed anyone throughout history!

Furthermore, when consuming cleanly grown and processed cannabis medicine with a clean mode of consumption, it has been found that this herb is both safe and healthy despite what most people think. Indeed a lot information already out there exists regarding many of the compounds that are about to be covered (thanks to several scientific and medical establishments around the world). It should be stressed that there is a desperate demand for further and more research into the cannabis plant as a powerful medicine, not because collectively we know so little about it, rather because the very real body of science that has already been built screams for a need for other medical establishments and even political government bodies to find more sympathetic, accessible, and even proper and accurate applications when utilizing cannabis in more real medical settings (consider the practice of incorporating cannabis vaporizers in a hospital like they already do in Israel). With that said, forget what you know about marijuana, this cannabis subsection has a lot to deal with chemistry, medicine, and just a little about botany and plants.

Phytocannabinoids (Phyto = plant)

Phytocannabinoids are a diverse and powerful set of organic compounds naturally produced by the cannabis plant. This term is often shortened to **'cannabinoids**' and there are more than 100 that have been discovered. The most commonly known ones are Delta-9-Tetrahydrocannabinol (**Δ9-THC**), Cannabidiol (**CBD**), and Cannabinol (**CBN**). Some of these compounds are psychoactive and consuming them either smoked or eaten oftentimes leads to what is commonly called, "getting high." These compounds are produced and contained in the crystal trichomes of the flowers or bud made by the plant. Although **Δ9-THC** is the most well known cannabinoid for psychoactivity as it is abundantly produced by a multitude of cannabis strains, a majority of the cannabinoids are actually not psychoactive in nature.

What makes these compounds truly fascinating is not how high they can get you, but rather their powerful and versatile therapeutic potential - they can treat multiple symptoms across multiple ailments and diseases and they do this without risking serious lasting harm or a lethal overdose to an individual.

How are these compounds so versatile in their therapeutic characteristics? As you will learn further in this section, the answer lies in their interactions with the Endocannabinoid System (ECS) that a vast majority of living animals and mammals, including humans, possess. This system is responsible for a very large portion of our health as it regulates and promotes homeostasis within our biological makeup - this will all be detailed and explained in the Endocannabinoid System section further on, but it needs initial mention here as this system points to another reason that phytocannabinoids are truly amazing! These particular compounds from the cannabis plant actually mimic compounds that our own body produces that are essential for upregulating and keeping the ECS functioning optimally - that is, the compounds that our bodies produce to help maintain our health can actually be found in abundance in the cannabis plant; this has huge implications where human and mammalian physiology are concerned! The full scope of this biological wonder will again be further explained once the plant's chemical constituents are covered.

Raw Cannabinoids vs Heated Cannabinoids vs Aged Cannabinoids

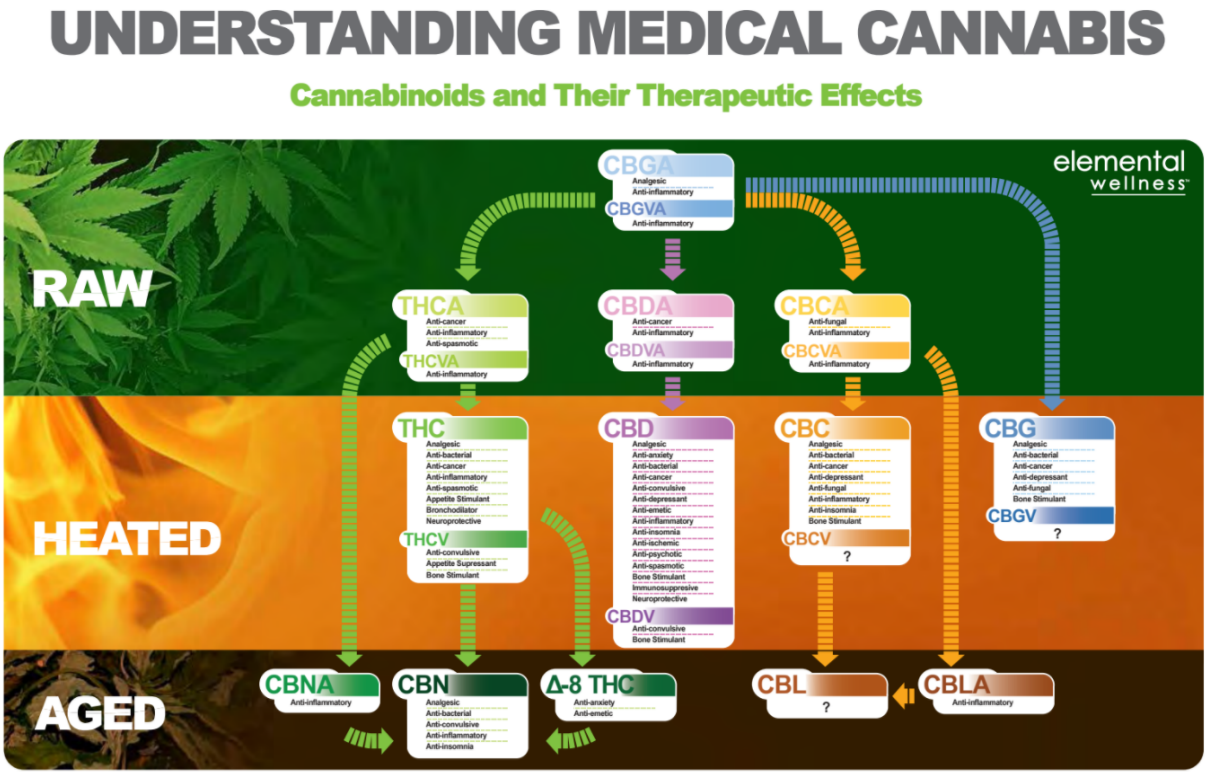


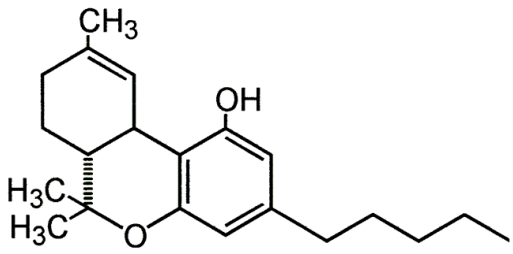
Image from Elemental Wellness Cannabis Collective in San Jose

Before delving into specific cannabinoids, an explanation needs to be given on **Raw Acidic Cannabinoids** vs **Decarboxylated Heated Cannabinoids** and **Aged cannabinoids**. When the plant is initially harvested, the cannabinoids of the plant are actually in a raw acidic state. When they are heated with a flame (smoked), cooked, or vaporized, carbons from their molecular structure are removed, and what is left are decarboxylated, heated cannabinoids. Lastly, when these compounds are left out, exposed to light and air, over time, these compounds can convert into different cannabinoids altogether. This is important to know because the therapeutic properties of these cannabinoids change depending on what state they are in! In fact, heated THC and heated CBD have far more therapeutic properties in their heated forms. Raw fresh THCA, on the other hand, is actually not psychoactive and an individual can consume a much higher dose of the compound for internal therapy without having to worry about getting overly high than if he/she were to take a baked edible. This interesting characteristic of these cannabinoids opens up the door for a variety of therapeutic approaches to utilizing and consuming cannabis for medical purposes!

Top 6 Abundant and Well Studied Cannabinoids

While advances are made in the research world where cannabis is concerned, we are slowly but surely finding that many of the compounds in the cannabis plant work with surprising effectiveness to help manage a multitude of debilitating symptoms. We will go into great detail with discussing the 6 most recognized, studied, and abundantly produced cannabinoids thanks to decades of scientific research throughout the world (some of these will be highlighted later in the chapter).

Tetrahydrocannabinol (THC)



∆-9-tetrahydrocannabinol (THC)

THC is easily the most well known and abundantly produced cannabinoid. It is the main psychoactive driver in cannabis responsible for getting people high, and marijuana enthusiasts are known for hunting down strains and products with the highest potency of THC. Activated **Δ9-THC** is the heated cannabinoid resulting from it's raw form **THCA,** and it is what smokers and/or people who like to vape inhale when they heat their cannabis products be it flower or concentrate. This can be from touching the cannabis with a flame and smoking it, or from using a vaporizer like the Volcano or the PAX in order to heat a chamber full of flower to a specific temperature which will result in the cannabinoids being converted and released in a vapor form.

Each of the Raw, Heated, and Aged states of THC possess medically valuable properties, with **Δ9-THC** being the psychoactive form. **THCA** however, can also be consumed by eating or juicing raw cannabis or raw unheated concentrates such as hash without psychoactivity in the user, opening up amazing therapeutic possibilities!

This compound, which was first isolated and synthesized by Dr. Raphael Mechoulam's team in Israel in 1964, possesses potent medical properties which include but are not limited to killing cancer cells, relieving pain, working as a powerful anti-inflammatory agent, working as a powerful pain reliever, and more!

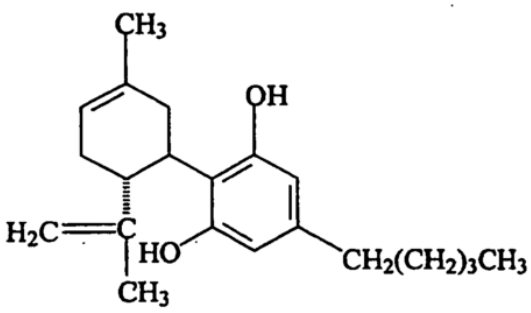
Raw: Tetrahydrocannabinolic Acid (THCA)
Boiling Point: 220 °F (105 °C)
Medical Properties: Anti-Cancer, Anti-Inflammatory, Anti-Spasmotic**.** Nonpsychoactive.

Heated: Delta-9-Tetrahydrocannabinol (Δ9-THC)
Medical Properties: Analgesic (Pain relieving), Anti-Bacterial, Anti-Cancer, Anti-Inflammatory, Anti-Spasmotic, Appetite Stimulant, Bronchodilator, Neuroprotective**.**

Aged: Cannabinol (CBN)
Medical Properties: Analgesic, Anti-Bacterial, Anti-Convulsive, Anti-Inflammatory, Anti-Insomnia.

11-Hydroxy-Delta-9-THC: This is a metabolite from THC being eaten and processed in the liver and this deserves special mention. The reason being is that whenever an individual eats an edible with **Δ9-THC**, it can lead to "THC Toxicity" which is common when overdosing on edibles. While it is nonlethal, the side effects of THC Toxicity are severe nausea which can lead to vomiting, severe disorientation, incapacitation, headache and discomfort for a few hours. It will go away but anyone that has ever overdosed on an edible can attest to how much it can ruin your day. With this said, responsible, measured, and safe consumption of cannabis is advocated and recommended - there isn't much of a point in ruining someone's time and turning that individual completely off from edibles. They can provide an amazing experience when properly dosed and even more powerful therapeutic effects than smoking, but when some individual's bodies can't handle the intense psychoactivity, caution and small increases in dosages should be stressed when experimenting with **Δ9-THC** edible consumption.

Cannabidiol (CBD)



Cannabidiol (CBD)

Cannabidiol is perhaps the second most well known compound produced by some cultivar strains of cannabis and attention to it has risen rapidly in just the past decade despite the fact that studies into this particular cannabinoid have existed since the 1960s and that it was first isolated from Cannabis Sativa in the 1940s. It represents considerable potential given that it has a slew of amazing therapeutic qualities that can benefit symptoms across numerous ailments without psychoactivity. Due to this versatility, CBD has been the cannabinoid of choice when having to give cannabis medicine to children; (the CNN documentary Weeds highlighted the story of an epileptic infant girl Charlotte Figi who was given CBD oil to control her seizures - it saved and gave her quality of life back). The paper "Cannabidiol: from an inactive compound to a drug with wide spectrum of action" by Antonio Zuardi covers this compound's history!

Like THC, CBD can be consumed in virtually the same variety of methods - it can be smoked or vaporized for a more immediate effect of relief, it may be eaten, applied as a topical, used as a suppository, or even be administered intravenously. While cannabidiol shares a number of therapeutic properties with THC, it does have very potent unique anti-psychotic, anti-anxiety, and immunosuppressive characteristics which THC does not.

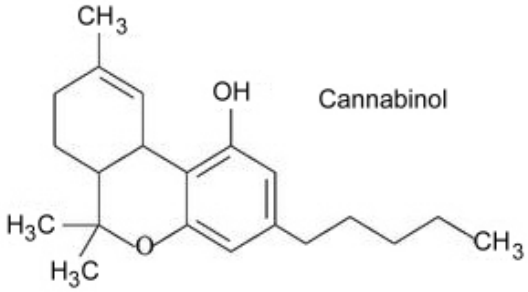
When it does come to the shared properties, and if the two cannabinoids THC and CBD are combined and consumed together, they actually potentiate each others' shared therapies - that is they enhance one another. This will be further detailed later in this chapter when the Entourage Effect is discussed, but for now, simply understand that the various cannabinoid compounds actually work better in concert with each other, and that an assortment of cannabinoids will almost always be more potent and powerful than any individual cannabinoid by itself when used for treatment.

Raw: Cannabidiolic Acid (CBDA)
Boiling Point: 248 °F (120 °C)
Medical Properties: Anti-Cancer, Anti-Inflammatory. Nonpsychoactive.

Heated: Cannabidiol (CBD)
Medical Properties: Analgesic, Anti-Anxiety, Anti-Bacterial, Anti-Cancer, Anti-Convulsive, Anti-Depressant, Anti-Emetic, Anti-Inflammatory, Anti-Insomnia, Anti-Ischemic (helps to regulate blood flow), Anti-Psychotic, Anti-Spasmotic, Bone Stimulant, Immunosuppressive, Neuroprotective. Nonpsychoactive.

Aged: CBDA or CBD do not convert into another cannabinoid with time or light exposure.

Cannabinol (CBN)



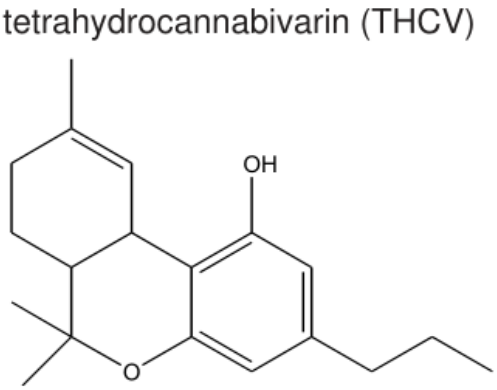
Cannabinol or CBN is perhaps the 3rd most abundant cannabinoid produced by the cannabis plant - it is naturally produced in small amounts in mature flowers but also more abundantly converted from other cannabinoids such as THC aging into this compound over time. With that said, this compound is known to be several times more sedative than even THC, and can have significant implications for individuals suffering from insomnia. In addition to its sedative properties, it also shares analgesic, anti-bacterial, anti-convulsive, and anti-inflammatory characteristics.

It should be discussed that this particular compound can be found in flower that is “over-ripened” or harvested late - when THC is left to age in the trichomes produced by the plant, they tend to turn amber/brown, and this familiar sign to cultivation experts and growers indicates the production and conversion of THC into CBN within the crystals of the bud. Additionally, aged flower and aged concentrates will also contain CBN converted from THC. Note that there is some debate regarding this, with some cannabis scientists claiming that CBN can only be formed from CBGA, but again this is a topic of dispute. Cannabis labs and analytics will need to verify and test this over multiple strains and flowers aged and ripened at different rates.

Raw: Cannabinolic Acid (CBNA). Furthermore, CBN can form from other cannabinoids over time and with being exposed to light; a few of these include: THCA, Δ8-THC, Δ9-THC, THCV.
Boiling Point: 365 °F (185 °C)
Medical Properties: Anti-Inflammatory.

Aged and/or Heated: Cannabinol (CBN)
Medical Properties: Analgesic, Anti-Bacterial, Anti-Convulsive, Anti-Inflammatory, Anti-Insomnia.

Tetrahydrocannabivarin (THCV)



Tetrahydrocannabivarin is a cannabinoid that is generating relatively new buzz. While it has been known to be produced in small amounts in certain strains from landrace African strains such as Durban Poison and some newer strain crosses such as Doug's Varin or Black Beauty, scientists, researchers, and even the general consumer are finding themselves more and more interested in this curious cannabinoid. It has been reported by renowned cannabis testing laboratory Steep Hill in Oakland, CA, that THCV possesses stronger psychoactive properties than THC, with a shorter duration. From a medical perspective, this may actually prove useful for therapy settings involving trauma and PTSD; more than a few therapists hypothesize that this increased psychoactivity may aid in releasing certain memories or mental pain. Research and experiments into this are early and limited, however, due to the current federal drug scheduling of cannabis.

In addition to the more pronounced psychoactive properties of THCV, this cannabinoid also possesses it's share of therapeutic characteristics. In its acidic raw form, it can act as a powerful anti-inflammatory agent. When heated and decarboxylated, it can act as a powerful anti-convulsive compound much like THC and CBD, and of particular interest are the Anti-Diabetic, Appetite Suppressant and Bone Stimulant properties. These deserve some discussion as they are relatively new and groundbreaking discoveries.

The potential anti-diabetic property of this cannabinoid has been tested and experimented with in animal models and early data suggests that THCV can actually help to correct insulin sensitivity in those prone to the disease. In fact, and this will be covered later in the chapter, the interactions with many other cannabinoids and the endocannabinoid system indicate that they can actually help correct a number of issues associated with both type 1 and 2 diabetes.

When it comes to the appetite suppressant properties of THCV, it does indeed that - suppresses one's appetite and kills the "munchies." Novel and informative experiments regarding this property can easily be found on google scholar with the search "THCV Appetite Suppressant", and it should be highlighted that this has great potential for individuals with eating disorders and obesity!

Last but not least, the Bone Stimulant properties of this compound have been observed in experiments with it being able to reduce osteoclasts - cells that break down bones over time and with age. This obviously screams for more intense research, and it is hoped by many scientists and medical professionals that society allows for more reasonable access to more widespread medical experiments with cannabis.

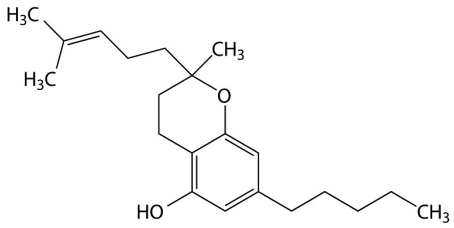
An excellent article covering this compound can actually be found on High Times in their article, "What is THCV (Tetrahydrocannabivarin) And What Does It Do?"

Raw: Tetrahydrocannabivarin Carboxylic Acid (THCVA)
Boiling Point: 428 °F (220 °C) *note that this boiling point is higher than THC; turn up the heat to get the psychoactive effects that are desired ;)*
Medical Properties: Anti-Inflammatory.

Heated: Tetrahydrocannabivarin (THCV)
Medical Properties: Anti-Convulsive, Anti-Diabetic, Appetite Suppressant, Bone Stimulant.

Aged: Cannabinol (CBN).

Cannabichromene (CBC)



Cannabichromene

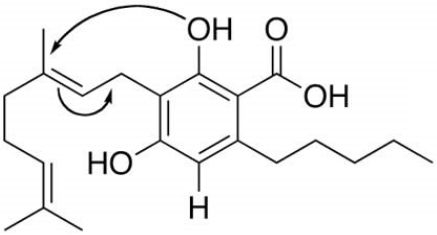
Cannabichromene (CBC) is a lesser known cannabinoid and it is only produced in small amounts compared to THC and even CBD. It was first discovered in the 60s (also by Dr. Mechoulams team), and limited experiments since then have found that it actually shares many therapeutic properties with some of the other cannabinoids; these can be found below. It is not psychoactive on its own, and its most unique properties of interest to scientists are the potential anti-fungal and anti-viral properties this compound possesses. Due to it only being produced in small amounts in the flower, more interest with with the limited resources in the cannabis scientific world have been focused on THC and CBD. The door and opportunity here is open for scientists and researchers to find out more.

Raw: Cannabichromic Acid (CBCA)
Boiling Point: 248 °F (120 °C)
Medical Properties: Anti-Fungal, Anti-Inflammatory.

Heated: Cannabichromene (CBC)
Medical Properties: Analgesic, Anti-Bacterial, Anti-Cancer, Anti-Depressant, Anti-Fungal, Anti-Inflammatory, Anti-Insomnia, Anti-Viral, Bone Stimulant (like THCV, CBC reduces osteoclast activity).

Aged: Cannabicyclol (CBL).
Medical Properties: Not much is known about CBL and it is a cannabinoid that deserves further study from scientists and researchers.

Cannabigerolic Acid (CBGA)



Cannabigerolic Acid (CBGA)

This is the molecular parent and precursor to THC, CBD, and most if not all of the cannabinoids developed in the cannabis flower. Sometimes shortened to CBG, it is naturally produced raw in the plant's trichomes as it begins to flower. Over time and as the plant matures and ripens over several weeks and months, this compound matures and transforms into the cannabinoids we are most familiar with. It is non-psychoactive, and on its own also possesses potent analgesic and anti-inflammatory properties. Due to it being produced early on in the plant's life cycle, there are some novel yet significant potential where relief is concerned! Inflammation is a major symptom across many ailments - sometimes even where excessive opiate and even alcohol consumption is concerned. Due to the cannabis plant being able to produce this compound in its flowers relatively early on, and with more attention and validity being given to juicing or consuming raw cannabis, this is a powerful therapeutic agent that can be consumed in large doses even before the plant fully matures in its growth!

Much like all the cannabinoids, there is both a call and need for more research, but there are countless patients suffering from various ailments that are already swearing by some of the life changing benefit raw cannabis has given them.

Raw: This cannabinoid is produced in the raw form from the beginning of the plants flowering cycle.
Boiling Point: ?
Medical Properties: Analgesic, Anti-Inflammatory

Some of the Other 100+ Cannabinoids (there are currently 113 that are known)

The following constitutes a list of just some of the other cannabinoids that the plant is known to produce. Credit to Hempgazette.com for this list of known cannabinoids.

Cannabichromene (CBC)
Cannabichromenic Acid (CBCA)
Cannabichromevarin (CBCV)
Cannabichromevarinic Acid (CBCVA)
Cannabicyclol (CBL)
Cannabicyclolic Acid (CBLA)
Cannabicyclovarin (CBLV)
Cannabidiol (CBD)
Cannabidiol Monomethylether (CBDM)

Cannabidiolic Acid (CBDA)
Cannabidiorcol (CBD-C1)
Cannabidvarin (CBDV)
Cannabidvarinic Acid (CBDVA)
Cannabielsoic Acid B (CBEA-B)
Cannabielsoin (CBE)
Cannabielsoin Acid A (CBEA-A)
Cannabigerol (CBG)
Cannabigerol Monomethylether (CBGM)
Cannabigerolic Acid (CBGA)
Cannabigerolic Acid Monomethylether (CBGAM)
Cannabigerovarin (CBGV)
Cannabigerovarinic Acid (CBGVA)
Cannabinodiol (CBND)
Cannabinoidivarin (CBVD)
Cannabinol (CBN)
Cannabinol Methylether (CBNM)
Cannabinol-C2 (CBN-C2)
Cannabinol-C4 (CBN-C4)
Cannabinolic Acid (CBNA)
Cannabiorcool (CBB-C1)
Cannabivarin (CBV)
10-Ethoxy-9-hydroxy-delta-6a-tetrahydrocannabinol
8,9-Dihodroxy-delta-6a-tetrahydrocannabinol
Cannabitriol (CBT)
Cannabidivarin (CBTV)
Delta-8-tetrahydrocannabinol (Δ8-THC)
Delta-8-tetrahydrocannabinolic Acid (Δ8-THCA)
Delta-9-tetrahydrocannabinol (Δ9-THC)
Delta-9-tetrahydrocannabinol-C4 (Δ9-THC-C4)
Delta-9-tetrahydrocannabinolic Acid A (Δ9-THCA-A)
Delta-9-tetrahydrocannabinolic Acid B (Δ9-THCA-B)
Delta-9-tetrahydrocannabinolic Acid C4 (Δ9-THCA-C4)
Delta-9-tetrahydrocannabiorcol (Δ9-THC-C1)
Delta-9-tetrahydrocannabiorcolic Acid (Δ9-THCA-C1)
Delta-9-tetrahydrocannabivarinic Acid (THCVA)
10-Oxo-delta-6a-tetrahydrocannabinol (OTHC)
Cannabichromanon (CBCF)
Cannabifuran (CBF)
Cannabiglendol
Cannabiripsol (CBR)
Cannabicitran (CBT)
Dehydrocannabifuran (DCBF)
Delta-9-cis-tetrahydrocannabinol (cis-THC)
Trihydroxy-delta-9-tetrahydrocannabinol (triOH-THC)
3,4,5,6-Tetrahydro-7-hydroxy-alpha-alpha-2-trimethyl-9-n-propyl-2,6-methano-2H-1-benzoxicin-5-methanol (OH-iso-HHCV)

Keep in mind that the study of each of these chemical compounds is a very involved one and that unfortunately we collectively still do not have a full comprehensive understanding of how all of them work. Prohibition and the erroneous drug scheduling of the cannabis plant makes more extensive research into this field difficult and limited. There is indeed a demand for more scientists and researchers to become involved, and for activists and the common voter to realize the importance of investigating the medical potential of cannabis.

Explaining the Anti-Cancer Properties of specific Cannabinoids

This section will be repeated again in chapter 5 when we begin to look at practical approaches to combating cancer with cannabis, but this being the science chapter, it deserves multiple places of mention.

Now, there is a lot of buzz going around regarding cannabis as a cancer cure. This is inaccurate from a medical standpoint. Cannabis does not cure cancer, cannabinoids contained within cannabis as well as your own endocannabinoids kill cancer cells. There is a hard distinction between what is considered a cure and what is considered a treatment.

You can use cannabinoids as a treatment to safely kill off cancer cells, but the patient must make lifestyle changes (i.e., live healthier, avoid exposure to carcinogens, stop smoking, exercise, consume probiotics, eat healthier, etc.) in order to ensure that the cancer does not come back.

With that said, there are 4 mechanisms by which cannabinoids kill cancer cells:

Mechanisms through which Cannabinoids in Cannabis Kills Cancer Cells.

- **Anti-Proliferative** - Prevents cancer cells from reproducing.
- **Anti-Angiogenic** - Prevents formation of new blood vessels needed by the tumor to grow.
- **Antimetastatic** - Prevents cancer cells from spreading to other organs.
- **Apoptotic** - Causes cancer cells to die. When cannabinoids bind to the receptors of a cancer cell, a compound known as ceramide is produced which signals the cancer cell to shut off it's own mitochondria, causing the cancer cell to die.

This is confirmed *in vitro* (studies in cell cultures in petri dishes) and *in vivo* (studies in living animal models including but not limited to: rats, guinea pigs, monkeys, apes, even horses).
Unfortunately we still need double blind controlled clinical trials; this is illegal at the Federal level.

Scientists throughout the world are trying to understand fully how these mechanisms function, and this involves mapping out and understanding the **Endocannabinoid System**; not just for cancer, but for all of the various therapies possible with this emerging field of study. The main scientists behind these researches involve but are obviously not limited to: Dr Raphael Mechoulam (Israel), Dr Manuel Guzman (Spain), Dr Vincenzo De Marzo (Italy), Dr Lester Greenspoon (Harvard University), Professor Bob Melamede (University of Colorado), Dr Donald Abrams (San Francisco General Hospital), Dr Tod Mikuriya (deceased).

Other Cannabinoids in Nature

There are indeed other plants and natural sources of cannabinoids that interact with your Endocannabinoid System (ECS)! Keep in mind that science will one day discover that many things out in nature impact this amazing system which lies in each and everyone one of us; in fact many cannabis scientists theorize already that much of what is going on in the external world impacts our internal biological makeup in a fascinating yet rapid way both good and bad - the ECS is simply evidence of this. We will discuss this more later in this chapter on the topic of Clinical Endocannabinoid Deficiency (CED), but for now, understand that we can actually upregulate this system when in need by consuming cannabinoids that many other herbs, fruits, and more possess (this makes sense as cannabis shares many of the terpenoids that are produced in other plants and flowers, it would be doubtful that it would be the only source of these therapeutic compounds); cannabis just happens to be an abundant source of some of the most effective ones, and without scientific investigation into the cannabis plant, we may never know what cannabinoids even are! Furthering this is the fact that as a plant it is relatively easily grown and as such, mass produced, with multiple possible harvests in a year!

Below is a small list of other sources of cannabinoids, and know that this list will also likely grow! (Credit to Marijuana.com and Herb.co)

Black Pepper (Piper nigrum)

Black Truffles (Tuber melanosporum)

Chocolate (Cacao)

Chinese Rhododendron (Rhododendron fortunei)

Coneflower (Echinacea)

Electric Daisy (Acmella oleracea)

Helichrysum (Helichrysum italicum)

Japanese and New Zealand Liverwort (Radula marginata)

Kava (Piper methysticum)

Maca (Lepidium meyenii / Peruvian ginseng)

Rosemary (Rosmarinus officinalis)

Terpenoids

Terpenoids are a diverse class of organic compounds naturally produced by a vast majority of plants and flowers, including cannabis. Terpenoids are responsible for producing the various aromas and smells most plants produce and they also possess medicinally valuable characteristics. Traditionally terpenoids have many uses - they can be found in cleaners, sprays, perfumes, and they are still used in aromatherapy. In the cannabis world, you will often hear of stoners and wooks (avid fans of the cannabis culture) constantly talk enthusiastically about terps and the amazing flavors that translate into the flowers and concentrates they enjoy vaping.

Surprisingly, in addition to simply adding fruity kushy tastes (and more) to the smoking and vaping experience, scientists have found that these terpenoids actually work synergistically with the cannabinoid compounds the plant produces to create the therapeutic effects. These terpenoids also help explain why cannabis provides a wide variety of psychoactive effects and varied experiences as well.

Upon understanding this and when looking at numerous lab tests for the various strains of cannabis, it becomes evident that the mixture and multitude of terpenoids alongside the psychoactive compounds in each strain - Δ9-THC and THCV for example - are what dictate the type of “high” a certain strain will produce, not whether they are Indica or Sativa. Essentially, terpenoids modulate and help to further drive the type of therapeutic effects of the various cannabinoids, as well as dictate or provide the varied psychoactive effects possible when consuming the plant.

Oftentimes, the words Terpenoid and Terpenes are used interchangeably but there is a slight difference between the two - Terpenes are a hydrocarbon, meaning that the only elements that make up the chemical structure of these compounds are hydrogen and carbon. Terpenoids on the other hand have been altered from their original natural state by oxidation (such as when drying and curing) or have been chemically modified or tampered with (such as when BHO or Rosin is manufactured or even when individual terpenoids are extracted and isolated through fractional distillation).

There are a multitude of terpenoids that scientists have identified - more than 200 when it comes to just cannabis (and not all terpenoids produced by the plant have been fully studied). One common example of a terpenoid would be **α-Pinene**, a known mood enhancer with anti-bacterial, anti-fungal, anti-inflammatory, and bronchodilating properties; this is a compound naturally produced in pine needles and in several strains of cannabis. Another common example would be **Myrcene**, a compound prevalent in mangoes and lemongrass and also produced in many cannabis strains, which has been known to have analgesic, anti-cancerous, anti-inflammatory, anti-insomnia, and anti-spasmotic properties!

In the next few pages is a chart and list of major terpenoids found in cannabis; there are more to be studied for sure, but the ones below make up a vast majority of the terpenoids scientists have been finding through rigorous lab testing with a large variety of cannabis strains.

TERPENOIDS

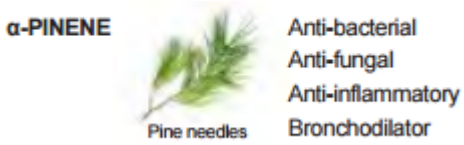
Smells and Therapeutic Effects

α-PINENE	 Pine needles	Anti-bacterial Anti-fungal Anti-inflammatory Bronchodilator	Energetic Promotes Alertness Uplifting
β-CARYOPHYLLENE	 Black Pepper  Clove	Anti-bacterial Anti-cancer Anti-fungal Anti-inflammatory Anti-septic	Mood Stabalizing Euphoric
BORNEOL	 Camphor	Analgesic Anti-insomnia Anti-septic Bronchodilator	Sedating Relaxing Calming Euphoric
CARYOPHYLLENE OXIDE	 Eucalyptus	Anti-fungal Anti-ischemic	Mood Stabalizing Euphoric
CINEOL	 Tea Tree	Anti-bacterial Anti-depressant Anti-inflammatory Anti-ischemic Bronchodilator	Uplifting Euphoric Stomach Relaxant
CITRONELLOL	 Rose	Anti-cancer Anti-inflammatory Anti-insomnia Anti-spasmotic	Relaxing Calming
HUMULENE	 Hops	Anorectic Anti-cancer Anti-bacterial Anti-inflammatory	Relaxing Calming

LIMONENE	 Citrus	Anti-anxiety Anti-bacterial Anti-cancer Anti-depressant Anti-fungal Bronchodilator	Energetic Uplifting Stress Relieving "Racey" in High Doses
LINALOOL	 Lavender	Anti-anxiety Anti-bacterial Anti-convulsive Anti-depressant Anti-insomnia	Calming Relaxing Sedative Euphoric
MYRCENE	 Lemongrass  Mango	Analgesic Anti-cancer Anti-inflammatory Anti-insomnia Anti-spasmotic	Relaxing Euphoric Sedative in High Doses "Couch Lock Effect"
NEROLIDOL	 Wood  Citrus rind	Anti-fungal Anti-insomnia	Sedative Calming "Focused Effect"
PHYTOL	 Green Tea	Anti-insomnia	Sedative Relaxing
TERPINOLENE	 Lilac  Apple	Anti-bacterial Anti-fungal Anti-insomnia Anti-septic	Sedative Relaxing

Image borrowed from the Understanding Medical Cannabis book by Elemental Wellness Center

Alpha Pinene



$C_{10}H_{16}$ Boiling Point: 155ºC (311ºF)

Commonly found in Pine Needles, Conifer Trees, Orange Peels, Turpentine, Rosemary, Dill, Basil, and Parsley.

Psychoactive effects: **Energetic**, **Promotes Alertness**, **Uplifting**.
Additional Properties: Anti-Oxidant and possibly helps to promote memory retention.

Strains high in α-Pinene: Jack Herer, Dutch Treat, Blue Dream, OG Kush, Fire OG, Strawberry Cough, Romulan, Island Sweet Skunk. (source: leafly.com) Gorilla Glue.

Beta-Caryophyllene

$C_{15}H_{24}$ Boiling Point: 254-257ºC (489-495ºF)

Commonly found in Black Pepper, Cloves, Cinnamon, Oregano, Basil, Rosemary.

Psychoactive effects: **Mood stabilizing**, **Euphoric**.
Additional Properties: High affinity to CB2 receptors - implications for topicals due to anti inflammatory properties.

Caryophyllene Oxide

Caryophyllene Oxide is an odor oxidized by Caryophyllene - drug sniffing dogs detect this scent.

Strains high in Beta Caryophyllene and Oxide: Hash Plant, Headband, SFV OG, Royal Nepalese

Borneol

$C_{10}H_{18}O$ Boiling Point: 213ºC (415ºF)

Commonly found in Camphor, Rosemary, Mint

Psychoactive effects: **Sedating, Relaxing, Calming, Euphoric**.
Additional Properties: Natural bug repellant; strains high in Borneol may actually be resistant to bugs.

Strains high in Borneol: Haze varieties; G-13 Haze.

Cineol (Eucalyptol)

$C_{10}H_{18}O$ Boiling Point: 176-177ºC (349-351ºF)

Commonly found in Tea Trees, Mugwort, Bay Leaves, Eucalyptus.

Psychoactive effects: **Uplifting, Euphoric, Stomach relaxant**.
Additional Properties: Natural anti-oxidant. Natural insecticide and repellant. Used in cough suppressants, mouthwash, and body powder.

Strains high in Cineol: Silver Haze, Chemdog, Lemon Haze

Citronellol

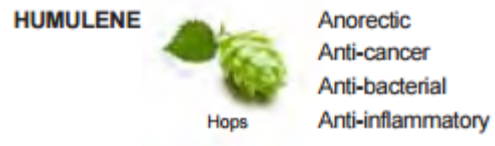
$C_{10}H_{20}O$ Boiling Point: 225ºC (467ºF)

Commonly found in Roses, Geranium, Lemongrass.

Psychoactive effects: **Relaxing, Calming**.
Additional Properties: Natural anti-oxidant. Natural insecticide and repellant.

Strains high in Citronellol: This is one particular terpene that appears in trace amounts of various "floral" and "bready" varieties such as Girl Scout Cookies and Lamb's Bread. It currently does not test particularly high in terms of overall terpene profile.

Humulene



$C_{15}H_{24}$ Boiling Point: 106-107ºC (223-225ºF)

Commonly found in Hops, Sage, Coriander, Ginseng.

Psychoactive effects: **Relaxing, Calming**.
Additional Properties: Natural anti-oxidant. Natural insecticide and repellant. Known to affect mood and is an appetite suppressant.

Strains high in Humulene: OG Kush, Sunset Sherbet, Purple Haze, Girl Scout Cookies

Limonene

$C_{10}H_{16}$ Boiling Point: 176ºC (349ºF)

Commonly found in Citrus Rind, Lemons, Juniper, Peppermint, Rosemary.

Psychoactive effects: **Energetic, Uplifting, Stress Relieving, Can cause "Racey Effect" in high doses**.
Additional Properties: As a topical stimulant, helps absorption of terpenes and cannabinoids. Strong implications in treating anxiety and depression. Shown to be good for gastric distress. Some studies show immunostimulating properties.

Strains high in Limonene: Super Lemon Haze, SFV OG, Berry White, Durban Poison, Dream Queen

Linalool

$C_{10}H_{18}O$ Boiling Point: 198-199ºC (388-390ºF)

Commonly found in Lavender, Rutaceae (citrus flowers), Laurels, Birch, Coriander, Rosewood. Lamiaceae plant and herb family.

Psychoactive effects: Used in aromatherapy for **Calming, Relaxing, and Sedation. Euphoric**.
Additional Properties: Helps with the production of Vitamin E in the body. Helps with elevated stress levels on the immune system. Natural bug repellant.

Strains high in Linalool: Kens GDP, Grape Ape, Purple Kush, Lavender, LA Confidential

Myrcene

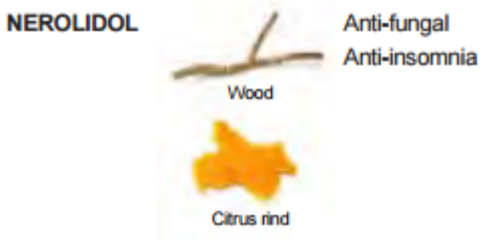
$C_{10}H_{16}$ Boiling Point: 166-168ºC (331-334ºF)

Commonly found in Fresh Mango, Lemongrass, Hops, Bay Leaves, Eucalyptus,

Psychoactive effects: **Relaxing, Euphoric, Sedative in high amounts**.
Additional Properties: Strains high in Myrcene are known to cause the “Couch Lock” effect. Shown to help thin the blood brain barrier, allowing for chemicals to cross into the brain more quickly. Myrcene has also been known to increase the maximum saturation levels of CB1 receptors. Possesses overlapping synergies and helps the antibiotic potential of other terpenes. Has implications for helping Diabetes.

Strains high in Myrcene: OG Kush, Bubba Kush, Many Kush Varieties, White Widow.

Nerolidol



$C_{15}H_{26}O$ Boiling Point: 122ºC (252ºF)

Commonly found in Neroli (Bitter Orange Tree), Ginger, Jasmine, Lavender, Tea Tree, Lemon Grass

Psychoactive effects: **Sedative, Calming. Possible “focused” effect**.
Additional Properties: Implications for topical use - helps with transdermal delivery.

Strains high in Nerolidol: Island Sweet Skunk, Skywalker OG, Jack Herer, Agent Orange.

Phytol

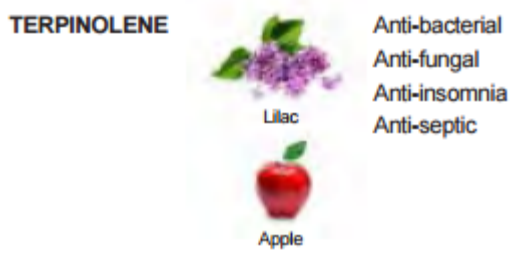
$C_{20}H_{40}O$ Boiling Point: 203-204ºC (397-399ºF)

Commonly found in Green Tea

Psychoactive effects: **Sedative, Relaxing**.
Additional Properties: Phytol is a byproduct of degraded chlorophyll; it appears in traces in several strains.

Strains high in Phytol: This particular terpene does not test particularly high on terpene profile scales, but is found in trace amounts of many strains that possess a "leafy tea" aroma - strains like Haze and some Kush varieties are known to test for this terpene.

Terpinolene

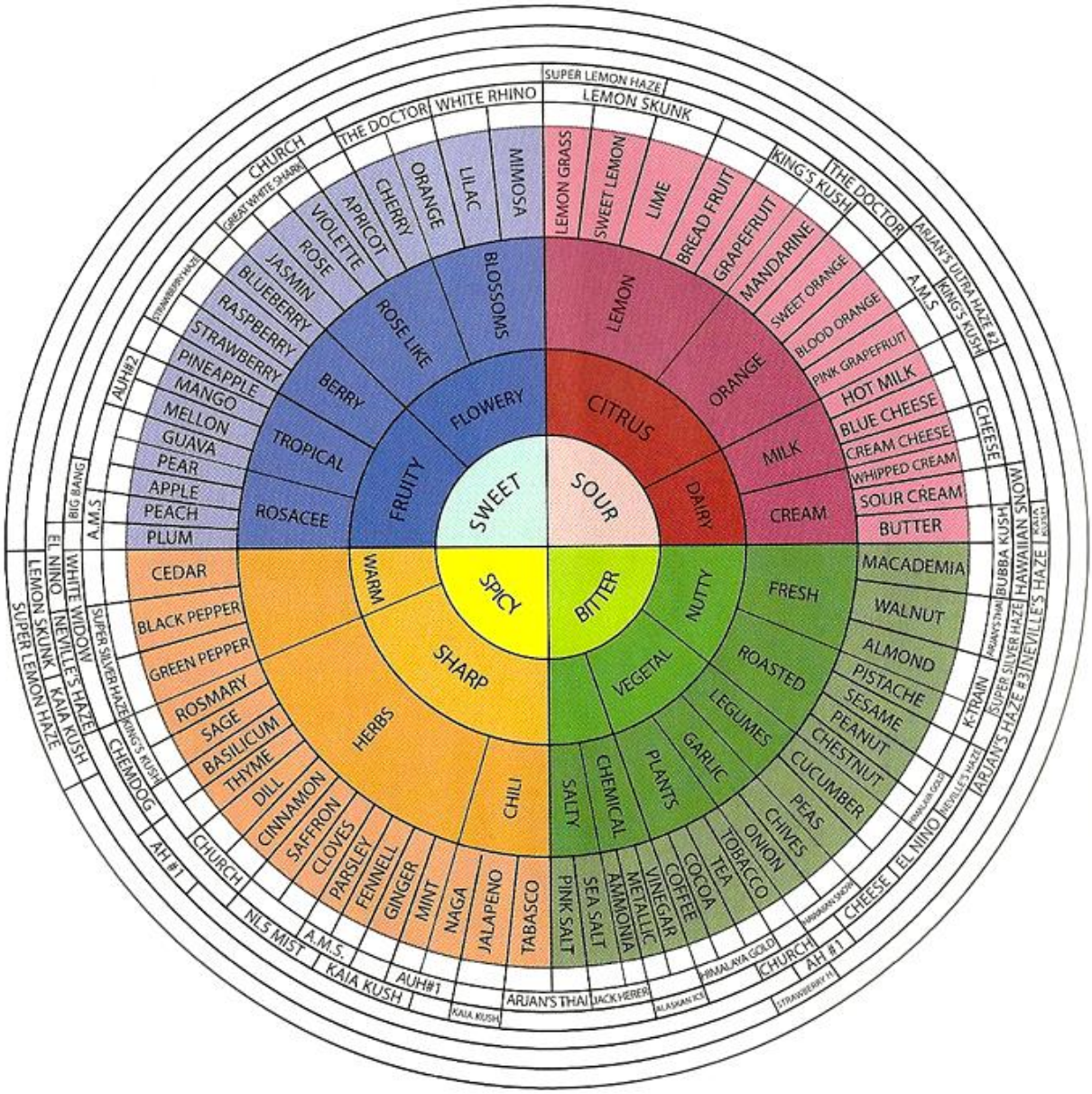


$C_{10}H_{16}$ Boiling Point: 183-220ºC (361-428ºF)

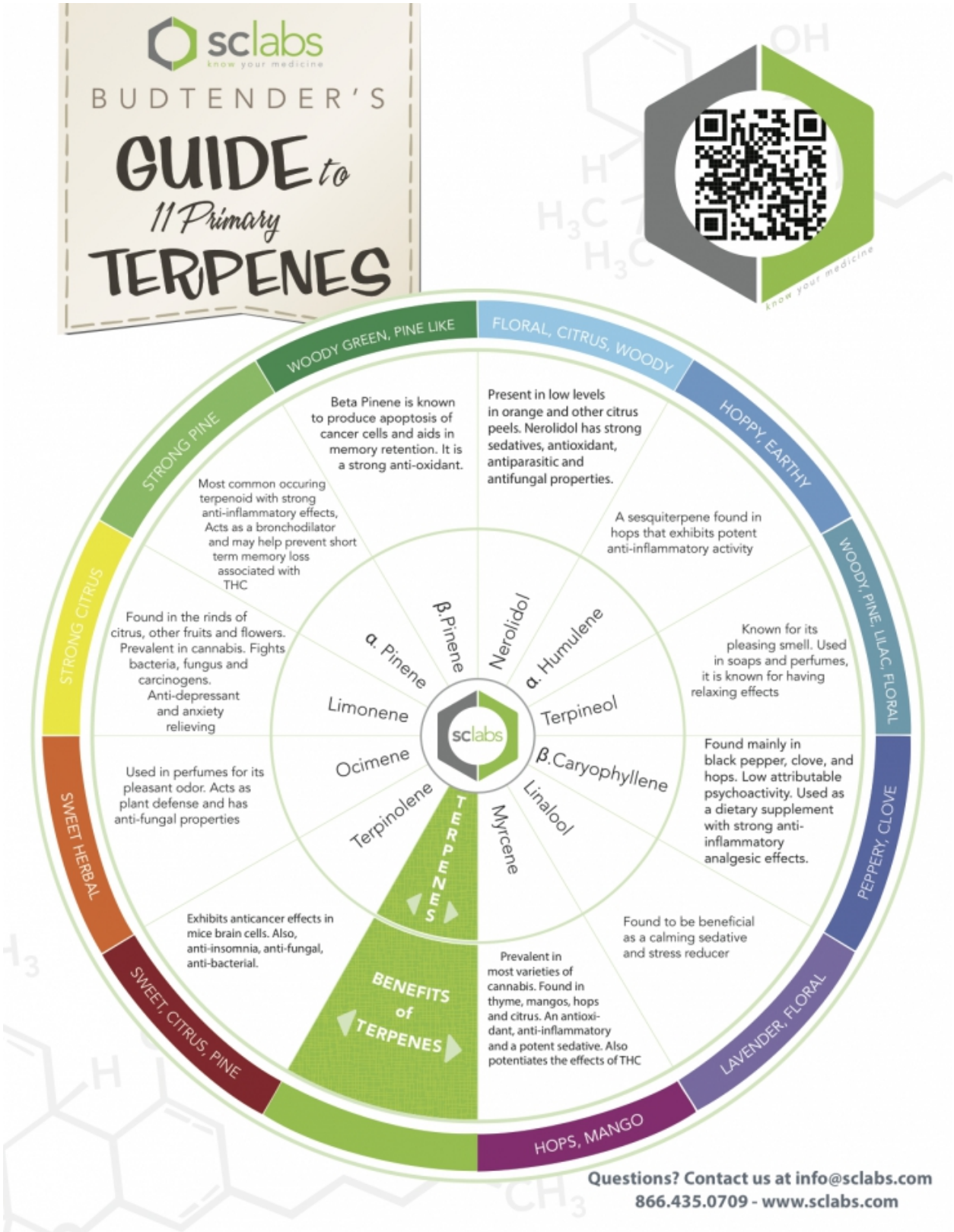
Commonly found in Apples, Cumin, Lilacs, Tea Tree.

Psychoactive effects: **Relaxing, Sedative**.
Additional Properties: Natural antioxidant.

Strains high in Terpinolene: Durban Poison, Ghost Train Haze, Kosher Jack



Flavor Wheel by GreenHouse Seeds Co.



Terpene Poster from SC Labs in California

Flavonoids

Flavonoids represent a third class of chemical constituent produced by the cannabis plant, and like terpenoids and cannabinoids, are shared amongst a wide variety of plants and flowers. Flavonoids are mostly associated with helping to determine the vibrant pigments of color in various plants and flowers, with the aim of communicating with and surviving in nature - for eg. certain flowers are bright colored in order to attract bees carrying pollen, while flavonoids in venus fly traps attract prey so that the plant itself can feed. This is no different in the cannabis plant, and the many various strains and their colorful variations are partly the result of flavonoids. The fields of botany have discovered that these compounds actually possess other functions and even therapeutic properties! These properties have been found to include: anti-allergic, anti-inflammatory, anti-oxidant, anti-cancer, antimicrobial, and anti-diarrheal benefits.

A small list of Flavonoids found in various cannabis strains is below. (Credit to FundacionCanna for this list and it's summaries)

Cannaflavins A, B, and C - Potent Anti-Inflammatory properties that work synergistically with the other cannabinoids.

Vitexin and Isovitexin - Has therapeutic potential for Gout and can inhibit thyroid peroxidase.

Kaempferol - Theorized to have antidepressant effects. Also a possible anti-cancer agent.

Apigenin - Immunosuppressant, possible anxiolytic and sedative agent.

Quercitin - Antiviral and anti-inflammatory properties.

Luteonin and Orientin (luteonin glucoside) - Antioxidant, anti-inflammatory, antibiotic, and anti-cancerous properties.

Note that much of the current research into the therapeutic properties of these particular flavonoids strongly suggest that they interact synergistically with the other cannabinoids and terpenoids produced by the cannabis plant. This is more than the simple fact that they share beneficial properties; molecular and biological studies actually show that some of these flavonoids work directly with some cannabinoids and terpenoids on the same physical channels and pathways within our body in order to potentiate the therapy the overall plant is offering. Additionally, the antioxidant properties of these 3 categories of compounds - cannabinoids, terpenoids, and flavonoids - are combined and enhanced when consumed together.

Research into Flavonoids is still relatively young, and this represents another class of study that needs more investigation. It is also interesting to note, that the aforementioned synergistic relationship between these compounds, is known as the Entourage Effect which we will go into great detail next. In addition to the excellent article on Flavonoids from Fundacion Canna, another highly informative page covering these compounds can be found on MerryJane.com.

The Entourage Effect

Now that we have covered the chemical constituents of the cannabis plant - cannabinoids, terpenoids, and flavonoids - we can discuss a powerful concept when it comes to cannabis science: the Entourage Effect which describes the ability for these particular compounds to work in concert with each other in order to provide a more powerful, more potentiated therapeutic effect. That is, when consuming an assortment of these compounds, an individual will find a more well rounded and more effective therapy than if he/she were to consume an individual cannabinoid such as THC or CBD alone.

One way to illustrate and give an example of this is to observe the Analgesic (pain relief) properties of the cannabis plant: the cannabinoids CBGA, THC, CBD, CBC, CBN, and the terpenoids, Borneol and Myrcene all share the same therapeutic characteristic of being pain relieving compounds. When consuming these compounds together, than if one were to consume them individually, it can be observed that each of the compounds "contribute" to the overall therapy being received by the individual. In other words, say THC, CBD, and CBN were combined into a medicine such as a pill or a tincture, a patient would be receiving 3 compounds that can help to remedy his or her pain than if he were to simply take a THC pill such as Marinol; the 1, 2, 3 punch of the former is obviously superior to the isolate.

Given that many of the cannabinoids, terpenoids, and flavonoids share numerous therapeutic properties, the theory behind the Entourage Effect opens up many possibilities in the realm of treatment and healing. In the next page is a chart listing most of the therapeutic possibilities with cannabis and the respective cannabinoids and terpenoids which coincide with the stated therapy. Note that this chart will be updated in the future to cover flavonoids as well! This particular concept was popularized and discussed by multiple cannabis scientists and doctors, and Dr. Ethan B Russo and Dr. John McPartland explain how "cannabis is inherently polypharmaceutical and that synergy arises from interactions between the plant's multiple components." In his paper, Taming THC: potential cannabis synergy and phytocannabinoid-terpenoid entourage effects, Dr Ethan Russo goes into great detail to describe and elucidate the various particular interactions with specific cannabinoids to their respective "entourage terpenoids." The previously mentioned organization Fundacion Canna out of Spain also expands into this concept and theory - they list and discuss how particular flavonoids add to this rounded therapy.

Overcoming the Bell Shaped Response in Cannabinoid Consumption

The previous concept of the Entourage Effect is actually further observed when looking at CBD exclusive medicines (medical preparations that only contain CBD and no other cannabinoids, terpenoids, or flavonoids). As discussed in the paper, Overcoming the Bell-Shaped Dose-Response of Cannabidiol by Using Cannabis Extract Enriched in Cannabidiol by Ruth Gallily et al., it is stated, "Cannabidiol (CBD), a major constituent of Cannabis, has been shown to be a powerful anti-inflammatory and anti-anxiety drug, without exerting a psychotropic effect. However, when given either intraperitoneally or orally as a purified product, a bell-shaped dose response was observed, which limits its clinical use. In other words, consuming CBD by itself provides the user a plateaued effect, and even diminishing returns after exceeding high doses of CBD. This means that you cannot simply take more and more CBD for better therapy; one will notice significant diminishing effects.

Whole Plant Therapy

The paper does go on to investigate what happens when utilizing whole plant extract - a complete assortment of the other cannabinoids and terpenoids produced in the plant. The study found that there was a clear correlation between the shared effects of the various compounds produced in the plant and that increasing the dosage of the medicine showed that this is how to overcome the diminished effect of individual cannabinoid consumption. In fact, many cannabis scientists today support the stance that whole plant therapy is far superior to isolated cannabinoid therapy, which the Entourage Effect explains.

Cannabinoid and Terpenoid Synergies

Anti-Inflammatory
CBGA
CBGVA
THCA
THCVA
CBDA
CBDVA
CBCA
CBCVA
THC
CBD
CBC
CBNA
CBN
CBLA
α-Pinene
β-Caryophyllene
Cineol
Citronellol
Humulene
Myrcene

Anti-Insomnia
CBD
CBC
CBN
Borneol
Citronellol
Linalool
Myrcene
Nerolidol
Phytol
Terpinolene

Analgesic
CBGA
THC
CBD
CBC
CBG
CBN
Borneol
Myrcene

Anti-Depressant
CBD
CBC
CBG
Cineol
Limonene
Linalool

Anti-Spasmotic
THCA
THC
CBD
Citronellol
Myrcene

Anti-Anxiety
Δ-8 THC
CBD
Linalool
Limonene

Anti-Ischemic
CBD
Caryophyllene Oxide

Anti-Convulsive
THCV
CBD
CBN
Linalool

Neuroprotective
THC
THCV
CBD

Immunosuppressive
CBD

Anti-Emetic
CBD
Δ-8 THC

Anti-Psychotic
CBD

Bone Stimulant
CBD
THCV
CBG

Appetite Stimulant
THC

Appetite Suppressant
THCv

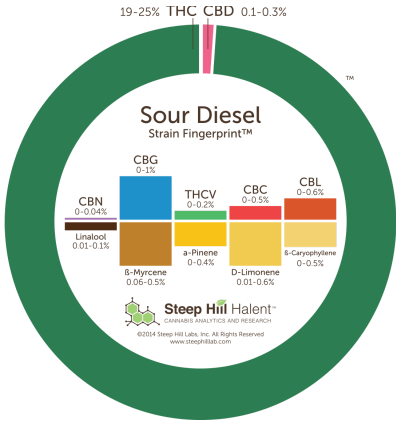
Anti-Bacterial
CBC
CBG
CBD
CBN
α-Pinene
β-Caryophyllene
Cineol
Humulene
Limonene
Linalool
Terpinolene

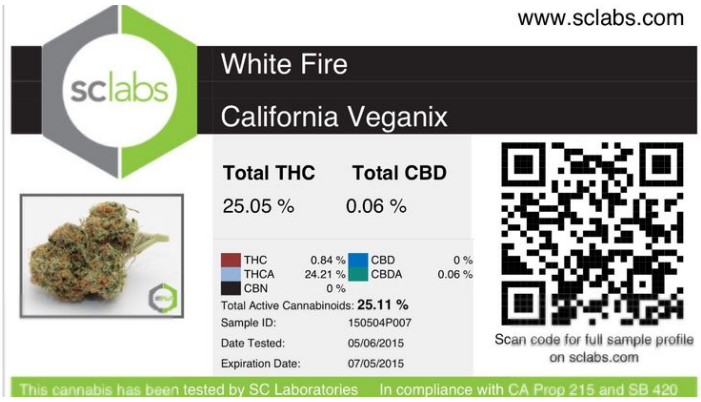
Anti-Cancer
THCA
CBDA
THC
CBD
CBC
CBG
β-Caryophyllene
Citronellol
Humulene
Limonene
Myrcene

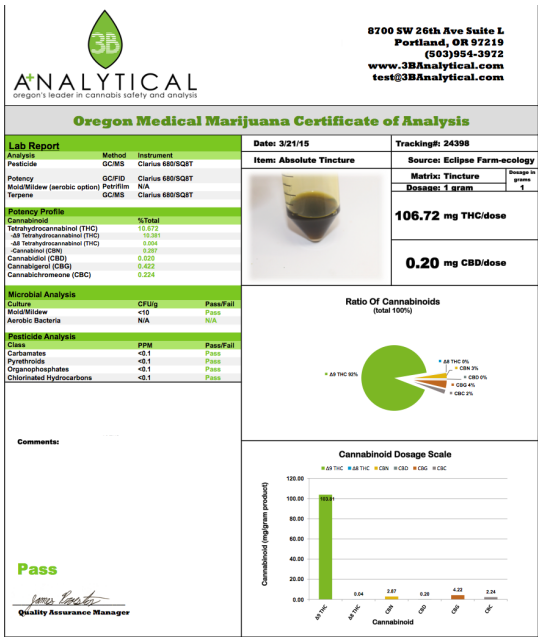
Anti-Fungal
CBCA
CBC
CBG
α-Pinene
β-Caryophyllene
Caryophyllene Oxide
Limonene
Nerolidol
Terpinolene

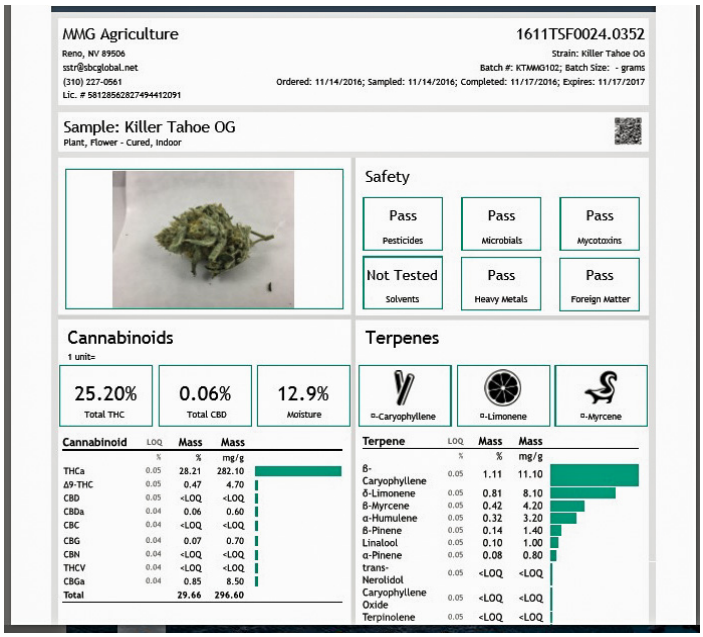
Bronchodilator
THC
α-Pinene
Borneol
Cineol

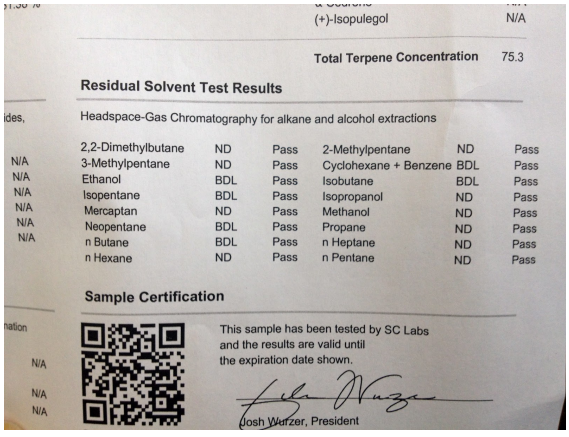
How do we quantify these compounds? Lab testing!











Rigorous and detailed Lab Testing is a relatively new practice and necessity in the cannabis industry. Throughout the states where cannabis is legal, either for medical or recreational reasons, professional high tech lab testing facilities have sprung up and emerged as much needed allies for the cannabis communities that work to build the infrastructure of the weed world. Medical patients need to know what is in their product so that they can utilize the medicine to accurate efficacy, while the recreational market needs to be regulated in the same way food, alcohol, and even nutritional products are in order to guarantee the safety and consistency of marijuana products being manufactured and distributed to the general consumer. While old school, die hard street hustlers, and even the best intending hippies that argue in favor of the old ways of wheeling and dealing herb to homies might scoff at the notion of having to lab test a nonlethal medicinal herb that has pervaded the black market, the advent of legalization and the serious medical need for this plant makes necessary the implementation of various regulations and controls in order to guarantee consumer safety and satisfaction.

As such, there are 2 major reasons Lab Testing is now a necessity:

1) **Quality Control**: How clean is the product? Is it up to regulation and health standards? These particular tests involve microbial analysis, where the product, either flower, concentrate, or edible are tested for microbiological contaminants such as mildew or mold; and a residual solvent analysis (RSA), for concentrates and edibles in order to determine that no harmful and toxic solvents are present in the consumable in question. Depending on the lab or need of the manufacturer, patient, or client, there may be more testing involved in this realm.

2) **Quantification**: These types of tests answer the following questions: What is in the plant? How potent are the cannabinoids? What does the product's terpene profile look like? Answering these questions is far more accurate in determining what kind of therapeutic effect and even psychoactive experience one will have from the product and is far more accurate than the classification of "Indica or Sativa." In fact this is a necessity for medical patients who need to determine the effective dosing of their cannabis medicines.

It comes as no surprise that serious instrumentation in Cannabis Lab Testing is involved. Some of the high tech equipment utilized by many of the cannabis lab facilities include but are not limited to: Mass Spectrometers (this is the same powerful machine that was used to determine the age of our planet), High Performance Liquid Chromatography (HPLC), Gas Chromatography (where a machine can read the chemical constituents contained in a vapor or smoke cloud), and the more unique and novel Quantacann - this unit is a rentable cannabis analytical machine that can return data on a test sample within minutes - this is useful for cannabis retail dispensaries and for purchasing entities within the industry. .

Two major labs in California's Bay Area include SteepHill and SCLabs - both are reliable outfits and both have contributed a lot of science and data for the cannabis world. Their websites contain a wealth of information, and they currently service many of the more professional cannabis outlets in northern California. There are other smaller startup labs that have set up shop. However do note that there are labs out there that still do not use full instrumentation, do not have an established reputation, and that there are downright shady operations out there that will lie on the tests! Proper legal regulation will help ameliorate this as time goes on.

Last but not least, it should be mentioned that tech companies are currently in development of portable cannabis lab testing kits, so that the average consumer can determine what is actually in their weed! Time will tell if these units will be affordable and as effective as the industry wishes them to be.

Understanding Strain Lineage and the Myth Behind Indica vs Sativa

From John McPartland's ICRS Presentation

Correct(ed) Vernacular Nomenclature

	Indica (formerly "Sativa")	Afghanica (formerly "Indica")	Sativa (formerly "Ruderalis")
Original provenance:	India	Central Asia (Afghanistan, Turkestan, Pakistan)	Usually feral or wild *C. sativa* from Europe, but sometimes of Asian provenance.
Morphology:	Relatively tall (ca. ≥1.5 m), laxly branched, with narrowly lanceolate leaflets, and relatively sparse flowering tops.	Relatively short (ca. 0.6-1.5 m), densely branched, with broad leaflets often oblanceolate, and dense flowering tops.	Variable, depending on provenance.
Physiology:	Flowering time (seed germination to intiation of reproduction structures under natural conditions) long, 9-14 weeks; no frost tolerance, moderate resin production.	Flowering time short, 7-9 weeks; frost tolerance, high resin production, susceptible to mold.	Flowering time relatively short but variable, sometimes autoflowering; moderate frost tolerance, relatively low resin production.
Chemistry:	THC much greater than CBD; uniquely prominent terpenoids: sabinene, α-terpinolene, trans-β-ocimene, trans-β-farnesene, imparting a flowery fragrance.	Cannabinoid profile variable (THC greater than or roughly equal to CBD); uniquely prominent terpenoids: camphene, β-myrcene, guaiol, β- and γ-eudesmol, imparting an acrid fragrance.	CBD>THC; prominent terpenoids: β-caryophyllene, myrcene, imparting a flowery fragrance.
Psychoactivity:	"Stimulating."	"Sedating."	Usually lacking.
Medical indications:	Lethargic depression, nausea, appetite stimulation, migraine headaches, and chronic pain. Relative contraindications: insomnia, anxiety, and schizophrenia.	Insomnia, anxiety, chronic pain, joint stiffness and inflammation, muscle spasms, tremors (from multiple sclerosis and Parkinson's disease), and epilepsy. Relative contraindications: lethargic depression, somnolence, and schizophrenia.	Chronic pain, joint stiffness and inflammation, epilepsy. Relative contraindications: allergy to cannabis.

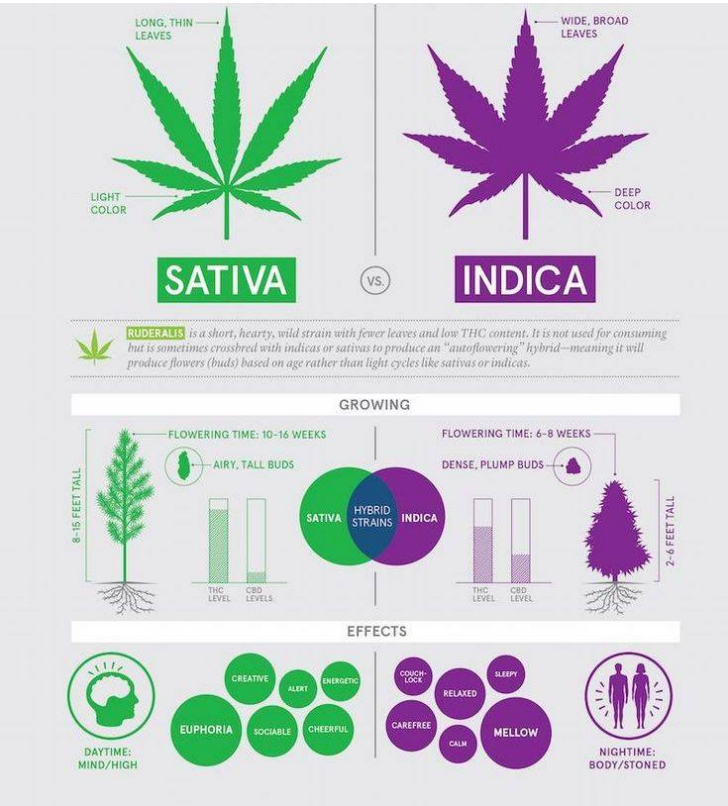
Revised vernacular nomenclature was proposed by John McPartland at the 2014 meeting of the International Cannabinoid Research Society. His paper, co-authored by Geoffrey Guy, used "DNA barcodes" to determine whether or not *Cannabis indica* and *Cannabis sativa* are separate species. The answer was not. *C. indica* and *C. sativa* are subspecies —separate varieties of one *Cannabis* species. McPartland traced the confusion that prevails today among plant breeders and the pot-loving masses to the 1970s, when a *C. afghanica* plant collected by botanist Richard Evans Schultes was incorrectly identified as *C. indica*.

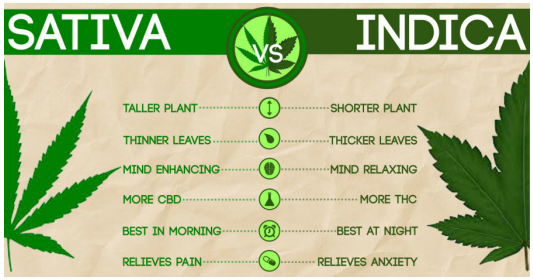
It is important to remember that the modern cannabis industry as we know it is young and it's evolution has seen unexpected twists and turns in this past century alone. There is a lot of misinformation that has permeated the industry for numerous reasons including the necessity caused by prohibition. With that said, especially with Cannabis' potential to impact and revolutionize the medical paradigm, it is becoming increasingly scientifically inaccurate and even medically irresponsible to rely on folklore, urban myths, legends, and what your homie told you about his 'dro' or outdoor.

A good example of this and the major topic of discussion in this section is the concept of Indica, Sativa, and Ruderalis - these are the original scientific classifications of cannabis strains as we currently know it and unfortunately for the layperson, scientists, horticulturists, and medical professionals are now seeing that the old way of looking at strains no longer holds for the more than 6000+ strains that have been bred and circulated throughout the world.

In discussing how any cannabis strain is going to affect you; it is more accurate to look at the cannabinoid and terpenoid production of the genetics of the plant - not if it is Indica or Sativa.

The Old and Current way of Thinking - Indica Vs Sativa





Note that these images are wrong.

It is indeed helpful and useful to use this classification in order to provide a simplified way of presenting the different strains of cannabis to someone new to their medicine. The “Indica Sativa Classification” is also powerful in introducing the concept of the various psychoactive experiences you have when consuming cannabis.

However, the problem arises when you are looking at cannabis strains and are trying to be more accurate about what exact chemical constituents are contained in the plant - the **Cannabinoids**, **Terpenoids**, and **Flavonoids** and their synergistic interactions are what really dictate the medical benefits and the kind of psychoactive experience you are going to be having. **Contrary to popular belief, Indica, Sativa, and Ruderalis has little to do with Cannabinoid and Terpenoid production, and we are also finding that most of the strains that we know of as Indica and Sativa are actually genomically incorrect.**

It is very important to the medical and scientific communities to know what is actually in the plant versus what folklore and myth say about strains.

6000+ Different Strains? What about Pure Indicas and Pure Sativas? Landraces? How did we get all these strains?




In understanding and explaining the lineage of strains and where they come from, you must look at the 2 following things: **Human Evolution** and **Geography**.

Anyone who has studied Darwin's theories of natural selection and evolution understands that all organisms have a transactional relation to the changing dynamics of its environment. This holds true for plants, trees, grass, the earth, our water, and our influences on all of these throughout the various parts of the planet.

Human Evolution

- **Seed and Strain Migration.**
- **Different Cultivation Methods.**
- **Breeding and Phenotyping.**
- **Folklore**

Geography

- **Different environments cause plants to produce different terpenes.**
- **Altitude, temperatures, fertility of the earth has an impact on plant structure.**
- **Natural breeding and crossing - natural selection.**

Landrace Strains vs New Hybrids

Most of the hybrids and crosses we have today originated from Landrace strains - these are strains that have adapted to the natural environment of its geographical location. The progenation of the thousands of different strains resulted in large part from smugglers, soldiers in various parts of the world, and cultivators over the past decades taking seeds from their original location and either growing them out in a different environment, crossing them with another strain for genetic stability, or for personal

experimentation. Over the past 20 years, with the evolution of the industry and how it is becoming more accepted and mainstream; you now have professional horticulturists and cultivators crossing strains nearly every day!!!

Concise List of Landrace Strains:

Afghanistan/Pakistan
- Hindu Kush
- Afghani

Jamaica
- Lamb's Bread

Mexico
- Acapulco Gold

Africa
- Durban Poison
- Malawi

Central America
- Panama Red

Asia
- Thai Stick

North America
- Skunk

OG Kush, Cookies, Purps?

These terms refer to names that have been given to specific crosses and families of strains.

OG Kush used to refer to strains of cannabis that were grown by the ocean, giving it the monicker "Ocean Grown" or OG. Nowadays, many OGs like True OG, SFV OG Kush, Fire OG, Skywalker OG, Tahoe OG, refer to strains that grow viny and stretchy, but maintain the classic "Kush" smell that Afghanis and certain Kush varieties produce. Nugs and colas are typically smaller than "traditional sativa" varieties like Trainwreck or Diesel, but are more dense, packed, hard, and covered in frost.

Cookies refers to strains that have been bred with the Girl Scout Cookies base - Durban Poison x Cherry Pie x OG Kush. There are many varieties of cookies including **Sherbet, Candyland, Animal Cookies, Purple Cookies, Platinum Cookies** and so on. They also typically grow stretchy and viny, but with smaller and denser nugs than OG. The aroma of cookies is oftentimes "bready, sweet, and floral,"

Purps simply refers to purple strains. There a numerous purple crosses ranging from Purple Haze to Purple Kush to Purple Trainwreck to Grand Daddy Purple. These strains mostly contain large amounts of a compound known as Linalool which is produced in Lilacs and possesses sedative but uplifting effects.

Now it is important to remember that new crosses and strains are being produced every day, it is hoped that this section has given you a better understanding of Cannabis strains, their history and where they came from, and with how to approach the subject as both a grower and medical patient!

An excellent interview concerning this discussion by Dr Ethan B Russo can be found below:

Cannabis and Cannabinoid Research: The Cannabis sativa Versus Cannabis indica Debate: An Interview with Ethan Russo, MD

The Endocannabinoid System (ECS)

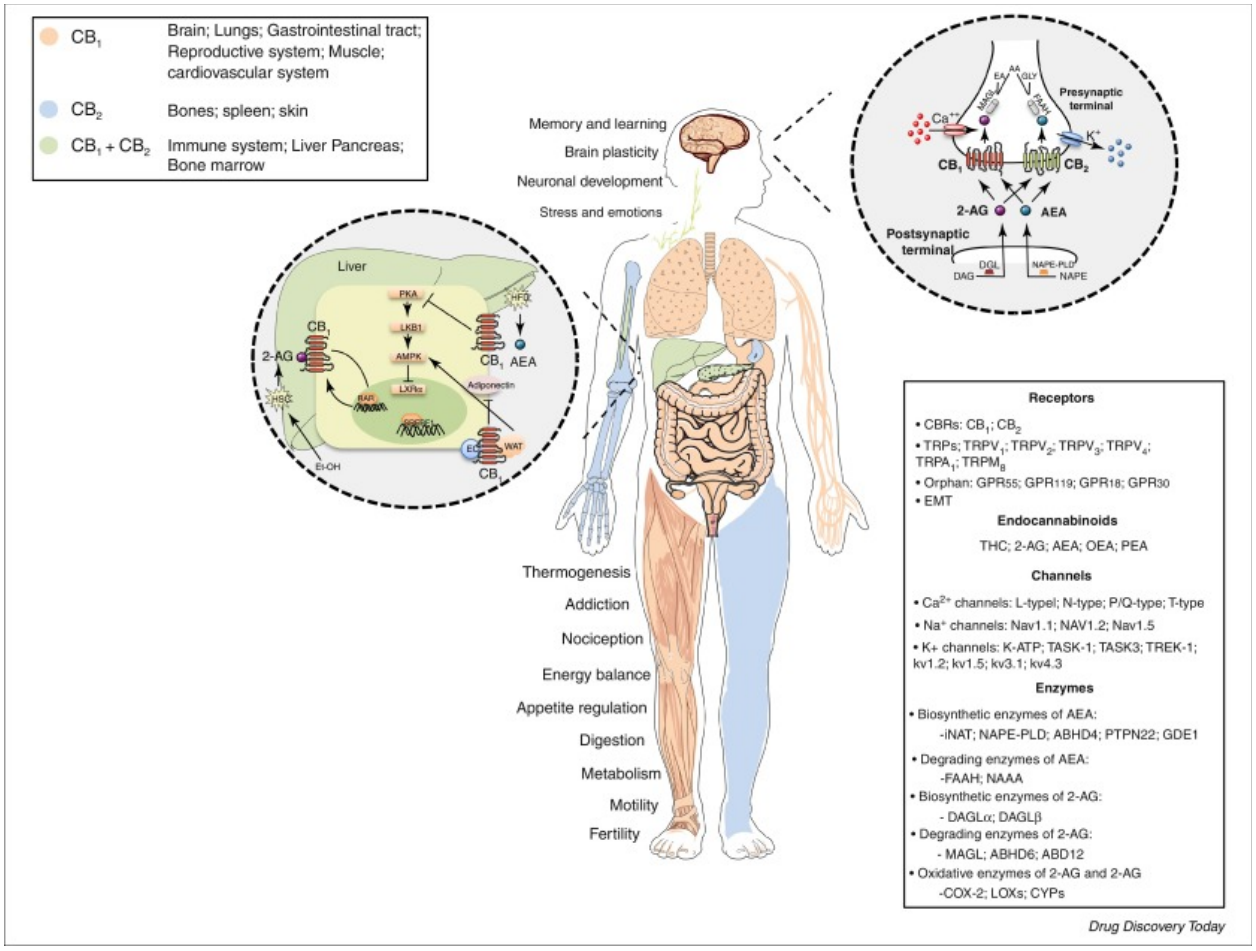


Image borrowed from the scientific article, "Targeting the endocannabinoid system: future therapeutic strategies," by Oier Aizpurua-Olaizola et al., published in Drug Discovery Today and Science Direct.

The Endocannabinoid System (ECS) represents a fascinating new field in the realm of biology and physiology. Although it was only discovered in the early 1990s, and limited research and scientific efforts into it's mapping and study are desiring more worldwide attention, it is nevertheless a scientific and medical wonder for several blaring reasons:

1) Scientists and doctors are now discovering that this system and its set of receptors alongside the compounds it produces, are actually bigger than our own immune system - in fact the immune system is encompassed within the ECS!
2) In observing the above chart, the ECS is amazingly largely involved with managing the following functions within our bodies: Memory and Learning; Brain Plasticity; Neuronal Development, Stress and Emotions, Thermogenesis, Addiction, Nociception, Energy Balance, Appetite Regulation, Digestion, Metabolism, Motility, and Fertility.
3) Scientists and doctors are also now discovering that particular deficiencies within this system could be related to a large number of ailments, diseases, and their respective symptoms. Conversely, upregulating and caring for this system can actually help to correct several difficult to treat sickness.

So what is the Endocannabinoid System?

This amazing and complex system is comprised of several components within your body. Involved are a set of receptors, classified as **CB1 receptors** (which are located throughout your Brain, Lungs, Gastrointestinal tract, your Reproductive system, your Muscles, and your Cardiovascular system, as well as the respective cells themselves contained in each of these), and **CB2 receptors** (which are located in your Bones, Spleen, and throughout the surface of your skin, and consequently the respective cells found in each of these). Both CB1 and CB2 receptors can also be found throughout your Immune System, your Liver, Pancreas, within your Bone Marrow, and again all of the cells associated with these organs/systems. It is also exciting to know that this system has not been fully mapped, and that scientists theorize that a 3rd set of receptors, CB3 may exist. Sounds like a lot, but it's true.

Endogenous cannabinoid receptors are located throughout your entire body, and these receptors, when functioning normally, help to promote and maintain what is known as **homeostasis** - an optimally functioning natural system, that is disease free.

Endocannabinoids

Now, imagine, that within your body, you are constantly producing several special compounds, 2 of the major and most important ones being - **Anandamide (AEA)** and **2-Arachidonoylglycerol (2-AG).** These compounds, known as endocannabinoids bond to the above mentioned receptors and are the flowing fuel of keeping this system going. Note that these particular cannabinoids are called "endo" to signify that they are produced from within. Also note that the production of these compounds within your body can take a hit and be diminished due to a number of external reasons - physical and psychological stress, physical trauma, lack of proper diet and nutrition, lack of proper exercise and health maintenance are just a few of the possible causes that lead to a deficiency in these essential compounds. More on this will be covered shortly.

So, the Endocannabinoid System (ECS), by definition is represented by both the CB1 and CB2 receptors that have been mapped thus far, as well as the endocannabinoids that bind to them which are produced from within our own bodies.

Comparing Endocannabinoids to Phytocannabinoids

Now, here's the miraculous and really cool part - THC, CBD, and the other phytocannabinoids found in the cannabis plant (remember that phyto means plant), actually mimic the endocannabinoids perfectly, and interact with the ECS and it's complex set of receptors just like their "endo" counterparts AEA and 2-AG. More specifically, phytocannabinoids can be taken as a supplement in order to help upregulate this system in the case that our own bodies are not producing enough endocannabinoids to keep the ECS healthy and going.

This helps to explain why cannabis is actually so useful and effective at treating so many diseases and symptoms - the interactions that phytocannabinoids have with our own endocannabinoid system strongly indicate that they can help to correct issues related to Memory and Learning (potential for Alzheimer's and brain disorders); Brain Plasticity (also potential for Alzheimer's and brain disorders); Neuronal Development (again potential for Alzheimer's and brain disorders), Stress and Emotions (mood disorders such as PTSD), Thermogenesis (the body's ability to regulate its temperature potential for fever and a possible correlation to autoimmune diseases), Addiction (alcohol and opiate), Nociception (this relates to pain relief with strong potential for Fibromyalgia and other autoimmune diseases), Energy Balance (uplifting strains of cannabis can help with raising one's vitality), Appetite Regulation (munchies

for wastings syndrome, THCV for diet control), Digestion (helpful for sickness and nausea), Metabolism (munchies are great for eating disorders), Motility (refers to movement, which means this can significantly help in the realm of seizures and tremors associated with epilepsy and Parkinson's respectively), and Fertility (check out the documentary [LEAF] The Health Benefits of Juicing Cannabis which covers Dr. William Courtney and a case study patient who juiced cannabis to relieve her lupus; her doctors had stated that she would be infertile, but with her treatment and consumption of cannabis, she was later able to have a child). All of the previous mentioned bodily functions or categories are regulated by the ECS.

Clinical Endocannabinoid Deficiency (CED)

Whether or not you have even heard of the Endocannabinoid System, you may not find it hard to believe that there is a term for what happens when the ECS takes a hit and is unable to adequately produce enough endocannabinoids to modulate and run the very said system; you can compare it to a car running out of gas, or an athlete tiring out - in either example, they may or may not be able to keep going if they've exhausted themselves. Research within the past 20 years suggest that the ECS being unable to upregulate itself may correlate to several of the more difficult to tackle ailments and diseases such Multiple Sclerosis, Fibromyalgia, Parkinson's Disease, Alzheimer's, and even multiple forms of Cancer. This is not all inclusive, there are more benefits that could be had from the cannabis plant, and the next two chapters aim to illustrate how versatile cannabis can be as a medicine with its multiple forms of preparation and consumption, as well as how to actually utilize cannabis to treat a number of ailments and diseases. Last but not least, multiple studies covering this can be found at the end of the chapter.

With all of that said, this system can be safely and healthily upregulated with cannabinoid compounds from the cannabis plant - phytocannabinoids (cannabinoids produced within a plant) and they can simply be consumed to correct deficiencies within this system. Sounds overly simple, and perhaps too good to be true. Some of the many scientific studies covering ALL of what was encompassed in this chapter can be found towards the end of it. The door is obviously open for debate, and indeed it is encouraged. There is a serious need for the professionals of the medical and scientific worlds to become involved. Countless lives could be affected by the medical potential of cannabis - the world just needs to catch up with the science and studies surrounding this herb for several decades; in fact it's been a part of the world's history for thousands of years, the previous chapter covers this.

Understanding How Cannabinoids, Terpenoids, and even Flavonoids Possess Medical Potential:

Cannabis is a medicinal herb, plain and simple. We just have the science and technology to study and understand it better; and to make utilizing it as a medicine an evolved boon to the world. There is great need worldwide for science and medicine to revisit this plant that has been cultivated and utilized in numerous ways for several thousands of years.

The Side Effects of Cannabinoid Consumption

Cannabis IS NOT a harmless plant as some stoners and hippies would like to believe. While it is indeed a non-lethal medicine that will not kill a user, it does have significant side effects that, although not permanent, can and will negatively impair someone who is not prepared to handle the side effects of either smoking or eating too much THC and being overly "high."

This is also especially true for cannabis edibles, where **THC-Toxicity** can definitely occur even in experienced smokers. When an individual eats THC, the cannabinoid produces a metabolite within his/her body called 11-Hydroxy-THC. A person not used to this compound can and will experience severe nausea, disorientation, possible paranoia, and both physical and mental discomfort. This can last for several hours and can be severely debilitating to the point of ruining someone's day. This is not ideal for anyone and as such it should be stressed that caution and proper education with cannabis should be had before consuming it in any form.

From a medical perspective, avoidance of these side effects for any patient will be a significant goal when considering recommending cannabis to the individual. He/she should be educated about the very real side effects of cannabis and that low to moderate dosing of the medicine should be started and practiced with. This goes for edibles, pills, tinctures, vaping, and topicals where applicable. Last but not least, should a "THC" overdose occur, reminding the individual that they will not die and that the effects will pass goes a long way in calming that person down.

Below is a list of the possible side effects of cannabis and also potential ways to deal with some of them should they occur:

- Dry Mouth - Drink water
- Nausea - Take some CBD to counteract the effects of THC
- Vomiting - Expel what you can and drink water. Try taking CBD
- Dry or Red Eyes - Eye Drops
- Impaired Mental Function - Relax and listen to calming music. Drink water.
- Headache - Lie down, warm wet cloth on head, try taking CBD.
- Dizziness - Lie down and relax, try taking CBD.
- Panic Attacks - Sit down, drink water, talk to someone, try taking CBD.
- Severe Anxiety - Try taking CBD, drink water, find a quiet calm place.

**note that CBD may not always correct some of the side-effects of THC Toxicity.*

As some of the advice above implies, CBD can indeed work to counteract some of the impairing side effects of consuming too much THC. While consuming CBD will not guarantee to "fix" these side effects, the anti-anxiety and calming effects of CBD are actually significant enough in proper doses to help "balance" an individual's mental state - which can significantly help to correct some of the above list. An excellent article discussing this concept can be found on Leafly.com: Can CBD Undo the Anxious Side Effects of THC?

Remember to start with low doses of THC (2.5 - 5 mg at first) when eating cannabinoids; this may be in the form of capsules, pills, edibles, and even tinctures. When experimenting with CBD, a user can have less to worry from psychoactivity. Even still, the user should be aware of how much THC is in the medicine - on one hand, it is still possible to receive a psychoactive effect if there is a significant amount of THC in the medicine; on the other, even if it is a CBD dominant formulation of medicine, there should still be a small amount of THC mixed in for the medicine to be effective (see the section on the Entourage effect).

It used to be thought that cannabis was simply a dangerous drug that would kill your brain cells, make you lazy and unmotivated, and that its use could lead to harder drugs or bad decision making - the so called “gateway drug” theory. It is sad to say that none of these harmful side effects have any scientific basis whatsoever. In fact many of these false claims were made by racist driven propaganda, flat out lies from government officials, and even bunk sham experiments (as was the case with an experiment that Ronald Reagan famously quoted when saying, “new science shows that marijuana is the most dangerous drug as it can kill brain cells” - the particular experiment he was citing involved suffocating monkeys with cannabis smoke in a gas mask for several hours on end - suffocation was the cause of dead brain cells, not the cannabis smoke). In a later chapter where the history of the plant is discussed, you will learn more about the mind-blowing and shocking efforts to keep cannabis in prohibition - it’s been going on since the late 1930s despite being mass produced for thousands of years prior.

Nowadays, there is more a mixed bag of opinions worldwide regarding marijuana. It seems that at the time of this writing, a majority of Americans support the legalization of cannabis nationwide. Additionally, other countries are slowly but surely following suit - Jamaica, Canada, Uruguay, Mexico, Spain, Portugal just to name a few, and while not all countries fully support recreational legalization, it is becoming more and more widely known and accepted that the plant does indeed have legitimate medical use.

However, it really isn’t just sentiment that is changing public opinion regarding prohibition, a big contributing factor to a renaissance in this plant’s reputation is the very real and growing body of science and research surrounding cannabis as a medicine. It has definitely become an esoteric subject for better or worse however, as much of the laypersons even involved with the green movement have found it hard to keep up with many of the advances made into the field. Even more so, with such a fast paced world with so much going on, it’s doubtful even that many uninformed scientists, doctors, medical professionals, government officials, lawmakers, politicians, and more even know what the Endocannabinoid System (ECS) is and how it can literally change our understanding of medicine and physiology.

In all fairness, there is no shame or disrespect in not knowing about cannabinoids and terpenoids, the medical efficacy of each of these compounds, how the ECS is actually bigger than our own immune system, and that there are literally thousands of medical studies and even patents regarding how cannabis can actually be used as an effective medicine - one capable of killing cancer cells as well as a multitude of awesome properties. Mainstream media doesn’t necessarily cover these topics, and again, it has been a rapidly growing field and there is admittedly a lot of confusion resulting from the miseducation caused by prohibition - it is understandable that there would be conflicting opinions and views (albeit misinformed and incorrect). This chapter was aimed at catching you the reader up to the latest and most accurate understanding of cannabis as a medicine - there was a lot of sciency stuff covered but it is hoped that all of the covered topics in this chapter were explained in great enough detail so that even professionals could read this book and afterwards be able to correctly discuss, understand, and even apply the medical properties of the cannabis plant towards helping people throughout the world.

A discussion on peer reviewed medical studies pertaining to cannabis

One of the many mantras of prohibition is “that there simply isn’t enough scientific research into the effects of cannabis.” As you may have noticed by now or not, this isn’t an entirely accurate statement. In fact, this subsection of this chapter has been designated to help illustrate and discuss the several thousand medical studies that have been written on cannabis for several decades, and this obviously isn’t including any of the centuries old writings by Sir William O’Shaughnessy, the Ayurvedic medical teachings, the Greeks and how they utilized cannabis, or even the several thousand year old herbal document Pen Ts’ao Ching by the Chinese - although these were discussed and mentioned in the History of Cannabis chapter as they offer the initial historical ground and framework by which the plant’s use as medicine has been established. Instead, the studies presented are from esteemed peer reviewed scientific medical journals and experiments involving cannabis have been going on while the War on Drugs has been waged. While this statement may cause some disbelief, like all of the information contained in this book, you the reader are more than free and in fact encouraged to pull these studies up and review the information presented; we live in the awesome digital information age and it only takes seconds to cross verify facts with a simple internet search on one’s smartphone. Check out Google Scholar at scholar.google.com to find only peer reviewed scientific articles and enter searches for cannabis and whatever ailment you are looking to research. You will no doubt come across tens of thousands of results. This is the awesome digital era where scientific work from all over the world can be shared and expanded upon!

Below is a somewhat extensive list to this chapter’s references, it is also a comprehensive collection of research that I have compiled over the years that I wish to share with other interested researchers, scientists, and/or curious individuals. There is more obviously and the scope and amount of studies are growing every year! Enjoy and I hope that you find the research helpful and useful!

End of Chapter Addendum - References and Resources

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Chapter 4 - Cannabis Medicine: preparation, consumption, and utilization for symptom management.

Modern Medical Cannabis Products.

The Medicine


As is the case with the previous and coming chapters, it is important to provide a bit of a different perspective of marijuana than what you might initially be used to - moving past the concepts of reefer and mary jane, dro, homegrown, fire stash for you friends and squad, sweet sensimilla, purps by the pound, and all that loud - **what we have when we're instead looking at cannabis from a medical and scientific standpoint is an herbal plant remedy that contains a number of compounds and chemical constituents that act in therapeutic concert when consumed in either aerosol form (smoked/vaped), orally ingested (edibles/pills/tinctures), topically applied (cream/lotion/patch), and even with rectal insertion (suppository).** The medicinal compounds in question that come from the cannabis plant include: Cannabinoids, which are contained in the trichomes of the cannabis plant; Terpenoids, which are the oils that may also be inside the trichomes as well as cover the surface of the flowers and leaves; and Flavonoids, which are compounds that help determine the pigmentation of the plant, but that scientists are only now heavily researching and looking into. It is important to remember even when deconstructing cannabis into its different parts for study and classification purposes, that the entire plant itself is an amazing medicinal herb. While it is true that much of the potent medical compounds lie in the flowers, there are still practices that date back thousands of years where various parts of the plant are used for therapy, and that it should come of interest to some that the whole plant - the flowered buds, leaves, stalk, and even the roots are considered to be a potential superfood!

When it comes to actually discussing the medical potential of the plant, however, it is vital to restress that **cannabis is a multifaceted herbal plant remedy that can treat multiple symptoms across a multitude of ailments and diseases; however, it is not an outright cure, but rather a powerful and versatile treatment tool that has virtually zero lethality.**

Suffice it to say, these various compounds of therapeutic potential can be consumed directly from the plant, extracted and made into concentrates, and even processed in various culinary or chemistry methods to make an infinite variety of medicines which can be orally ingested - foods, tinctures, pills/capsules can easily be manufactured. Topicals, which contains extractions of these compounds and are often mixed and concocted with other herbal ingredients are also useful in a medical setting. Last but not least, suppositories provide a method of consumption and dosing for those who cannot ingest or inhale the medicine.

Flower and Plant Material

Various projects the author has worked on - Tahoe OG grown in High Tech Greenhouse (left, grown with jacketgeorge) ; Gorilla Glue #4 Indoor (right, LA Vision Project)

This section encompasses what is done with the full plant material. This includes the medicine-rich bud or flower, the usefulness of trim, and even what to do with the lesser used stems and roots.

Raw Cannabis

The raw cannabis plant's flowers, leaves, and stems may actually be picked fresh off the plant and be consumed. While trichomes can be found on the surface of the leaves, the flowers contain the highest concentration of these medicine rich crystals in a raw non-toxic acidic form.

What this means is that you can eat the plant (add it to a salad for example), or even juice the raw plant alongside other berries and fruit to receive certain medical effects possible with cannabis. When consuming the plant in the raw form, psychoactivity is vastly reduced. Even with the reduced psychoactivity, you will still be receiving the therapeutic effects from the raw cannabinoids and terpenoids. For example, THCA, the raw form of THC, still possesses the same anti-cancer, anti-inflammatory, and anti-spasmotic properties that THC does. The free documentary "**LEAF - The Health Benefits of Juicing Cannabis**" can be found on YouTube, and depicts Dr. William Courtney MD of Mendocino recommending juicing raw cannabis leaves to help manage a patient's lupus and medication side effects. There are indeed many medical uses for this plant, and this is just scratching the surface.

It is also important to remember that combining fruits and vegetables with raw cannabis while juicing only helps to further and potentiate the therapeutic effects of each compound involved - not just those of the cannabis plant! This makes for a wide variety of healthy blends that may benefit the health of patients!

Dried and Cured Flower



Properly Dried and Cured bud is easily the most recognizable form of marijuana that is consumed. Cannabis that is grown in a clean controlled environment, free of harmful pesticides and plant growth regulators (PGRs) that has been verified with a lab test is suitable for medical use (though unfortunately not all bud and flower is regulated as much as it should). This is the bud that you will see on the shelves of cannabis clubs and dispensaries, and there are a number of recognizable ways to smoke or vaporize these flowers - some high tech, some fairly low tech.

Smoked - joint, blunt, pipe, bong, or other creative ways.


Vietnam soldiers smoking marijuana

From an episode of "Strange Buds" on Youtube, "A Priest, a Rabbi, and an Atheist Smoke Weed Together."

The iconic image of smoking marijuana is recognizable throughout the world. Whether it's of Rastafarians blowing smoke clouds; Soldiers in Vietnam 'shotgunning;' Your average 20-30 something year old wook hitting joint crosses, tulip rolls, and blunts; or that grandpa in a wheelchair hitting his bong; the practice of smoking cannabis has been around for thousands of years for both medical and recreational purposes.

Essentially, ground up, shredded, or even hand crushed cannabis flower is put into a smoking apparatus and these can range from paper rolls, pipes, bongs, blunts (cigars that are hollowed out and filled with ground up herb instead), to even apples, bread conchitas, and more. The act of burning cannabis pyrolysis and decarboxylates the cannabinoids and terpenoids contained in the flower, to which they are inhaled and processed by the user's lungs, which then activates CB1 receptors, especially in the brain. *Note that 30-40% of these cannabinoid and terpenoid compounds are lost due to the combustion and burning process. Also note that medical professionals do not recommend mixing cannabis with tobacco for health reasons*.

Vaporized - portable or tabletop

The famous Volcano Vaporizer

An assortment of various handheld vaporizers.

Vaporizing Dried and Cured flower is a little different than traditionally smoking marijuana. The primary difference is that while smoking involves touching a flame to the herb, which involves combustion; vaporizing involves heating the flower and medicine in an enclosed chamber at the right temperature so that considerably less of the chemical compounds in the plant are lost to combustion. Vaporizing is also less irritating to one's lungs, and it is the growing method of consumption recommended by health professionals if smoking cannabis is going to be a major form of therapy for the user.

There are many different vaporizers on the market, ranging from table top Volcano Vaporizers, to handheld devices that look like inhalers, pens, or even ipods, to low tech boxes of wood such as the magic flight launch box. With this method of consumption, the herb and flower is placed in the vaporizing apparatus, the heating chamber is heated to a low temperature which releases the cannabinoids and terpenoids into a vapor cloud (no flame or combustion is involved resulting in only 10-20% cannabinoid and terpenoid loss or even less) and these vapors are inhaled to which again activates CB1 receptors throughout your body and especially your brain.

Note that vaporization also includes CO2 cartridges and dabbing, but that those are covered in the concentrate section below.

Trim, Stems, and Roots


Even professional growers trim from time to time; we work hard and around the clock!

Although the bud and flowers are indeed the most desirable part of the plant for consumption or extracting, it is important to remember that the byproducts created by the production of cannabis flower are still viable from a medicinal sense.

Trim is going to be the next most valuable part of the plant. These leftover leaves will more than likely still have trichomes and terpenoids although in smaller concentrations than those found on the bud. This is useful for edible makers (cooking with actual bud can be really expensive) and concentrate makers (hash makers and blasters can turn this stuff into proverbial gold), or they can also be simply smoked (kind of like smoking bammer ditch weed…)

Stems and Roots have a much smaller niche demand but there are definitely those who believe In grounding up the stems and roots into a powder, making herbal remedies and concoctions, or even medicinal teas. There are indeed historical practices of boiling cannabis roots and using them in herbal medicines to be applied topically or ingested.

Last but not least, green minded growers can utilize harvested stems and roots in composts, mulches, and with re-fertilizing their soils.

Dosing

Dosing the actual bud is a little tricky but easily explained. When cannabis flower is tested in a licensed lab, scientists can identify what the exact chemical compounds and constituents are in that bud. Most certified labs will report back verifiable amounts of cannabinoids, terpenoids, and flavonoids in percentages per gram. To simplify things, most clubs and cannabis products will only give the most prevalent compounds. Eg. You will sometimes see strains listed as follows: **Sour Diesel (S)** 22.3% THCA, 0.3% CBDA, .43% CBNA. or **Blue Dream (I/S)** 25.3% THCA, 0.23% CBDA, .43% CBNA.

What these 2 examples mean is this: for every gram of mass of that particular Sour Diesel Sample, 22.3% of that matter is THCA, 0.3% of that matter is CBDA, and .43% of it is CBNA. Using the other example, 1 Gram of Blue Dream breaks down to 25.3% being THCA, .23% of it being CBDA, and .43% of that gram being CBNA. The rest of the gram matter, the other percentages not listed will include other cannabinoids, terpenoids, flavonoids, and most abundantly, plant matter. *Note that these examples do not really represent the profiles of these strains.*

How do we convert that into milligrams of cannabinoids consumed?

Understanding the percentages above, the way to convert them into milligrams is easier and simpler than you might think. **Simply move the decimal point over, remove the percent, and replace with milligrams**.

Using the same examples above - that gram of Sour Diesel contains 223 mg of THCA, 3 mg of CBDA, and 4.3 mg of CBNA. The Blue Dream gram contains 253 mg of THCA, 2.3 mg of CBDA, and 4.3 mg of CBNA. *Again, note that these examples do not really represent the profiles of these strains.*

Remember that the initial compounds prior to being heated will more than likely come in an acidic form. **Depending on how you heat the flower for the intention of inhalation, which will decarboxylate the flower and result in the active compounds such as THC, you will lose 30-40% of those cannabinoids to combustion and smoking, while vaporizing only loses 10-20%, sometimes less**.

If this is your first time studying and understanding dosing actual flower buds, it is the author's hope that these examples were made clear enough and that they make sense in your head. Plus it is hoped that this blows your mind so that you can now explain how cannabis percentages work with much enthusiasm.

Medical Application of Cannabis Flower

Contrary to what many may believe, **smoking or vaping cannabis DOES INDEED HAVE MEDICAL VALUE**! This has been evident with adult users of cannabis who have Epilepsy, MS, Fibromyalgia, and more. In fact this is perhaps the fastest method of consuming cannabis in order to feel the fastest relief, next to concentrate smoking or dabbing, (intravenous application would be the only faster method of applying the medicine) and provides the fast acting therapy for the following:

- **Pain Symptoms: Ocular Pain from Glaucoma, Joint Pain, Muscle Pain, Nerve Pain**
- **Convulsions, Spasms, Full Blown Seizures, Parkinson's Tremors**
- **Depression, Mood Swings, Post Traumatic Stress Disorder (PTSD)**
- **Anxiety (note that some strains may increase or induce anxiety; taking too much THC for an inexperienced user can also lead to this)**
- **Headaches and Migraines**
- **Anorexia or lack of appetite due medications, chemo (THC is an appetite stimulant)**
- **Nausea**
- **Insomnia**
- **+potential for much more!**

Smoking cannabis does have its drawbacks. Carcinogenic tars are created when burning and smoking flower, but this is nowhere near the amount created in tobacco and cigarettes. Additionally, smoking and even vaping can lead to lung irritation in sensitive users - this may be a contributing reason that smoking cannabis is not preferred by medical professionals, and worse, is grossly misunderstood.

Also note that cannabis smokers do like to experiment with the various psychoactive experiences associated with the multitude of available strains - these varied and tuned “experiences” can help nuanced problems as well. Many users who suffer from ADD or ADHD report that smoking certain strains such as Jack Herer help with focus and motivation; other lethargic users will look to energetic strains to help energize them for the day, even motivate some users with weight problems to work out or be more physically active. Conversely, many insomniacs swear by the lethargic effects of “heavy” strains such as Purples, Kushes, and Cookies just to name a few.

This is just scratching the surface as there are more possibilities that are only expanded upon by the awesome variety provided by cannabis and it’s many strains; suffice it to say, **smoking cannabis, despite being associated with the recreational side of marijuana, is definitely a viable way of medically consuming cannabis which provides multifaceted health benefits and relief from numerous severe symptoms.**

Recommended Flower Dosing

Keep in mind that every individual’s physiology and tolerance is going to be different, and there are a multitude of variables that may affect each user’s experience with cannabis, whether psychoactive or not. **Self Titration** is a method of an individual experimenting with a medicine with trial and error in order to figure out one’s proper dose. Unfortunately, without double blind clinical trials, there are no clinical recommendations for dosing that can be offered. The recommended doses listed below are based off of the experience from industry professionals including but not limited to Growers, Budtenders, Patients, and even Doctors. Note that onset of effects (psychoactive or not) from smoking/vaporizing cannabis occurs very quickly - usually within 5-10 seconds of inhalation. Duration of smoked cannabis is typically a 1-3 hours.

- **New User: 1-2 Puffs from a Joint, Bong, or Vaporizer.**
- **Intermediate User: Half a Joint or Half a “Bowl”. ¼ g to ½ g of flower.**
- **Experienced or Heavy Recreational Users will typically have varied doses. Some might already be high, not even joking.**

Concentrates



Concentrates are growing in popularity and represent the “next level of cannabis consumption.” A common industry comparison that may or may not be in good taste is that while smoking a joint or even hitting a bong rip is like drinking a heavy beer; dabbing is likened to taking multiple shots of THC. The more scientific and accurate way to illustrate this is that while smoking flower provides the user with an average of 20-30% THC; **smoking and especially dabbing concentrates has the user consuming THC contents ranging between 30% to even 90%+ THC! That’s effectively more than triple the potency in some cases!**

What is a Concentrate?

Simply put, a concentrate is an extraction of the trichomes and terpenoids separated from the cannabis plant material. It is a material concentration of the medicine essentially and they can be smoked/vaped outright or made into edible or topical products. It is important to note that the quality of the starting material must be good and especially clean, as this will drastically affect the quality of the concentrates. Impurities, pesticides, mold, and their harm can possibly be magnified in concentrates. With that said, there are various methods and techniques of extraction and a resulting variety of different textures and consistencies, each of which is explained below.

Dry Hash Extractions - Old School Drum Extraction, Kief, Charas, Finger Hash


The act of making Hashish has been around for thousands of years and is the original way of making “Concentrated” Cannabis. Originally popularized in ancient cultures and countries in the middle east - Egypt, Lebanon, Morocco, Afghanistan, Africa, and more - the old school method of manufacturing hash involved packing harvested cannabis plants into drums, to which they would be covered with silk screens and then beaten and banged like a drum. Trichomes and powdery kief would be filtered through the screen during the banging, collected and then cured for consumption. Although this may sound crude, this method does produce good medicine that can be outright smoked, pressed out, or utilized in making edibles, tinctures, and topicals.

It is also important to mention that “Charas” or scissor/finger hash, or even the kief from the bottom of a flower grinder is also considered a concentrate in the same vein as dry hash extraction.

Water Extraction - Bubble Hash

Bubble Hash Bags - the modern method of making hash.

There is a more modern way to make hashish, and this involves a little more technique than simply banging on drums filled with cannabis. Utilizing bags with micron (µ) specific screens at the bottom of each bag, they are placed in tandem and in order from smallest micron to largest in a bucket. Cannabis plant material is placed into the top most bag, which is then combined with ice and water. This mixture is then agitated by hand stirring or even with a drill in order to force the valuable trichomes and terpenes towards the bottom of each bag and into the bucket. Large scale, more high tech runs can utilize an actual washer! The resulting material is then laid out, dried, sometimes sifted and microplaned, and cured. Multiple “wash runs” are possible, and most hash makers are pretty thorough about maximizing their yields and resulting materials from each wash.

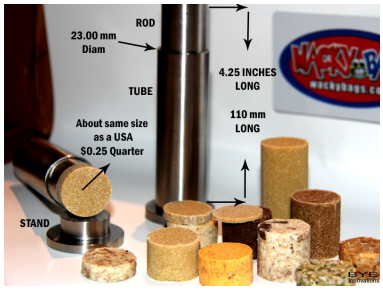
As with dry hash, the manufactured product can be smoked or vaped outright, pressed out, or utilized to make edibles, topicals, and even Rosin (see below).

Grades - Burner, Bubble, Full Melt, Moonshine

There are indeed different textures and what connoisseurs call “grades” of hash. Oftentimes, they are graded by 1-4 star ratings, but the industry has seen several other ways of judging quality such as calling certain grades Bubble, Full Bubble, Full Melt, Moonshine - these are all industry standards subject to change at any time unfortunately.

Suffice it to say, this variety is dependent on many factors including but not limited to: quality of starting flower material; the micron size of each granular group of hash (each bag in the bubble system produces different grades); how cold the room is where the hash is being processed and stored; whether or not the hash maker is employing fine sifting techniques during production; what the final consistency comes out as; and how the concentrate inevitably smokes - how well it melts and how much ash is left. The exact particulars of making different grades of hash are beyond the scope of this book, but it is important to note the differences and recognize them for both medical and recreational consumption.

Pressed Hash



Hash makers will typically like to have their hash pressed out for ease of storage or for distribution. Additionally, some connoisseurs like to take loose hash, press it out themselves, and dab it!

Chemical Solvent Extraction

Chemical Solvent Concentrates include concentrates that were manufactured utilizing a solvent such as Butane or Carbon Dioxide (CO2) in order to separate trichomes and terpenoids from the plant, so that they may be reprocessed into a smaller more concentrated substance. The resulting consistencies of product are varied and are dependent on a number of factors including but not limited to: quality and freshness of starting flower material, type of solvent used, what type of extraction method is being used, type of purging method use, what temperatures were used throughout the process, what type of machine, vacuum, or oven were used, and whether the concentrate maker employs techniques like whipping or stirring during the purging process. Most concentrates are made with the intention of being vaporized or “dabbed” but they may also be smoked (mixed in with a joint or bowl), and used in making edibles, topicals and more.

BHO

Butane Hash Oil or BHO for short is one of the most common form of concentrates recognized by cannabis connoisseurs. The primary solvent used for extraction is Butane which is used to “blast” and collect the trichomes and terpenoids into an oil, which is then purged using a combination of heat and vacuum extraction to “purge” out the butane solvent. What is left when properly purged, is a product that is free of chemicals (0 PPM or 0 Parts Per Million). BHO can come in many consistencies, is most often vaporized/dabbed but can also be used for edible and topical creation. The most common ones are listed below:

- **Wax** - this consistency is similar to candle wax in that it is thick and sticky, but easily melts.
- **Crumble/Honeycomb** - this consistency is dry, loose, and crumbles into smaller pieces easily. Larger samples often have small holes in them and resemble a “honeycomb.”
- **Budder** - this is more viscous, sticky, and resembles a gooey butter.
- **Shatter/Glass** - this consistency looks similar to hard candy and cracks when handled.
- **Sap** - this is a sticky texture and consistency that resembles honey or molasses.
- **Taffy** - this is slightly firmer than sap but not as brittle or as hard like shatter; it almost resembles taffy candy.

Clean BHO is a major topic in the industry, and unfortunately, these kinds of concentrates carry some sort of infamy - there are countless stories of amateur concentrate makers manufacturing bad product that taste like sulfur and pesticides (improperly purged material) and wanna be chemists with little real world knowledge blowing themselves and their houses up. As such, it is an unfortunate industry responsibility to only manufacture and source clean medicine in a properly controlled system and environment. Regardless, BHO still remains and is sometimes the preferred mode of consumption for many users.

CO2

Carbon dioxide vapor cartridges have hit the cannabis industry hard and are only growing in popularity. There are countless brand manufacturers and each have their own spin, take, design, flavors, and latest and greatest tech behind both their extraction and functionality of the actual pen/battery.

Essentially, the concentrate itself is a liquid made of trichomes and terpenoids extracted from the cannabis plant with Carbon Dioxide supercritical fluid extraction technology and then mixed with vaporizable liquids that may or may not be infused with flavoring.

CO2 cartridges offer a vaporizable alternative to smoking cannabis that is fairly cost effective. Users enjoy how discreet they can be - instead of leaving behind smoke clouds and odors that may be abrasive to other non-smokers, vapor cartridges leave small and fast dissipating vapers that carry very little smell.

CO2 extraction and cartridges are not without their downsides, however, and the quality between the various CO2 manufacturers can be vast depending on the quality of the machines being used and any other post extraction techniques such as winterization or additional distillation.

With that said, the market and CO2 carts are evolving, and like smoking, they provide a viable way of medicating with cannabis if smoking or vaping is intended for therapeutic use.

Other Chemical Solvents - Propane, Hexane, Fractional Distillation, +More

There are indeed other solvents that can be used in the chemical extraction of cannabis. “Extract Artists” have been known to experiment with various methods and techs including but not limited to utilizing Propane, Hexane, and more, and with using esoteric chemistry techniques such as Fractional Distillation. These processes are out of the scope of this book/journal, but it is important to know that other techniques of creating cannabis extracts and concentrates do exist and that those crafts are also growing and evolving.

Rosin

Pressing or “Squishing” out Rosin is easy enough to do with a hair straightener. No solvents needed!

While Cannabis Rosin may be new to the market, the actual concept of Rosin is not. Musicians, especially those who play string instruments such as violins or cellos, are familiar with the hard but brittle clumps of solidified oil that helps with the maintenance and treating of their bows strings. This rosin is essentially comprised of hardened oil and sap from trees and this is very similar to Cannabis Rosin.

Cannabis Rosin is the heated and hardened collection of cannabinoids and terpenoid oils created by pressure and heat. As in the above image, this can even be done with something as crude as a hair straightener. Most industrial Cannabis Rosin producers utilize multi-ton jack presses in order to process large amounts. Essentially, raw flower or even hash/kief, is placed in between a parchment paper or screen, to which they are pressed and smashed together utilizing low heat temperatures, and extreme pressure - sometimes several tons of weight pressure.

The resulting amberish oil can be collected and dabbed outright, which is the most common form of consumption, but they may also be cured to achieve a better texture, as well as used in creating edibles and topicals.

“NugRun”; “Fresh Frozen”; “Live Resin”

These are terms often used to describe high quality cannabis wax or rosin. **Nug Run** refers to concentrates processed with actual bud instead of trim. **Fresh Frozen** refers to concentrates processed with bud that is immediately frozen after a harvest in order to preserve as much terpenoids as possible. **Live Resin** refers to concentrates made immediately after a flower’s harvest in order to produce the freshest possible material. Connoisseurs prefer any of the above as they maintain the closest representation of taste in relation to the original flower. It is easy to argue that these taste the best when it comes to consuming concentrates.

Dosing

Dosing concentrates actually follows the same conventions as flower does, although it is important to remember that these extracts come packed with much higher percentages and doses than those traditionally found in flower. Here are a couple of examples to illustrate this: A gram of Cannatonic Bubble Hash contains 44.3% CBD,17.4% THC, 10.2% CBN and a gram of Girl Scout Cookies Live Resin Wax contains 88.4% THC, 4.3% CBD, and 9.8% CBN.

The resulting milligram contents of these gram examples are as follows: The Cannatonic Bubble Hash gram contains 443 mg of CBD, 174 mg of THC, and 102 mg of CBN; while the Girl Scout Cookies Live Resin Wax gram contains 884 mg of THC, 43 mg of CBD, and 98 mg of CBN.

Although concentrates may indeed be smoked, which hash often is, the growing method of consumption for these concentrates is vaporizing. Like smoking flower, 30-40% of the medicinal content is lost to combustion, while vaporizing nets a smaller loss at 10-20%, sometimes even less when done at proper “heady” low temperatures (low temp dabbing).

CO2 Cartridge dosing varies from manufacturer to manufacturer and the contents and sizes of each cartridge will indeed differ from product to product. Professional and established companies will, however, have these products lab tested and have part of their lab results shown on their packaging. Most will have a recommended amount of puffs listed so that users can have an idea of how much to take.

Medical Application of Concentrates

Like smoking, consumption of cannabis concentrates is oftentimes ignorantly misunderstood, despite the fact that there are indeed medical and therapeutic benefits to vaping and dabbing.

Consumption of concentrates may actually provide near instantaneous relief to symptoms in users who need much heavier doses and relief than those provided by smoking flower, as well as faster relief than what edibles and even tinctures can provide. **Recommending doses can be tricky with the high variances in potency possible with the various extracts, but soldiers with severe PTSD, patients fresh out of surgery, individuals with a long history of severe back or joint pain, and even Fibromyalgia and Multiple Sclerosis patients - many have reported positive feedback with consuming concentrates ranging from smoking hash, to discreetly using CO2 carts during the day, to outright dabbing after going through a severe pain spike.** As with smoking cannabis, self titration is the key with finding one's dose and frequency of medication. The versatility of concentrates cannot be understated and some of the many medical applications of these include but are not limited to:

- **Severe Pain Symptoms: Post surgery, Phantom Limb Syndrome,**
- **Convulsions, Spasms, Grand Mal Seizures, Parkinson's Tremors**
- **Severe Depression**
- **Headaches and Migraines (Cluster Headaches)**
- **Anorexia or lack of appetite due wastings syndrome, medication, or chemo.**
- **Severe and Chronic Insomnia**
- **Anxiety and Panic attacks (CBD and heavier strains are recommended for this)**
- **Nausea**

Note that the onset of smoking/vaping concentrates is very similar to smoking flower - effects typically occur within 5-10 seconds of inhalation. Duration of effects typically lasts 1-4 hours.

Due to the many varied types of concentrates out there, it is difficult to provide accurate recommendations for new users; moderation is best, and start small when trying a new product.

Edibles


Edibles encompass and represent an infinite variety of possibilities when it comes to manufacturing and consuming cannabis. You can literally infuse any type of food, beverage, pill, tincture, and food ingredient with THC, CBD, or any of the cannabinoids and terpenoids contained in the cannabis plant. This versatility allows for medical edible makers to craft and cook medicines that may actually fit into more specific dietary needs.

Consuming edibles can also be a very very potent form of therapy. Oral ingestion of THC and the other cannabinoids leads to activation of both CB1 and CB2 endocannabinoid receptors in one's body, versus inhalation which activates only CB1 and a small amount of CB2 receptors. Additionally, ingesting THC and the other cannabinoids produces effects different and more magnified than if you were simply to smoke the plant - this is especially evident with THC; the psychoactive experience of THC when ingested are indeed different than those found in joint hits, bong rips, and dabs.

From a therapeutic standpoint however, activation of the CB2 receptors made possible by ingesting cannabinoids opens up a plethora of treatments for a wide array of debilitating symptoms and diseases.

The concept of **Clinical Endocannabinoid Deficiency (CED)** was covered in the previous chapter, and as stated there, one can indeed offset **CED** significantly by orally consuming cannabis.

Cannabis Edibles, are however, a double edge sword. It is very easy to overdose on THC found in edibles. Even experienced users can have difficulties with taking too much, and the resulting negative side effects of THC Toxicity include but are not limited to: Nausea, Disorientation, Anxiety, Vomiting, and severe Dysphoria which can last hours, sometimes even a few days in especially sensitive users. Edibles can totally ruin someone's day or even turn them away from cannabis entirely. It is important to stress responsibility and proper dosing when consuming, discussing, and recommending edibles.

This is due to the fact that when THC is orally ingested, a new compound known as **11-Hydroxy-THC** is synthesized in the consumer's liver. This compound does possess inherent therapeutic properties, but know that it can cause the above side effects even with heavy cannabis smokers - simply put, if your body has not developed a tolerance to edibles, and you are not used to having this compound in your body, no matter how many years you have been smoking or even dabbing, this compound can and will mess you up!

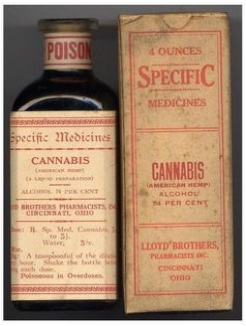
Note that at the very least, despite these side effects, **YOU STILL CANNOT DIE FROM AN OVERDOSE OF CANNABINOIDS.**

Below, we will cover some of the various classes of edibles available on the market for both medical and recreational users.

Capsules and Pills


Capsule and Pill forms of cannabis are easy to manufacture and they come in varying doses, with different ratios of active cannabinoids, and with the medicine suspended in various emulsifiers contained in the capsule such as coconut oil, olive oil, grapeseed oil, and more in order to meet various dietary restrictions. Companies can even formulate them in an “AM/PM” fashion, or have CBD dominant ratios to help manage anxiety during the daytime, or even mixes to help with focus - there are certainly many possibilities and with time, more finely tuned medicines could be produced! These kind of edibles also offer medical patients a familiar form of dosing no different from other pharmaceutical pills. Each pill or capsule comes with a specified milligram content of each cannabinoid and this makes it easy for consumers to journal and adjust their dose accordingly.

Tinctures

Tinctures have made a resurgence in the cannabis industry and their usefulness is a boon to many a patient. Tinctures are a liquid suspension of the cannabinoids and terpenoids contained in the plant, and these compounds are likely decarboxylated and activated. They typically come in small milliliter bottles and with a squeezable dosing pipette, but may also come in a spray form. Tinctures are meant to be consumed **sublingually - that is under the tongue.** This mode of consumption makes for a faster onset of effects (typically within 10-15 minutes) than traditionally eating or drinking a cannabis edible (onset of effects from ingestion is typically 30 minutes to a little more than an hour). The actual overall effects of tinctures are the same as other edibles, but they come with the added benefit of providing faster relief and ease of dosing than what you might encounter with an edible cookie, cake, or drink. Additionally, tinctures can also be used as a topical!

Premade Candies, Confectionery, Drinks, Snacks, Ingredients


Again, cannabis can be infused into literally anything edible, and oftentimes they are! Edible makers creatively manufacture many kinds of candies, confections, snacks, drinks, and even other cookable ingredients so that users can concoct something of their own! Edible dosing has infinite possibilities and these items come in a large variety. As such it is sometimes hard to recommend specific dosing, but most responsible edible companies will lab test and list their contents and potency on their packaging.

Full Extract Oil (Rick Simpsons Oil or RSO)

Full Extract Oil or Rick Simpson's Oil also known as RSO (named after the Nova-Scotian Farmer who rediscovered the process for making hemp oil) deserves special mention and it's own section. There is a lot of lore, myth, even hype, and information on the internet regarding this effective medicine - there are multiple documentaries on youtube depicting it. With that said, there are indeed numerous case studies and success stories involving Rick Simpson's oil, a crude and simple but effective extraction of the cannabis plant's trichomes and cannabinoids which has been used to help with many severe diseases such as Epilepsy, MS, Alzheimer's, ALS, HIV/AIDS, Obesity, and even with combating and killing Cancer cells. This is just a small list of diseases and ailments that users report back as being manageable with Full Extract Oil.

These oils are made using a grain alcohol to extract the medicine. The alcohol is then boiled off leaving a thick tarish oil (unfortunately many of the valuable terpenoids are also lost in the creation of the oil, but it is still an effective way to consume THC and even CBD). The oil is typically very potent when made. It is then consumed like an edible or used topically, but in small amounts - the size of a grain of rice. This is done on a daily schedule, and there are varying reports on what doses people used to treat their individual symptoms. Virtually all studies done on this oil are unfortunately isolated case studies; we still lack the necessary double blind clinical trials needed in order to deduce and test varying doses for varying ailments and diseases. More information about Rick Simpson can be found on pheonixtears.ca/ and the documentary "Run From the Cure". Credit should be given here as this documentary helped to spark the conversation of cannabis as a cancer cure in the public eye. Unfortunately the medical and scientific community does not currently recognize these oils as official medications for the treatment of cancer.

It is important to stress that these oils are very concentrated and contain large amounts of THC and CBD. It must be stressed that dosing with these should be done in small increments as it will be easy to overdose and experience THC toxicity on just a small amount of oil. With that said, users who can develop a tolerance, or patients who are in a terminal situation can find near miraculous results with this product - many times finding quality of life changing benefits!

Making Edibles From Scratch

Making cannabis butter the old school way by mixing ground up cannabis with melted butter and straining it with a cheesecloth.

Prior to the rise of legalization and before the establishment of legal edible companies, throughout prohibition many home growers, recreational cannabis fanatics, and even resourceful medical patients would make their own edibles. Consumers typically made their own butters and chocolates by cooking plant matter with melted butter or chocolate, and then straining the resulting material with a cheesecloth. Other methods of making edibles are varied and one includes decarboxylating hash or concentrates in an oven for a short amount of time and then directly adding in the decarbed material to a recipe.

Homemade edibles can be a little hard to dose without a lab test, but there are mathematical methods of getting a ballpark estimate of what might be contained in any freshly or handmade edible. As with all edibles, caution and responsibility with their consumption must be stressed!

A Few Nuances to Familiarize Yourself With Making Edibles:

Decarboxylation - 30 minutes at 215°F or 15 minutes at 230°F. These temperatures represent the proper “cooking” time for decarboxylating cannabinoids and making THCA into the active Delta 9 THC.

Trim vs Concentrate - Edible makers will typically use either of these in edible creation. Trim is flatout cheaper than purchasing bulk bud, and Concentrates can be used in significantly smaller amounts to achieve higher doses and more potent products.

Medical Application of Edibles and Dosing

Many patients who opt to use cannabis are turned off by the idea of smoking, and many first time medical users of cannabis nowadays prefer to consume cannabis as a pill, tincture, or edible. The onset of effects may be slower, but much longer lasting. With that said, there is indeed a wealth of benefit that is possible with consuming edibles from a medical standpoint, but it is also important to remember that there are very real side effects when consuming too much.

As was mentioned previously, oral consumption of cannabis activates more receptors within your Endocannabinoid System, and the potential therapies and possible ailments to treat are vast. With our more modern understanding of cannabinoids, the ECS, and how they work, medical professionals and medical patients are heavily involved with tackling some of the following and much much more:

- **Killing Cancer Cells and managing cancer chemotherapy and radiation therapy.**
- **Reducing Opiate and or Alcohol Abuse**
- **Near eliminating seizures in epileptics**
- **Managing severe, chronic, and or neuropathic pain**
- **Managing countless diseases and ailments and their respective symptoms ranging from IBS, Crohn's, HIV/AIDS, ALS, Fibromyalgia, Multiple Sclerosis, Alzheimer's, Parkinson's, PTSD, Dementia, Lethargy, Insomnia, Viral and Bacterial Infections, and many more.**

When ingesting cannabis, users can expect the onset of effects to occur anywhere between 30 minutes to an hour and a half (tinctures being the exception as they have an onset of 10-20 minutes when administered under the tongue), with the duration of the medicine lasting anywhere from 4 - 12 hours depending on the amount of cannabinoids consumed and the individual's tolerance. If considerable time has past (2 hours) and no effects from the cannabis is felt, the user may increase the dose, though small incrementations are recommended. It is important to start with small doses, and the following recommendations are based off of the opinions of experienced industry professionals, doctors, and patients:

- **New User: 2.5 mg - 5 mg of THC**
- **Intermediate User: 10 mg - 30 mg THC**
- **Experienced User/Patient In Need of High Dose: 30+mg of THC**
  Increase and self-titrate over several days to determine which is tolerable.
- **Patient with a terminal ailment or cancer: 5-20 mg of THC and/or CBD per kg of the patient's body weight. (This dose was borrowed from the US Patent Filing: Phytocannabinoids in the Treatment of Cancer. Note that this patent actually experimented with doses of 1, 10, and 100 mg of THC per kg of body weight. The 5-20 mg range is a bit more practical for patient use).**
  Eg. A 175 lb man is roughly 79 kg. The minimum recommended dose at 5mg x 79 kg = 395 mg THC and/or CBD daily. If we use the high dosing, that same patient will be taking 20 mg x 79 kg = 1580 mg THC and/or CBD daily. Note that these doses are easier to achieve with THCA which is also non psychoactive - consuming raw cannabis or raw cannabis concentrate will achieve these high doses as well. Last but not least, Full Extract Oil or Rick Simpson's Oil (RSO) will typically be made with high concentrations of THC as well - these oils have been helping and saving lives for more than a decade now, and more information on utilizing these oils can be found with simple internet and youtube searches, but the best direct source for this information would be phoenixtears.ca

  If these doses are found to be ineffective, increase THC in 5-10 mg increments and self-titrate over several days to determine which is tolerable. CBD will be easier to experiment with but keep in mind that a small amount of THC should be in the medicine to ensure that the full effects of CBD and the Entourage Effect are received. Again, CBD isolate is nowhere near as effective with accompanying cannabinoids.

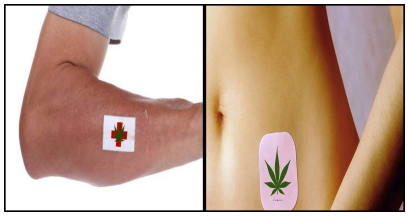
Topicals




Medicinal Topicals concocted with cannabis herbs is actually not a new thing, and as has been stated before, many cultures throughout history actually utilized the cannabis plant in many medical remedies including using them topically! There are many benefits to cannabis topicals and one of the major facets to them is that it is virtually impossible to receive a psychoactive effect or even THC toxicity as these compounds are not being ingested. (Should the topical be eaten...that would be a different story.)

Specific CB1 and CB2 receptors on the surface of the skin or under the skin (transdermal) are activated when a cannabis topical is applied and relief occurs from issues such as inflammation, surface pain from burns, cuts and bruises, and with helping to prevent or combat skin dryness (eczema), infection, irritation, and more. Underlining the versatility of topicals, they can be applied in large doses without worry of getting “high.

The Cannabis Patch




The Cannabis patch is a newer product developed only in the last 20-30 years, with testable patches only recently hitting shelves. They have been formulated to help with a number of pain related ailments such as Fibromyalgia, MS, nerve pain from Diabetes and more. These have been met with mixed reviews, as some users swear by them, while others report little to no relief. As such, further testing and use by patients will only tell the efficacy of these topical patches.

Medical Application of Topicals and Dosing

Topicals definitely have a useful place in the medical cannabis arsenal and only help to represent the amazing versatility of this potent herb. Oftentimes, topicals are combined with many other herbal ingredients and remedies to make powerful concoctions useful for treating a number of ailments and their respective symptoms. It is not uncommon to see other herbs such as St John’s Wort, Arnica, Chamomile, and Lavender to name a few, emulsified and combined with cannabinoids, terpenoids, in a beeswax or cream lotion. The resulting product would be a versatile multifaceted topical remedy. There are indeed many and varied products available on the market, but to generalize, a small list topicals can be used for includes but is not limited to:

- **Inflammation (eg. Gout, or irritated body parts)**
- **Eczema and dry skin**
- **Melanoma (Skin Cancers)**
- **Helping to Prevent or Treat Bacterial Infections (eg. Staph infection)**
- **Stiff Joints and Fingers**
- **Relieving Bruises, Cuts, Burns**
- **Muscle Pain, Nerve Pain**

Dosing with topicals is a little easier than other modes of consumption, although many times non-specific. Products will typically have their cannabinoid contents listed, and herbal combinations will vary from product to product; but it is often recommended that users apply the medicine liberally until they find relief. Due to the lack of psychoactivity, users can also apply topicals as often as they prefer!

Suppository (i.e. “Boofing” as wooks and industry people like to call it)

Suppositories offer a mode of consumption and access to medical cannabis for those who cannot smoke or even ingest medicine. While the common person may see suppositories in a comedic light, and there are countless “up the butt” jokes related to the subject, it is important to recognize that there are cancer sufferers, patients without stomachs, patients who have difficulty inhaling smoke or even swallowing pills, and more individuals who legitimately need to medicate, lest their quality of life significantly suffer, or worse, be cut short because of an inability to consume medicine.

Suppositories, which are cannabinoid suspensions in a capsule and are meant to be inserted and held inside one’s rectum, actually provides faster relief than edibles, and sometimes, due to the lack of having to be processed in the stomach, a more potent therapy as the capsule melts in the anal cavity. The effects of suppositories have been likened to taking an edible but with a much faster and more potent experience.

Medical Application of Suppositories and Dosing

Suppositories will typically be made with an ailment in mind to tackle - most common would be **colon** and **prostate cancers**. Doses will be labeled per suppository capsule, and users will typically utilize these medicines on a scheduled regiment. Again, suppositories were designed in order to tackle any ailments and diseases not normally targetable when a patient cannot ingest or inhale the intended medicine.

Consuming and dosing CBD and THC - CBD ratios explained

With the advent of CBD products hitting the market, many various medicines, formulations, and most importantly CBD to THC ratioed pills, tinctures, and even cartridges have surfaced. This can no doubt cause some confusion, but this section of the module will explain how to properly approach and use these.

It is first important to stress that CBD isolate, or CBD by itself, is nowhere near as effective as when it is combined with the other cannabinoids, if even in small amounts. This is most evident with THC, where both these compounds act in a synergistic manner in what is known as the **entourage effect.** Numerous lab tests and studies by scientists confirm this fact in testing CBD synthetics, CBD isolates, and CBD combined with the other cannabinoids. The leading theory behind this offered by horticulturists, herbalists, scientists, and doctors, is that the cannabis plant naturally produces the ratios of cannabinoids together - nature intended for them to work in concert, not by themselves.

With this understanding, the creators of the Care By Design sprays as well as other manufacturers of CBD products, create medicines that may or may not be CBD dominant, but that have varying amounts of THC and other cannabinoids in the mix so as to have a more effective medicine.

Due to the fact that CBD is non-psychoactive, and actually works to inhibit some of the psychoactivity caused by THC, these tinctures or capsules will often be labeled by their CBD to THC ratio. Essentially, the higher the ratio of CBD to THC, the less psychoactive the medicine will be. In order to more easily illustrate this, the following popular CBD to THC ratios are explained:

- **25:1 CBD to THC.**. This ratio offers the least amount of psychoactivity (virtually none except in especially sensitive users) and is suitable for new users, children who must medicate with cannabis, and even pets. An example pill would contain 25 mg of CBD and 1 mg of THC.
- **18:1 CBD to THC.** An example to illustrate this ratio would be a spray tincture that delivers 3 mg of CBD and 0.1 mg of THC per spray. This causes almost no psychoactivity (except in especially sensitive users) and easily illustrates the dosing of CBD vs THC.
- **8:1 CBD to THC.** This ratio and example tincture delivers 2.6 mg of CBD and .3 mg of THC per drop. The psychoactivity involved with this is very mild, and sometimes can only be noticed by sensitive users.
- **4:1 CBD to THC.** This ratio and example spray tincture would deliver 2.6 mg of CBD and .6 mg of THC per spray. Psychoactivity starts to become noticeable (which may be preferred depending on the ailment being treated).
- **2:1 CBD to THC.** This ratio and example pill would contain 20 mg of CBD and 10 mg of THC. This product can and will be psychoactive and is a milder and more tolerable dose than an outright 1:1 mix for a new user.
- **1:1 CBD to THC.** These doses offer even ratios of THC to CBD, so users should be aware that there will be psychoactivity.

Which CBD ratio is best for me? what medical cannabis products are best for me and my ailment?

Unfortunately there is no easy answer for these as they are loaded questions that beg even more from the patient - what ailments and symptoms are being treated? Does the patient have a tolerance to THC or not? Is THC desired for the specific treatment, or is a CBD mix more appropriate? How active is the person and does he/she need to medicate throughout the day or only at night? How old is the patient? How much does the patient weigh?

Utilizing medical cannabis to treat any ailment and set of symptoms is going to have to be a nuanced approach. With how vast the potential of cannabis is, you can only imagine that it must have varied applications if utilized for many different treatments - as such, without the support of double blind clinical trials to have clinical recommendations for these, unfortunately even as of 2018 we must still rely on experimentation, peer to patient investigation, case studies and recommendations from those studies, and self-titration in order to deduce what might work best for a new patient seeking to medicate with cannabis for the first time, and even if they have a history with smoking marijuana.

With that said, the approach and journey with utilizing cannabis for medical purposes will be filled with experimentation, a lot of research, and a lot of new experiences for medical marijuana patients across the board - we really are in a new frontier of holistics, medicine, and science, and those involved with the medical cannabis movement are building the much needed body of work day by day so that this field is taken seriously amongst the medical and scientific communities, as well as the legislative bodies across the entire world.

CBD for Pets and Animals!

There are indeed cannabis products that are being utilized for domestic pets! One noteworthy fact about the endocannabinoid system is that it actually exists in a vast majority of living creatures - this includes all vertebrates and invertebrates, with the simplest life form observed having one being the sea squirt. In fact, many of the scientific studies on the endocannabinoid system and cannabinoids in general were first done on animals. With that said, this opens up a world of therapeutic possibility for veterinarians, animal health care professionals, and even the average person who cares for pets! Remember that CBD is non-psychoactive, and that there are other non-psychoactive cannabinoids that could be given to an ailing animal without risk of killing them. Yes they will be more sensitive to the cannabinoids depending on what size the animal is. The author would like to stress that he is not a veterinary expert, suffice it to say, there is a growing need for more research and experimentation where this subject is concerned.

Cannabis and Pregnancy

Several scientific articles strongly recommend against this. Mothers should wait till after giving birth or even after breast feeding their child to consume cannabis. There is a direct correlation with smaller and underweight babies born from mothers who consumed cannabis throughout their pregnancies, and numerous studies have also suggested that the psychoactive compound THC may hinder a growing child's motor functions. It can easily pass through the placenta and into the the developing baby's brain. Additionally, breast milk can also carry traces of THC if the mother is regularly consuming during the early parts of weaning the baby. While these only represent early studies, the verdict is still out that there isn't enough data from research on this topic. Medical professionals across the board, including the American Academy of Pediatrics (AAP) and the Centers for Disease Control and Prevention (CDC) recommend abstinence and caution when consuming cannabis while an individual is pregnant. More research articles and resources on this can be found at the end of the chapter in the addendum.

Can I use cannabis medicine alongside other prescriptions?

For the most part yes. Unless specifically prohibited by a patient's primary care physician. Many patients and cannabis users consume cannabis alongside their prescriptions, sometimes in order to wean themselves off of them, especially where opiate addiction is concerned. It is important to note however, that THC may compound and affect other possible psychoactive side effects related to some prescriptions. That is, taking them together may actually worsen some side-effects. Discussion with one's primary care physician as well as consulting with multiple professional opinions given an individual's medical regiment should be had before attempting this. It is indeed possible, and there are many success stories that attest to this, but caution as well as prior research should be done by the patient.

The Importance of Clean Medicine

This cannot be stressed enough, especially where medicine and science are involved. We live in a sophisticated world with many new exciting possibilities for the future. Whether you believe it or not, Medical Cannabis for the entire world is one of those possibilities. With the inevitable growth and spread of cannabis as a medicine, it is of vital importance to those involved in the industry to have an ethical understanding of what is at stake for patients, members and advocates of the green movement, the community of growers, industry professionals, doctors, scientists, and virtually every single individual on the planet.

Believe it now or not, time will tell and the world does change - as more and more people learn about the reality of cannabis as a medicine, and with the growing field of science backing the understanding of this ignorantly misunderstood plant, the potential and power to change the medical paradigm and even the world is possible in only the next few decades, maybe even less.

As such, there is an intrinsic mandate and responsibility to do this industry right - to have clean, ethical and educated practices when it comes to cultivation, extraction, manufacturing, consulting, and managing of the the various establishments such as grows, dispensaries and clubs, kitchens, and even the media.

Growing medicine in your own backyard or home

This facet of cannabis represents one of the most unique aspects of this amazing plant. Imagine, being able to grow a potent and powerful medicine capable of killing cancer cells, stopping seizures, replacing opiates, and saving lives right in your own backyard, or even inside a small grow tent within your own home. An individual could choose between growing CBD, his/her favorite strain, or even still a mixture of some the newest genetics on the market.

This unique and fascinating possibility has actually already been practiced in some of the medical states - California for example has had quite the storied history since passing Proposition 215 The Compassionate Use Act in 1996, and homegrown cannabis farmers have enjoyed the right of building and contributing to the marijuana growing community for several decades now. Current legislation in multiple legal states (though not all), provide for this right and it should only make sense - if we're allowed to grow peppers and tomatoes in our backyards, shouldn't we all be allowed to grow an herb that could significantly help treat our sicknesses, provide a better quality of life, or even save it?

As a professional grower who loves this community, I can and will stress that growing cannabis for one's own personal medical use is relatively easy given some time, effort, and learning. Ironically, one of the current complaints within the cannabis world is that consumers are faced with high prices for their herb; high quality medical grade cannabis can be even more difficult for medical patients who are on low income to acquire. As unfortunate as this reality is, it is hoped that prices across the board become affordable to the average person, and that more specifically individuals possessing life affecting diseases and ailments be given compassionate access to a simple plant. One way to offset this is indeed for patients to be able to grow their own, though this isn't always possible. With that said, for interested individuals, there are a number of recommended grow books and resources that are available: Marijuana Horticulture the Indoor/Outdoor Medical Grower's Bible by Jorge Cervantes, and the Marijuana Grower's Handbook by Ed Rosenthal are two excellent manuals to check out, and the website www.growweedeasy.com has been an accessible free resource for cultivating cannabis for years. In the future, there will no doubt be gardening and horticulture educational classes that center around growing our favorite herb at universities and schools!

Underlining the amazing versatility of cannabis from a medical standpoint - some talking points to make you think

- Doctors, scientists, researchers, and patients themselves can experiment with cannabis medicines without having to worry about a lethal overdose. The dose can be increased without lethal toxicity.
- Instead of tackling sickness and symptoms with one medicine or pill only to have to take another pill to treat the side effects of the previous medicine, to which you would have to be prescribed another pill to deal with the side effects of the previous two (and note that this can go on through several medications), with cannabis you can turn to one herbal plant that has a multitude of compounds that can tackle a wide range of symptoms across many ailments.
- Stimulating the Endocannabinoid System with phytocannabinoid based medicines is actually healthy for you.
- Cannabis is a versatile medicine that can be administered or consumed in so many various ways.
- As mentioned in the previous section, patients themselves can grow their own medicine.
- Medical Cannabis will no doubt be an emerging field open and hungry for fresh researchers, scientists, and medical professionals.
- All this impacts you the reader, and the rest of society.

End of Chapter Addendum - Instead of another exhaustive reference list, this really nifty booklet I've been working on for a while should pique some of your interest.

CANNABINOID AND TERPENOID THERAPY REFERENCE BOOK v1.06

by

Danny Gagaoin

Analgesic

CBGA
THC
CBD
CBC
CBG
CBN
Borneol
Myrcene

an-al-ge-sic [an-l-jee-zik, -sik]
noun.
1) a remedy that relieves or allays pain.

adjective.
2) causing analgesia; pain relieving.

An analgesic (painkiller) is a drug used to relieve pain. They are separate from anesthetics, which work to reverse and eliminate sensation.

There are several major classes of analgesics and these include: 1) Paracetamol (acetaminophen) and (NSAIDs) Non-steroidal anti-inflammatory drugs such as Aspirin; 2) COX-2 inhibitors derived from NSAIDS which reduce the production of the inflammatory enzyme cyclooxgenase; 3) Opioids which bind to cerebral opioid receptors; 4) Flupirtines which act as K+ (Potassium) channel openers; and 5) and Adjuvant or atypical analgesics.

Useful for Treating Symptoms of: ALS (Lou Gehrig's Disease), Arthritis (Rheumatoid), Cancer and Chemotherapy, Dystonia, Fibromyalgia, General Pain (muscle soreness, bruises, recovery from surgery, etc.), HIV/AIDS, Multiple Sclerosis, Parkinson's disease, +MORE

Other Analgesic Drugs: Paracetamol/acetaminophen (Tylenol), ***NSAIDs -*** Aspirin (Anacin, Ascriptin, Bayer, Bufferin, Ecotrin, Excedrin), Choline and magnesium salicylates (CMT, Tricosal, Trilisate), Choline salicylate (Arthropan), Celecoxib (Celebrex), Diclofenac Potassium (Cataflam), Dicolfenac sodium (Voltaren, Voltaren XR), Diclofenac sodium with misoprostol (Arthrotec), Diflunisal (Dolobid), Etodolac (Lodine, Lodine XL), Fenoprofen calcium (Nalfon), Flurbiprofen (Ansaid), Ibuprofen (Advil, Motrin, Motrin IB, Nuprin), Indomethacin (Indocin, Indocin SR), Ketoprofen (Actron, Orudis, Orudis KT, Oruvail), Magnesium salicylate (Arthritab, Bayer select, Doan's pills, Magan, Mobidin, Mobogesic), Meclofenamate sodium (Meclomen), Mefenamic acid (Ponstel), Meloxicam (Mobic), Nabumetone (Relafen), Naproxen (Naprosyn, Naprelan), Naproxen sodium (Aleve, Anaprox), Oxaprozin (Daypro), Piroxicam (Feldene), Rofecoxib (Vioxx), salsalate (Amigesic, Anaflex 750, Disalcid, Marthritic, Mono-gesic, Salflex, Salsitab), Sodium salicylate, Sulindac (Clinoril), Tolmetin sodium (Tolectin), Valdecoxib (Bextra). ***COX-2 inhibitors -*** Rofecoxib, Celcoxib, Etroicoxib. ***Opiods -*** *Morphine and analogues* - Morphine, Heroin, Codeine, Levorphanol, Dihydrocodeine, Nalorphine, Nalbuphine, Butorphanol, Naloxone, Buprenorphine. Meperidine, Diphenoxylate (Lomotil), Methadone, Propoxyphene (Darvon). Pentazocine (Talwin), Nalbuphine (Nubain). ***Flupirtine -*** Katadolon, Trancolong, Awegal, Efiret,Trancopal Doio, Metanor. ***Adjuvant analgesics -*** amitriptyline, duloxetine, hydroxyzine, promethazine, carisoprodol, tripelennamine, nefopam, orphenadrine, pregabalin, gabapentin, cyclobenzaprine, scopolamine, +MORE.

Anti-Anxiety
Δ-8 THC
CBD
Linalool
Limonene

anx-i-o-lyt-ic [ang-zee-uh-lit-ik]
noun.
1) anti-anxiety drug.

adjective.
2) anxiety relieving.

Anxiolytic drugs are used to either intervene or inhibit anxiety. They are also known as anti-panic or anti-anxiety drugs, and these psychoactive compounds are also classified as anxiotropic agents. In some cases they are considered minor tranquilizers.

There are several medications, both over the counter and prescription, that belong to a variety of different classes of drugs for the use of anxiolysis. The major ones include: Benzodiazepines, Serotonergic antidepressants or Selective serotonin reuptake inhibitors (SSRIs), Azapirones, Barbiturates, Pregabalin, and some Beta blockers.

Useful for Treating Symptoms of: Anxiety Disorders (Panic Disorder, Social Anxiety Disorder, Selective Mutism, Phobias, etc.), Alzheimer's Disease, ALS (Lou Gehrig's Disease), Depression, Epilepsy, Fibromyalgia, Multiple Sclerosis, Parkinson's Disease, Post Traumatic Stress Disorder (PTSD). +MORE

Other Anxiolytic Drugs: ***Benzodiazepines -*** Alprazolam (Xanax), Bromazepam (Lectopam, Lexotan), Chlordiazepoxide (Librium), Clonazepam (Klonopin, Rivotril), Clorazepate (Tranxene), Diazepam (Valium), Flurazepam (Dalmane), Lorazepam (Ativan), Oxazepam (Serax, Serapax), Temazepam (Restoril), Triazolam (Halcion), Tofisopam (Emandaxin, Grandaxin). ***Selective serotonin reuptake inhibitor -*** citalopram (Celexa, Cipramil, Cipram, Dalsan, Recital, Emocal, Sepram, Seropram, Citox, Cital), dapoxetine (Priligy), escitalopram (Lexapro, Cipralex, Seroplex, Esertia), fluoxetine (Depex, Prozac, Fontex, Seromex, Seronil, Sarafem, Ladose, Motivest, Flutop, Fluctin, Fluox, Depress, Lovan, Prodep), fluvoxamine (Luvox, Fevarin, Faverin, Dumyrox, Favoxil, Movox, Floxyfral), indalpine (Upstene), paroxetine (Paxil, Seroxat, Sereupin, Aropax, Deroxat, Divarius, Rexetin, Xetanor, Paroxat, Loxamine, Deparoc), sertraline (Zoloft, Lustral, Serlain, Asentra, Tresleen), zimelidine (Zelmid, Normud). ***Azapirones -*** buspirone (Buspar), tandospirone (Sediel). ***Barbiturates -*** allobarbital, amobarbital, aprobarbital, alphenal, brallobarbital, pentobarbital, phenobarbital, secobarbital. ***Pregabalin -*** Lyrica, Nervalin. ***Beta blockers -*** *Nonselective Agents* - Bucindolol, Carteolol, Carvedilol, Labetalol, Nadolol, Oxprenolol, Penbutolol, Pindolol, Propranolol, Sotalol, Timolol, Eucommia. *β-selective agents (cardioselective)* - Acebutolol, Atenolol, Betaxolol, Bisoprolol, Celiprolol, Esmolol, Metoprolol, Nebivolol.

Anti-Bacterial

CBC
CBG
CBD
CBN
α-Pinene
β-Caryophyllene
Cineol
Humulene
Limonene
Linalool
Terpinolene

an·ti·bac·te·ri·al
ˌantēbakˈti(ə)rēəl, ˌantī-/
adjective

1. active against bacteria.

Note: Antibacterial drugs are also part of the Antibiotic family of drugs.

“An antibiotic is an agent that either kills or inhibits the growth of a microorganism.“ - Wikipedia

Useful for Treating Symptoms of: Botulism, Campylobacteriosis, Cholera, E Coli Infection, M Marinum Infection, Dysentery, Legionellosis, Leptospirosis, Otitis Externa, Salmonella, Typhoid Fever, Vibrio Illness.

Other Anti-Bacterial Drugs: Amoxicillin, Ampicillin, Cefazolin, Cefepime, Cefotaxime, Cefoxitin, Ceftazidime, Ceftriaxone, Cefuroxime, Cephalexin, Ciprofloxacin, Clavulanic Acid, Imipenem (+ cilastin), Levofloxacin, Metronidazole, Nafcillin, Nitrofurantoin, Oxacillin, pen G-benzathine penicillin G, Penicillin G, Piperacillin, Rifabutin, Rifampin Rifampicin, Sulfamethoxazole-trimethoprim (cotrimoxazole), Sulfisoxazole, Ticarcillin, Vancomycin.

Anti-Cancer

THCA
CBDA
THC
CBD
CBC
CBG
β-Caryophyllene
Citronellol
Humulene
Limonene
Myrcene

an·ti·can·cer
[an-tee-kan-ser, an-tahy-] *adjective*
for or used in the prevention or treatment of cancer: *an anticancer drug.*
Origin:
1925–30; anti- + cancer

“Chemotherapy (often abbreviated to chemo and sometimes CTX or CTx) is a category of cancer treatment that uses chemical substances, especially one or more anti-cancer drugs (chemotherapeutic agents) that are given as part of standardized chemotherapy regimen. Chemotherapy may be given with a curative intent, or it may aim to prolong life or to reduce symptoms. ...these modalities are often used in conjunction with other cancer treatments, such as radiation therapy, surgery, and/or hyperthermia therapy.” - Wikipedia

Useful for Treating Symptoms of: CANCER: Bladder Cancer, Bone Cancer, Brain Tumors, Breast Cancer, Bronchial Tumors, Carcinoma, Cervical Cancer, Colon Cancer, Colorectal Cancer, Endometrial Cancer, Gallbladder Cancer, Gastric Cancer, Gliomas (Brain and/or Spine Tumor), Head and Neck Cancers, Heart Tumors, Intraocular Melanoma, Kidney Cancer, Kaposi Sarcoma, Leukemia, Liver Cancer, Lung Cancer, Lymphoma, Merkel Cell Carcinoma, Melanoma, Myeloma, Nasopharyngeal Cancer, Neuroblastoma, Oral Cancer, Oropharyngeal Cancer, Ovarian Cancer, Pancreatic Cancer, Papillomatosis, Paraganglioma, Paranasal and Sinus Cancer, Parathyroid Cancer, Penile Cancer, Pharyngeal Cancer, Pituitary Tumor, Plasma Cell Neosplasm, Pleuropulmonary Cancer, Pregnancy Cancer, Prostate Cancer, Rectal Cancer, Renal Cell (Kidney) Cancer, Retinoblastoma, Sarcoma, Skin Cancer (Basal Cell Carcinoma, Melanoma), Small Intestinal Cancer, Stomach Gastric Cancer, Testicular Cancer, Throat Cancer, Thymic Cancer, Thyroid Cancer, Urethral Cancer, Uterine Sarcoma, Vaginal Cancer, Vulvar Cancer, +MORE.

Other Anti-Cancer Drugs: Bendamustine, Busulfan, Carmustine, Chlorambucil, Cyclophosphamide, Decarbazine, Ifosfamide, Melphalan, Procarbazine, Streptozocin, Temozolomide, Asparaginase, Capecitabine, Cytarabine, 5-Fluoro Uracil, Fludarabine, Gemcitabine, Methotrexate, Pemetrexed, Raltitrexed, Actinomycin, Bleomycin, Daunorubicin, Doxorubicin, Epirubicin, Idarubicin, Mitomycin, Mitoxantrone, Etoposide, Docetaxel, Irinotecan, Paclitaxel, Topotecan, Vinblastine, Vincristine, Vinorelbine, Carboplatin, Cisplatin, Oxaliplatin, Alemtuzamab, BCG, Bevacizumab, Cetuximab, Denosumab, Erlotinib, Gefitinib, Imatinib, Interferon, Ipilimumab, Lapatinib, Panitumumab, Rituximab, Sunitinib, Sorafenib, Temsirolimus, Trastuzumab, Clodronate, Ibandronic acid, Pamidronate, Zolendronic Acid, Anastrozole, Abiraterone, Amifostine, Bexarotene, Bicalutamide, Buserelin, Cyproterone, Degarelix, Exemestane, Flutamide, Folinic Acid, Fulvestrant, Goserelin, Lanreotide, Lenalidomide, Letrozole, Leuprorelin, Medroxyprogesterone, Megestrol, Mesna, Octreotide, Stilbolestrol, Tamoxifen, Thalidomide, Triptorelin
+MORE.

Anti-Convulsive

THCV
CBD
CBN
Linalool

con·vul·sant
[kuh n-vuhl-suh nt]
adjective
1.
causing convulsions; convulsive.

"Anticonvulsants (also commonly known as antiepileptic drugs or as antiseizure drugs) are a diverse group of pharmaceuticals used in the treatment of epileptic seizures. Anticonvulsants are also increasingly being used in the treatment of bipolar disorder, since many seem to act as mood stabilizers, and for the treatment of neuropathic pain. Anticonvulsants suppress the rapid and excessive firing of neurons during seizures. Anticonvulsants also prevent the spread of the seizure within the brain. Some investigators have observed that anticonvulsants themselves may cause reduced IQ in children. However these adverse effects must be balanced against the significant risk epileptic seizures pose to children and the distinct possibility of death and devastating neurological sequelae secondary to seizures. Anticonvulsants are more accurately called antiepileptic drugs (abbreviated "AEDS"), and are often referred to as antiseizure drugs because they provide symptomatic treatment only and have not been demonstrated to alter the course of epilepsy."
- Wikipedia

Useful for Treating Symptoms of: Dystonia, Epilepsy, Multiple Sclerosis, Parkinson's Disease +MORE.

Other Anti-Convulsive Drugs: Banzel (rufinamide), carbamazepine (Tegretol, Carbatrol), Celontin (methsuximide), divalproex sodium (Depakote, Depakote ER), ethosuximide (Zarontin), Felbatol (felbamate), gabapentin (Neurontin), Gabitril (tiagabine hcl), lamotrigine (lamictal, lamictal ODT, lamictal XR), levetiracetam (Keppra, Keppra XR), Lyrica (pregabalin), oxcarbazepine (Trileptal), Peganone (ethotoin), phenytoin sodium (Dilantin), primidone (Mysoline), Sabril (vigabatrin), topiramate (Topomax), Valporic Acid (Depakene, Stavzor), Vimpat (lacosamide), zonisamide (Zeonegran) +MORE.

Anti-Depressant

CBD
CBC
CBG
Cineol
Limonene
Linalool

an·ti·de·pres·sant
[an-tee-di-pres-*uh* nt, an-tahy-] *Pharmacology* .
adjective
1.
of or pertaining to a substance that is used in the treatment of mood disorders, as characterized by various manic or depressive effects.
noun
2. Also called **energizer**, **psychic energizer**. any such substance, as a tricyclic antidepressant, MAOinhibitor, or lithium.
Also, **an·ti-de·pres·sant, an·ti·de·pres·sive** [an-tee-di-pres-iv, an-tahy-]

"Antidepressants are drugs used for the treatment of major depressive disorder and other conditions, including dysthymia, anxiety disorders, obsessive compulsive disorder, eating disorders, chronic pain, neuropathic pain, and in some cases, dysmenorrhoea, snoring, migraines, attention-deficit hyperactivity disorder (ADHD), substance abuse and sleep disorders. They can be used alone or in combination with other medications." - Wikipedia

Useful for Treating Symptoms of: Alzheimer's Disease, ALS (Lou Gehrig's Disease), Anxiety Disorders, Depression, Epilepsy, Fibromyalgia, Insomnia, Multiple Sclerosis, Parkinson's Disease, Post Traumatic Stress Disorder (PTSD) +MORE.

Other Anti-Depressant Drugs: ***Monoamine Oxidase Inhibitor (MAOIs)*** - Parnate (tranylcypromine sulfate), Nardil (phenelzine sulfate), Marplan (isocarboxazid). ***Tricyclic Antidepressants (TCAs)*** - Anafranil (chlomipramine hydrochloride), Elavil (amitriptyline hydrochloride), Norpramin (desipramine hydrochloride), Pamelor (nortriptyline hydrochloride), Surmontil (trimipramine maleate). ***Selective Serotonin Reuptake Inhibitors (SSRIs)*** - Celexa (citalopram hydrobromide), Lexapro (escitalopram oxalate), Luvox (fluvoxamine maleate), Paxil (paroxetine hydrochloride), Prozac (fluoxetine hydrochloride), Zoloft (sertraline hydrochloride). Cymbalta (duloxetine hydrochloride), Effexor (venlafaxine hydrochloride), Remeron (mirtazapine). Wellbutrin (bupropion hydrochloride). Desyrel (trazodone hydrochloride) +MORE.

Anti-Emetic

CBD

an·ti·e·met·ic

[an-tee-*uh*-met-ik, an-tahy-] *Pharmacology*.

adjective

1. of or pertaining to a substance that is useful in the suppression of nausea or vomiting.

"An antiemetic is a drug that is effective against vomiting and nausea. Antiemetics are typically used to treat motion sickness and the side effects of opioid analgesics, general anaesthetics, and chemotherapy directed against cancer.

Antiemetics are also used for morning sickness, but there is little information about the effect on the fetus, and doctors prefer not to use them unless it is strictly necessary." - Wikipedia

Useful for Treating Symptoms of: Alzheimer's Disease, ALS (Lou Gehrig's Disease), Anxiety Disorders, Cancer and Chemotherapy Treatment, Crohn's Disease, Dystonia, Epilepsy and Seizures, Migraines, Multiple Sclerosis, Nausea (general, sickness related, drug abuse, medication induced), Parkinson's Disease, Post Traumatic Stress Disorder (PTSD) +MORE.

Other Anti-Emetic Drugs: Alka Seltzer, Antivert, aprepitant, Benadryl, Bonine, *Cesamet/Nabilone (Synthetic Antagonist Cannabinoid)*, Emetrol, Triaminic Thin Strips, Compazine, Diclegis, dimenhydrinate, diphenhydramine, doxylamine/pyridoxine, Dramamine, Emend, fosaprepitant, hydroxyzine, Inapsine, Maldemar, *Marinol (Synthetic Cannabinoid),* meclizine, meclozine, Meni D, metoclopramide, Metozolv ODT, Nauzene, Nyquil, Nytol, PediaCare, Phenadoz, Phenergan, phosphorated carbohydrate, phosphoric acid, prochlorperazine, promethazine, Reglan, Scopace, scopolamine, sodium citrate, Sominex, Tigan, Tranquil, Transderm Scop, trimethobenzamide, Unisom, VertiCalm, Vistaril, ZzzQuil +MORE

Anti-Fungal

CBCA
CBC
CBG
α-Pinene
β-Caryophyllene
Caryophyllene Oxide
Limonene
Nerolidol
Terpinolene

antifungal

/ˌæntɪˈfʌŋgəl/ adjective

1. inhibiting the growth of fungi
2. (of a drug) possessing antifungal properties and therefore used to treat fungal infections

"An antifungal medication is a pharmaceutical fungicide used to treat and prevent mycoses such as athlete's foot, ringworm, candidiasis (thrush), serious systemic infections such as cryptococcal meningitis, and others. Such drugs are usually obtained by a doctor's prescription, but a few are available over-the-counter." - Wikipedia

Useful for Treating Symptoms of: Athlete's Foot, Candidiasis (Thrush), Coccidioidomycosis (Valley Fever), Cryptococcal Meningitis, Dermatophytes (Fungal Skin and Nail Infections), Histoplasmosis, Ringworm, Sporotrichosis +More.

Other Anti-Fungal Drugs: Amphotericin B, Azole Antifungals, Fluconazole, Itraconazole, Posaconazole, Voriconazole, Echinocandins, Flucytosine, Candicidin, Filipinm Hamycin, Natamycin, Nystatin, Rimocidin, Bifonazole, Butoconazole, Clotrimazole, Econazole, Fenticonazole, Isoconazole, Ketoconazole, Luliconazole, Miconazole, Omoconazole, Oxiconazole, Sertaconazole, Sulconazole, Tioconazole, Albaconazole, Fluconazole, Isavuconazole, Posaconazole, Ravuconazole, Terconazole, Voriconazole, Abafungin, Amorolfin, Butenafine, Naftifine, Terbinafine, Anidulafungin, Caspofungin, Micafungin.

Anti-Inflammatory

CBGA
CBGVA
THCA
THCVA
CBDA
CBDVA
CBCA
CBCVA
THC
CBD
CBC
CBNA
CBN
CBLA
α-Pinene
β-Caryophyllene
Cineol
Citronellol
Humulene
Myrcene

an·ti-in·flam·ma·to·ry
[an-tee-in-flam-*uh*-tawr-ee, -tohr-ee, an-tahy-]
adjective
1.
acting to reduce certain signs of inflammation, as swelling, tenderness, fever, and pain.
noun, plural **an·ti-in·flam·ma·to·ries.**
2.
Pharmacology . a medication, as aspirin, used to reduce inflammation.

"Anti-inflammatory or antiinflammatory refers to the property of a substance or treatment that reduces inflammation. Anti-inflammatory drugs make up about half of analgesics, remedying pain by reducing inflammation as opposed to opioids, which affect the central nervous system."
- Wikipedia

Useful for Treating Symptoms of: Arthritis (including Rheumatoid), Bug Bites, Diabetes, General Pain (muscle soreness, bruises, recovery from surgery, etc.), Gout, HIV/AIDS, Infections, Poison Oak, Internal inflamation, +MORE.

Other Anti-Inflammatory Drugs: ***NSAIDs (Non Steroidal Anti-Inflammatories) - Over the Counter -*** Advil, Motrin (Ibuprofen), Aleve (naproxen sodium), Ascriptin, Bayer, Ecotrin (Asprin). ***Rx -*** Anaprox (naproxen sodium), Celebrex (celecoxib), Clinoril (sulindac), Daypro (oxaprozin), Disalcid (salsalate), Dolobid (diflunisal), Feldene (piroxicam), Indocin (indomethacin), Lodine (etodolac), Mobic (meloxicam), Naprosyn (naproxen), Relafen (nabumetone), Toradol (ketorolac tromethamine), Vimovo (naproxen/esomeprazole), Voltaren (diclofenac).

Anti-Insomnia

CBD
CBC
CBN
Borneol
Citronellol
Linalool
Myrcene
Nerolidol
Phytol
Terpinolene

in·som·ni·a
[in-som-nee-*uh*]
noun
inability to obtain sufficient sleep, especially when chronic; difficulty in falling or staying asleep;sleeplessness.
Origin:
1685–95; < Latin, equivalent to *insomn* (*is*) sleepless (*in-* in-3 + *somn* (*us*) sleep + *-is* adj. suffix) + *-ia* -ia

“Hypnotic or soporific drugs are a class of psychoactive drugs whose primary function is to induce sleep and to be used in the treatment of insomnia (sleeplessness), or surgical anesthesia.

This group is related to a very similar group of drugs called sedatives. Whereas the term sedative describes drugs that serve to calm or relieve anxiety, the term hypnotic generally describes drugs whose main purpose is to initiate, sustain, or lengthen sleep. Because these two functions frequently overlap, and because drugs in this class generally produce dose-dependant effects (ranging from anxiolysis to loss of consciousness) they are often referred to collectively as sedative-hypnotic drugs.” - Wikipedia

“A sedative or tranquilizer is a substance that induces sedation by reducing irritability or excitement. At higher doses it may result in slurred speech, staggering gait, poor judgement, and slow, uncertain reflexes. Doses of sedatives such as benzodiazepines, when used as a hypnotic to induce sleep, tend to be higher than amounts used to relieve anxiety, whereas only low doses are needed to provide a peaceful effect.

Sedatives can be misused to produce an overly-calming effect (alcohol being the classic and most common sedating drug). In the event of an overdose or if combined with another sedative, many of these drugs can cause unconsciousness (see hypnotic) or even death.” - Wikipedia

Useful for Treating Symptoms of: Alzheimer’s Disease, Anxiety Disorders, Depression, Epilepsy, Fibromyalgia, Insomnia, Multiple Sclerosis, Parkinson’s Disease, Post Traumatic Stress Disorder (PTSD) +MORE

Other Anti-Insomnia Drugs: Advil PM, Ambien, Ambien CR, Ativan, Belsomra, Dalmane, Elavil, Halcion, Intermezzo, Prosom, Restoril, Rozerem, Silenor, Tylenol PM, Unisom SleepTabs, Zyprexa, Zyprexa Zydis. ***Barbiturates -*** amobarbital, pentobarbital, phenobarbital, secobarbital, sodium thiopental. ***Quinazolinones -*** cloroqualone, diproqualone, etaqualone, mebroqualone, mecloqualone, methaqualone. ***Benzodiazepines -*** alprazolam (Xanax), lorazepam (Ativan), diazepam (Valium), clonazepam (Klonopin). ***Nonbenzodiazepines -*** zopiclone (Imovane, Zimovane), eszopiclone (Lunesta), zaleplon (Sonata), zolpidem (Ambien, Stilnox, Stilnoct). ***Antihistamines -*** diphenhydramine (Benadryl), doxylamine.

Anti-Ischemic

CBD

Caryophyllene Oxide

is·che·mi·a
[ih-skee-mee-*uh*]
noun Pathology .
local deficiency of blood supply produced by vasoconstriction or local obstacles to the arterial flow.
Also, is·chae·mi·a.

“Ischemia, also spelled as ischaemia, is a restriction in blood supply to tissues, causing a shortage of oxygen and glucose needed for cellular metabolism (to keep tissue alive). Ischemia is generally caused by problems with blood vessels, with resultant damage to or dysfunction of tissue. It also means local anemia in a given part of a body sometimes resulting from congestion (such as vasoconstriction, thrombosis or embolism).” - Wikipedia

Useful for Treating Symptoms of: Arterial Ischemia, Glaucoma, High Blood Pressure, Migraine, Myocardial Ischemia +MORE.

Other Anti-Ischemic Drugs: Aspirin, Nitroglycerin, ***Beta Blockers -*** acebutolol (Sectral), atenolol (Tenormin), betaxolol, bisoprolol (Monocor), carvedilol (Coreg), metoprolol (Lopressor, Toprol), nadolol (Corgard), penbutolol (Levatol), pindolol, propranolol (Inderal). ***Cholesterol-lowering medications -*** Statins, Niacin, Bile-acid resins, Fibric acid derivatives, Cholesterol absorption inhibitors. ***Angiotensin-converting enzyme (ACE) inhibitors -*** benazepril (Lotensin), captopril (Capoten), enalapril (Vasotec), fosinopril (Monopril), lisinopril (Aceon), quinapril (Accupril), ramipril (Altace), trandolapril (Mavik), Ranolazine (Ranexa).

Anti-Psychotic **an·ti·psy·chot·ic**

CBD **[an-tee-sahy-kot-ik, an-tahy-]** ***Pharmacology*** **.**

adjective

1. of or pertaining to any of various substances used in thetreatment of psychosis, especially schizophrenia, and acute or severe states of mania, depression, or paranoia.

noun

2. Also called major tranquilizer, neuroleptic. any such substance, as the phenothiazines.

“Antipsychotics (also known as neuroleptics or major tranquilizers) are a class of psychiatric medication primarily used to manage psychosis (including delusions, hallucinations, or disordered thought), in particular in schizophrenia and bipolar disorder, and are increasingly being used in the management of non-psychotic disorders.

The superiority of antipsychotics to placebo in the treatment of schizophrenia, bipolar disorder, and certain other psychiatric disorders is well-established, but their efficacy is suboptimal and their use is associated with significant side effects, most notably movement disorders and weight gain.” - Wikipedia

Useful for Treating Symptoms of: Alzheimer’s Disease, Anxiety Disorders, Depression, Epilepsy, Insomnia, Parkinson’s Disease, Post Traumatic Stress Disorder (PTSD) +MORE.

Other Anti-Psychotic Drugs: ***Butyrophenones -*** Benperidol (Anguil, Benguil, Frenactil, Glianimon), Bromperidol (Bromodol, Imrpomen), Droperidol (Droleptan, Inapsine), Haloperidol (Haldol, Serenace), Moperone (Luvatren), Pipamperone (Dipiperon, Piperonil), Timiperone (Celmanil, Tolopelon). ***Diphenylbutylpiperidine -*** Fluspirilene (Imap), Penfluridol (Semap), Pimozide (Orap). ***Phenothiazines -*** Acepromazine (Plegicil), Chlorpromazine (Largactil, Thorazine), Cyamemazine (Tercian), Dixyrazine (Esucos), Fluphenazine (Modecate, Permitil, Prolixin), Levomepromazine (Levinana, Levoprome, Nozinan), Mesoridazine (Lidanil, Serentil), Perazine (Peragal, Perazin, Pernazinum, Taxilan), Pericyazine (Neulactil, Neuleptil), Perphenazine (Trilafon), Pipotiazine (Lonseren, Piportil), Prochlorperazine (Compazine), Promazine (Prozine, Sparine), Promethazine (Avomine, Phenergan), Prothipendyl (Dominal), Thioproperazine (Majeptil), Thioridazine (Aldazine, Mellaril, Mellaril), Trifluoperazine (Majeptil), Trifluprom azine (Vesperin). ***Thioxanthenes -*** Chlorprothixene (Cloxan, Taractan, Truxal), Clopenthixol (Sordinol), Flupentixol (Depixol, Fluanxol), Tiotixene (Navane, Thixit), Zuclopenthixol (Acuphase, Cisordinol, Clopixol). ***Others -*** Clotiapine (Entumine, Etomine, Etumine), Loxapine (Adasuve, Loxitane), Prothipendyl (Dominal).

Anti-Spasmotic

THCA
THC
CBD
Citronellol
Myrcene

an·ti·spas·mod·ic (ăn'tē-spăz-mŏd'ĭk, ăn'tī-)
adj.
1. Relieving or preventing spasms, especially of smooth muscle.
n.
2. An antispasmodic agent. Also called *spasmolytic*.

“An antispasmodic (synonym: spasmolytic) is a drug or an herb that suppresses muscle spasms.”
- Wikipedia

“What is Antispasmodic (belladonna alkaloids and phenobarbital)?
Phenobarbital is in a group of drugs called barbiturates (bar-BIT-chur-ates). Phenobarbital slows the activity of your brain and nervous system.

Belladonna alkaloids produce many effects in the body, including reduced muscle spasms in the digestive or urinary tract, and reduced fluid secretions from certain glands or organs.” - Drugs.com

Useful for Treating Symptoms of: Dystonia, Bladder Spasms, Epilepsy, Gastrointestinal Spasms, Multiple Sclerosis, Nausea, Parkinson’s Disease +MORE.

Other Anti-Spasmotic Drugs: Levsin SL, Donnatal, Donnatal extentabs, Levbid, Librax, Pamine, Scopace, Symax Duotab, Bentyl, HyoMax, HyoMax SR, Robinul, Hyosyne, Levsin, Transderm-Scop, HyoMax SL, Pamine Forte, Belladonna Tincture, A-Spaz, Alkabel-SR, Anaspaz, Antispasmodic, Atreza, AtroPen, Bel-Phen-Ergot, Bellamine, Bellamine S, Bellamor, Bellaphen-S, Bellaspas, Bellatal, Bellergal-S, Cantil, Colidrops, Cuvposa, Cystospaz, D-Tal, Digex NF, Duragal-S, Ed-Spaz, Eperbel-S, HyoMax DT, HyoMax FT, Hyosophen, Hyospaz, IB-Stat, Levsinex, Levsinex SR, Maldemar, NuLev, Oscimin, PB-Hyos, Pro-Banthine, Quadrapax, Quarzan, RE-PB Hyos Elixir, Robinul Forte, Sal-Tropine, Servira, Spasdel, Spasmolin, Spastrin, Symax FasTab, Symax SL, Symax SR, Vitetal

Appetite Stimulant

THC

orexigenic /orex·i·gen·ic/ (o-rek″sĭ-jen´ik)
increasing or stimulating the appetite.

“An Orexigenic (OVX), or appetite stimulant, is a drug, hormone, or compound that increases appetite. This can be a naturally occurring neuropeptide hormone such as ghrelin, orexin, or neuropeptide Y, or a medication which increases hunger and therefore enhances food consumption. Usually appetite enhancement is considered an undesirable side effect of certain drugs as it leads to unwanted weight gain, but sometimes it can be beneficial and a drug may be prescribed solely for this purpose, especially when the patient is suffering from severe appetite loss or muscle wasting due to cystic fibrosis, anorexia, old age, cancer or AIDS”. - Wikipedia

Useful for Treating Symptoms of: Alzheimer’s Disease, ALS (Lou Gehrig’s Disease), Anorexia, Cancer Chemotherapy, HIV/AIDs Wastings Syndrome, Sunday Nights when you’re baked +MORE

Other Appetite Stimulant Drugs: ***5-HTC antagonists / H1 receptor antagonists -*** mirtazapine, olanzapine, quetiapine, amitriptyline, cyproheptadine. ***Dopamine antagonists -*** haloperidol, chlorpromazine, olanzapine, risperidone, quetiapine. ***Adrenergic antagonists -*** carvedilol, propranolol, clonidine. ***CB1 receptor agonists -*** THC, dronabinol, nabilone. ***Corticosteroids -*** dexamethasone, prednisone, hydrocortisone. ***Pregnane steroids -*** megestrol acetate, medroxyprogesterone acetate. ***Anabolic steroids*** **-** oxandrolone, nandrolone, testosterone. Pregabalin. Insulin. Sugar. Fructose.

*~

Appetite Suppressant

THCv

anorexiant
[an′ôrek′sē·ənt]
a drug or other agent that suppresses the appetite, such as amphetamine.

“An anorectic or anorexic, also known as anorexigenic, anorexiant, or appetite suppressant, is a dietary supplement and/or drug which reduces appetite and food consumption, and, as a result, causes weight loss to occur.” - Wikipedia.

Useful for Treating Symptoms of: Depression, Obesity

Other Appetite Suppressant Drugs: Phentermine (Adipex, Duromine, Fastin, Ionamin, Metermine). Diethylpropion (Tenuate). ***CB1 Antagoinist -*** Rimonobant (Acomplia). Sibutramine, Oxymtazoline (Afrin). Benfluorex, Butenolide, Cathine, Diethylpropiion, FG-7142, Phenmetrazine, Phenylpropanolamine, Pyroglutamyl-histidyl-glycine, Sibutramine.

Bone Stimulant

CBD
THCV
CBG

Useful for Treating Symptoms of: Arthritis (Rheumatoid included), Injury and Surgical Recovery.

Other Bone Stimulant Drugs:

Current research into the bone stimulating effects of cannabinoids show a relationship with the production of osteoclasts which are a type of bone cell that is critical in maintaining and repairing bones within the skeletal system. Irregular production and function of osteoclasts has been associated with various degenerative conditions including osteoporosis, bone tumors, and paget disease.

Like many of the cells within our body, osteoclasts respond to cannabinoids and they do this specifically by the CB2 receptors and their functions.

An article covering this can be found in the Annals of Medicine under the title, "Cannabinoids and the skeleton: from marijuana to reversal of bone loss," by Bab I, et al.

This is another facet of cannabis medicine that desperately needs more investigation and research.

- D

Immunosuppressive
CBD

im·mu·no·sup·pres·sive
[im-y*uh*-noh-s*uh*-pres-iv, ih-myoo-] *Pharmacology* .
adjective
1. capable of causing immunosuppression: *immunosuppressive drugs.*
noun
2. *Pharmacology* . Also, im·mu·no·sup·pres·sor [im-y*uh*-noh-s*uh*-pres-er, ih-myoo-]. any substance that results in or effects immunosuppression.

“Immunosuppression involves an act that reduces the activation or efficacy of the immune system. Some portions of the immune system itself have immunosuppressive effects on other parts of the immune system, and immunosuppression may occur as an adverse reaction to treatment of other conditions.

In general, deliberately induced immunosuppression is performed to prevent the body from rejecting an organ transplant, treating graft-versus-host disease after a bone marrow transplant, or for the treatment of auto-immune diseases such as rheumatoid arthritis or Crohn’s disease. This is typically done using drugs but may involve surgery (splenectomy), plasmapharesis, or radiation.

A person who is undergoing immunosuppression, or whose immune system is weak for other reasons (for example, chemotherapy and HIV), is said to be immunocompromised. An immunosuppressant is any agent that causes immunosuppression, including immunosuppressive drugs and some environmental toxins.”
- Wikipedia

Useful for Treating Symptoms of: ALS (Lou Gehrig’s Disease), Diabetes Mellitus, Multiple Sclerosis, Rheumatoid Arthritis +MORE

Other Immunosuppressive Drugs: ***Immunosuppressants for organ transplants -*** Cyclosporin (Neoral, Sandimmune, SangCya). Azathioprines (Imuran). Corticosteroids (Deltasone, Orasone). basiliximab (Simulect), daclizumab (Zenapax), muromonab CD3 (Orthoclone OKT3)m tacrolimus (Prograf). ***Immunosuppressants for autoimmune disease -*** Azathioprine (Imuran), Cyclosporin (Sandimmune, Neoral), Glatiramer acetate (Copaxone), Mycopehnolate (CellCept), Sirolimus (Rapamune).

Neuroprotective

THC
THCV
CBD

neu·ro·pro·tec·tive
adj \ˌn(y)u̇r-ō-prə-ˈtek-tiv\
Definition of NEUROPROTECTIVE
1. serving to protect neurons from injury or degeneration
—neu·ro·pro·tec·tion noun

“Neuroprotection refers to the relative preservation of neuronal structure and/or function. In the case of an ongoing insult (a neurodegenerative insult) the relative preservation of neuronal integrity implies a reduction in the rate of neuronal loss over time, which can be expressed as a differential equation. It is a widely explored treatment option for many central nervous system (CNS) disorders including neurodegenerative diseases, stroke, traumatic brain injury and spinal cord injury. Neuroprotection aims to prevent or slow disease progression and secondary injuries by halting or at least slowing the loss of neurons.” - Wikipedia

Useful for Treating Symptoms of: Alzheimer’s Disease, Amyotrophic Lateral Sclerosis (ALS), Diabetes, Epilepsy, Fibromyalgia, Glaucoma, HIV/AIDS, Insomnia, Migraine, Parkinson’s Disease, +MORE

Other Neuroprotective Drugs: ***Glutamate antagonists to treat Glutamate excitotoxicity -*** Estrogen (17β-Estradiol), Ginsenoside, Progesterone, Simvastatin. ***Antioxidants to treat Oxidative stress -*** Acetylcysteine, Crocin, Fish Oil, Minocycline, Pyrroloquinoline quinone (PQQ), Resveratrol, Vinpocetine, Vitamin E. ***Stimulants -*** Selegiline, Nicotine, Caffeine.

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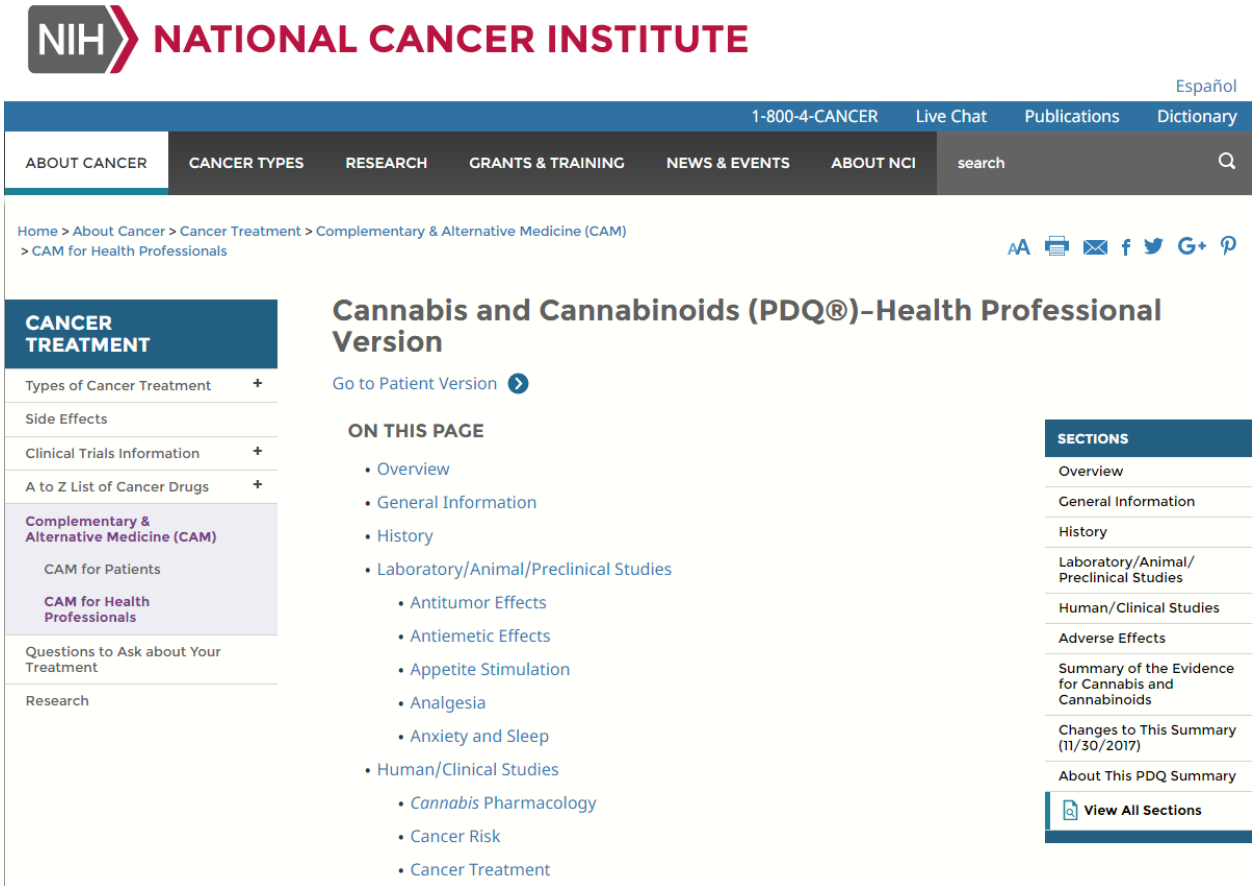
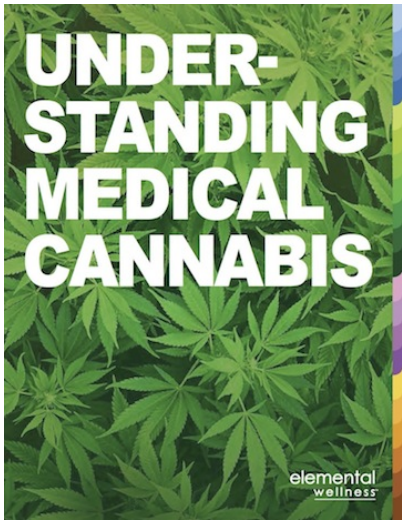
Chapter 5 - Combating cancer, Alzheimer's disease, autoimmune diseases, mood disorders, pain, and the opiate epidemic with cannabis.



Screenshot of the National Cancer Institute's website and page on cannabis for the treatment of cancer.

Here is the full hyperlink for those interested:
https://www.cancer.gov/about-cancer/treatment/cam/hp/cannabis-pdq#section/all

The Private Consultation Team at Elemental Wellness Center in San Jose



I'm going to throw a little curveball in the intro to this chapter. Yes, we're literally going to discuss how cannabis can combat cancer and save lives around the world; we're going to cover the neuroprotective properties of cannabis and how it can be used to fight Alzheimer's and other neurodegenerative diseases; we're also going to make sense of how this plant is safer and healthier than the common antidepressants prescribed for mood disorders and even sufferers of PTSD; and last but definitely not least; we're going to have an understanding of both how and why cannabis can significantly help to combat the opiate epidemic as well as how to safely alleviate pain and suffering with a simple herbal plant that cannot kill you.

But first, I'd like talk a little about the Private Consultation Team at Elemental Wellness Center in San Jose - it's an amazing cannabis club that to this day provides medical consultations to patients with various ailments and diseases across the country. It's scope as a medical cannabis collective operating under The Compassionate Use Act Proposition 215 have grown and shifted in light of legalization in the state of California, and the new Proposition 64 in effect has pushed most if not all legal operating dispensaries in the state of California to work towards building its recreational infrastructure. The complexity and evershifting policies of legal cannabis in this beautiful state are beyond the subject of this particular book, but suffice it to say, the current framework as of 2018 in the new young industry are far from perfect, there is a lot of education as well as experimentation that all around needs to be done by everyone getting involved, and that heavy taxations that came with the existing model of legalization in this state (as well as others) are not favorable to medical patients whom some desperately need access to this life saving medicine.

As a result of the current landscape of legal cannabis in California, with uncertainties facing many of the original medical patients, collectives, and small nonprofit businesses who have built this industry, unfortunately there is less of a focus on cannabis as a medicine, and rather as another recreational outlet which should be treated like alcohol and tobacco. One of the aims of this book is to prove that this is an erroneous stance. Yes the recreational use of cannabis is just as legitimate a right as any, but the lack of attention and focus on cannabis as an herbal plant medicine is an unfortunate and harmful side effect of improper regulation and misguided legal policies.

Now why did I mention the Private Consultation Team at Elemental Wellness Center? There was a time when a program within the collective allowed a team of qualified cannabis consultants to intake medical patients across a variety of diseases with a plethora of symptoms to document and record how they were treating themselves with cannabis. The team was formed with members who had their own set of ailments and symptoms as well - we had a member who had ulcerative colitis and crohn's disease, a member who was bipolar and had severe bouts of depression and social anxiety, a member who was a recovering opiate addict, a member whose mother had cancer, and members who had PTSD, and more - they all had the drive and goal to record and document legitimate medical cannabis and to help prove to the world through scientific research that this plant could literally save and give quality of life back to those suffering from some of the most difficult and life threatening diseases known - various cancers included.

The collective also had a doctor and access to many other medical professionals in order to aide in the effort (some of the lab testing facilities in the state such as Steep Hill and SC Labs, as well as the numerous doctors who throughout the state were making medical recommendations to legitimate medical patients). Last but not least it had me, their scientific researcher and founding lead. Our team in it's prime saw more than a 1000 patients, many recurring and willing to share their medical regiments, their personal experimentations with cannabis and what worked for them, and many to this day still frequent the quaint collective nestled in Silicon Valley. While the team no longer exists at the Elemental dispensary (again due to the changing landscape of recreational cannabis superseding the original medical cannabis industry in terms of interest and focus), there are still efforts and hope industry wide to bring what cannabis can do in the medical realm to light.

Our team's past work, however, represents a significant contribution to the information presented here; one of my goals in writing this book is to help share our research and findings, so that the medical and scientific communities throughout the world have a legitimate body of study with which to learn and refer to cannabis as the very powerful and versatile herbal medicine it is. The medical cannabis industry encompasses a growing and evolving body of scientific and medical work, it is hoped that professionals around the world continue to work and add to it in the years to come. This is totally real by the way, you can look them up and pay them a visit! 985 Timothy Dr, San Jose, California. Give em a call at 408-433-3344, here's their website at https://elementalwellnesscenter.com/
Check out the mini library I helped put together on medical cannabis if you ever get a chance to visit them in person!

Now, without further delay some proposed treatments on combating Cancer, and so much more!

Combating Cancer With Cannabis

Image from the author's first cannabis grow project.

Defining Cancer:

"Cancer is the name given to a collection of related diseases. In all types of cancer, some of the body's cells begin to divide without stopping and spread to surrounding tissues.

Cancer can start almost anywhere in the human body, which is made up of trillions of cells. Normally, human cells grow and divide to form new cells as the body needs them. When cells grow old or become damaged, they die, and new cells take their place.

When cancer develops, however, this orderly process breaks down. As cells become more and more abnormal, old or damaged cells survive when they should die, and the new cells form when they are not needed. These extra cells can divide without stopping and may form growths called tumors.

Many cancers form solid tumors, which are masses of tissue. Cancers of the blood, such as leukemias, generally do not form solid tumors.

Cancerous tumors are malignant, which means they can spread into, or invade, nearby tissues. In addition, as these tumors grow, some cancer cells can break off and travel to distant places in the body through the blood of the lymph system and form new tumors far from the original tumor.

Unlike malignant tumors, benign tumors do not spread into, or invade, nearby tissues. Benign tumors can sometimes be quite large, however. When removed, they usually don't grow back, whereas malignant tumors sometimes do. Unlike most benign tumors elsewhere in the body, benign brain tumors can be life threatening."

(Quoted from the National Cancer Institute at: https://www.cancer.gov/about-cancer/understanding/what-is-cancer)

Approximately 39.6% of men and women will be diagnosed with cancer at some point during their lifetimes (based on 2010-2012 data).
(source: The National Cancer Institute, www.cancer.gov/about-cancer)

Now, there is a lot of buzz going around regarding cannabis as a cancer cure. This is inaccurate from a medical standpoint. Cannabis does not cure cancer, cannabinoids contained within cannabis as well as your own endocannabinoids kill cancer cells. There is a hard distinction between what is considered a cure and what is considered a treatment.

You can use cannabinoids as a treatment to safely kill off cancer cells, but the patient must make lifestyle changes (i.e., live healthier, avoid exposure to carcinogens, stop smoking, exercise, consume antioxidants and probiotics, eat healthier, etc.) in order to ensure that the cancer does not come back.

With that said, there are 4 mechanisms by which cannabinoids kill cancer cells (yes it was stated in chapter 1 and chapter 3, but this section deserves to have it included here as well):

Mechanisms through which Cannabinoids in Cannabis Kills Cancer Cells.

- **Anti-Proliferative** - Prevents cancer cells from reproducing.
- **Anti-Angiogenic** - Prevents formation of new blood vessels needed by the tumor to grow.
- **Antimetastatic** - Prevents cancer cells from spreading to other organs.
- **Apoptotic** - Causes cancer cells to die. When cannabinoids bind to the receptors of a cancer cell, a compound known as ceramide is produced which signals the cancer cell to shut off it's own mitochondria, causing the cancer cell to die.

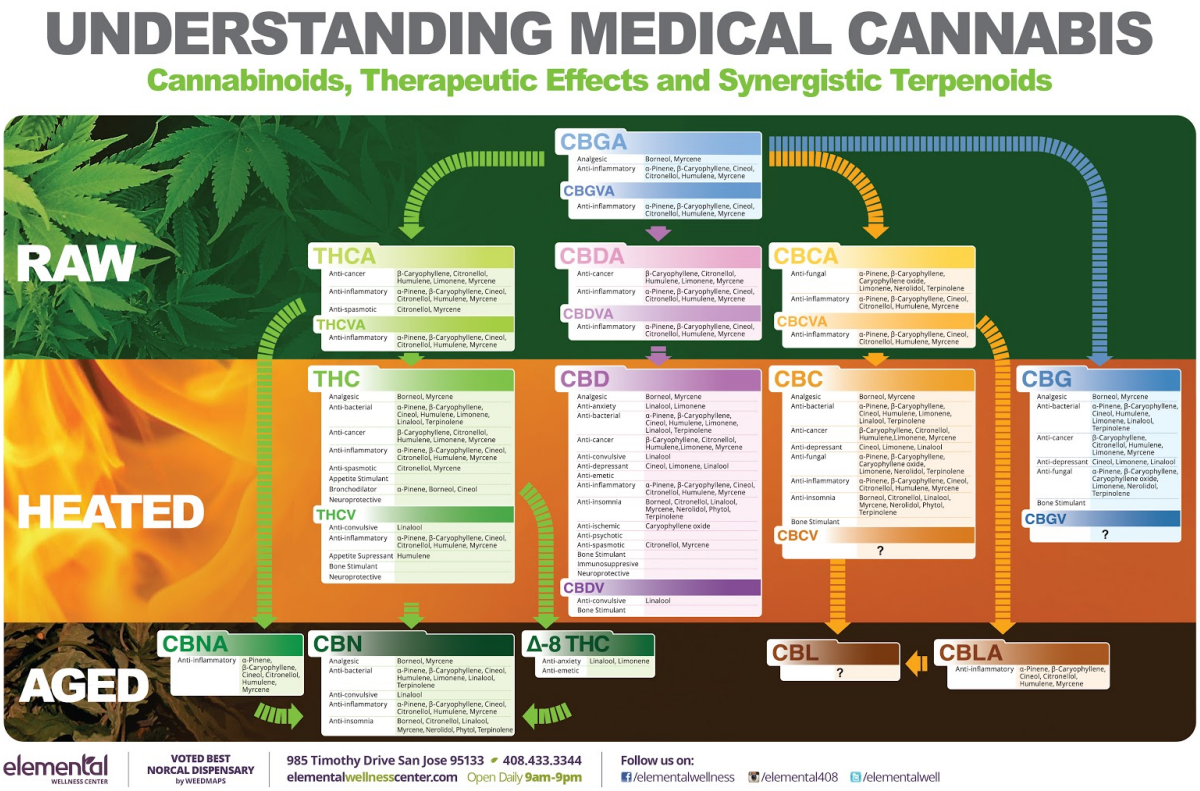
This is confirmed in *in vitro* (studies in cell cultures in petri dishes) and *in vivo* (studies in living animal models including but not limited to: rats, guinea pigs, monkeys, apes, even horses).
Unfortunately we still need double blind controlled clinical trials; this is illegal at the Federal level.

Scientists throughout the world are trying to understand fully how these mechanisms function, and this involves mapping out and understanding the **Endocannabinoid System**; not just for cancer, but for all of the various therapies possible with this emerging field of study. The main scientists behind these researches involve but are obviously not limited to: Dr Raphael Mechoulam (Israel), Dr Manuel Guzman (Spain), Dr Christina Sanchez (Spain), Dr Vincenzo De Marzo (Italy), Dr Lester Greenspoon (Harvard University), Professor Bob Melamede (University of Colorado), Dr Donald Abrams (San Francisco General Hospital), Dr Tod Mikuriya (deceased).

At the end of this chapter is a comprehensive list of medical research over the past 40 years surrounding cannabis and the following 11 cancers: **Bone related cancers, Breast Cancer, Colon and Colorectal Cancers, Gliomas, Leukemia, Lung Cancer, Lymphomas, Pancreatic Cancer, Ovarian Cancer, Prostate Cancer, and Skin Cancers (Melanoma)**. The very first Cannabis Cancer study was done in 1975 on Leukemia in mice models and was published in the Journal of the National Cancer Institute as "Antineoplastic activity of cannabinoids" by Munson, et al.

Utilizing Cannabinoids to Treat Cancer

Cannabis can be used as a multifaceted approach to treat cancer but has and **can only be professionally recommended as a treatment for the symptoms of cancer** - **nausea, appetite loss, weight loss, pain, depression, anxiety, and insomnia**. Marinol (Dronabinol) and Nabilone (Cesamet) are two synthetic cannabinoids mimicking THC that have been approved by the FDA. The latter was approved as a schedule II drug in 1985. None of the synthetic cannabinoids currently on the market are accompanied by the other valuable cannabinoids and terpenoids produced by the cannabis plant. It should be noted, however, that Sativex (Nabiximols) is a plant derived oral spray that has been approved in the UK (by GW Pharmaceuticals) for the purposes of treating pain, spasticity, and an overactive bladder in Multiple Sclerosis (MS) patients. However, it is important to consider that synthetic cannabinoids (marinol and nabilone) have been used in conjunction with chemotherapy over the past 30 years with mixed results.



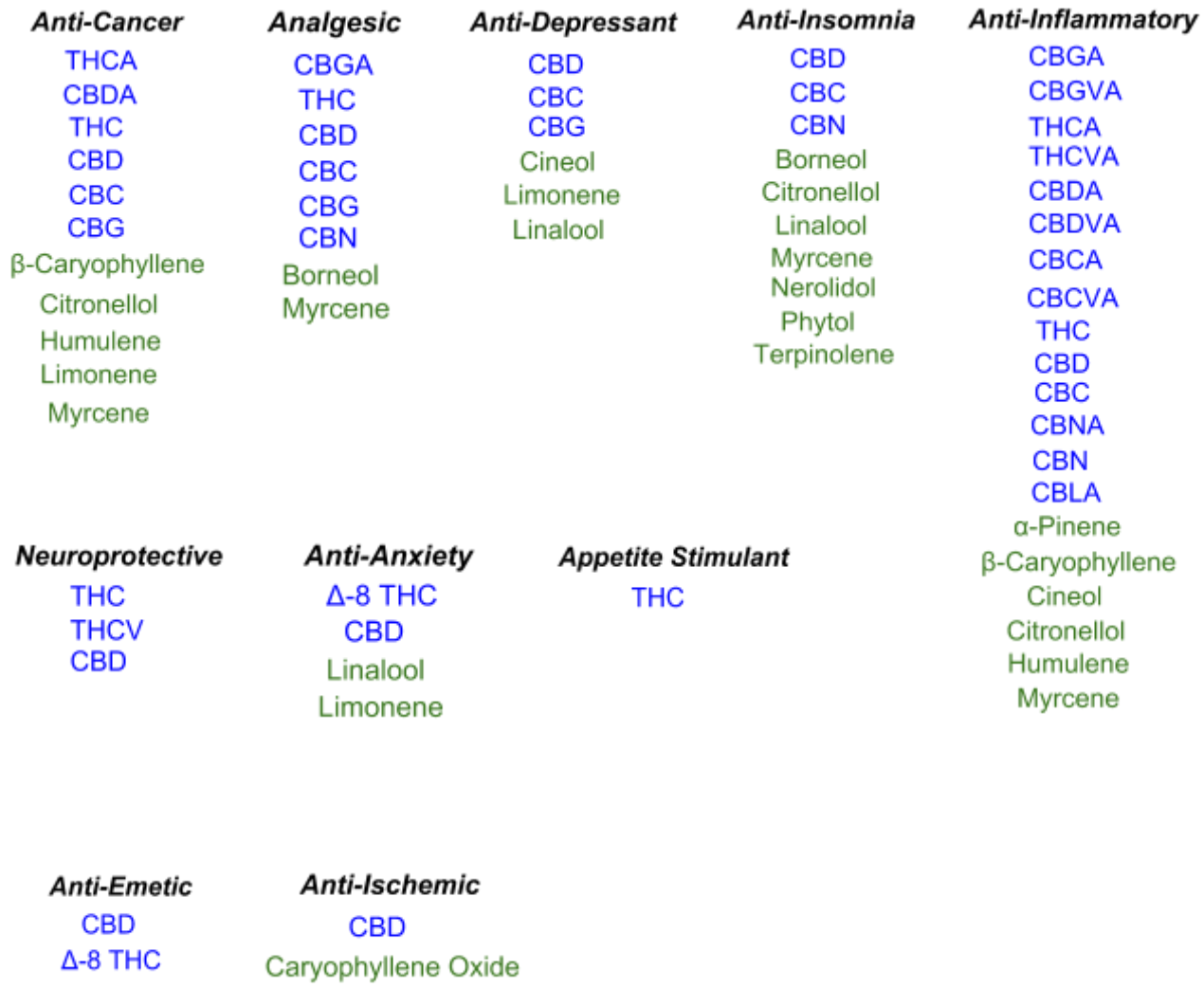
Utilizing the Cannabis Plant to Treat and Potentially Beat Cancer

Knowing what we now know of the individual compounds contained in the cannabis plant - the various properties of the cannabinoids (THC, CBD, CBN), the terpenoids, and how the **entourage effect** works, it becomes increasingly evident that the cannabis plant may be far more effective at treating cancer than we had thought. Successful case studies and medical research are finding more and more that this plant, which is remarkably non-toxic, can significantly aid with not just improving the quality of life for a cancer patient, but with potentially saving it.

In general, scientific studies have shown that natural cannabis may be quite useful for treating various kinds of cancers for the following reasons: **killing cancer cells, reducing possible inflammations caused by the cancer, significantly reducing pain, protecting from possible nerve damage caused by the cancer, helping to regulate blood flow should the cancer cause complications with this, acting as an immunosuppressant in the case of related cancers, helping to combat depression, helping to reduce anxiety, helping to combat insomnia, assisting with one's appetite, helping to reduce nausea**.

Beneficial Cannabinoids and Terpenoids Useful for Treating Various Cancers:

The cannabis plant offers a plethora of therapeutic benefits and contains cannabinoids and terpenoid compounds that may be useful in the treatment of various cancers and their debilitating symptoms. The following list denotes which cannabinoids and terpenoids work synergistically with each other for possible therapeutic benefit when it comes to the possible symptoms of cancer:



When managing the debilitating symptoms of cancer and side-effects of traditional anti-cancer treatments, cannabis based medicines with the above cannabinoid and/or terpenoid combinations can significantly help with the process of healing and recovery.

Fighting Cancer and Proposed Consumption Regiments

The Hypothesis - Utilizing phytocannabinoid based therapy the aim is to combat cancer in 3 major ways:

1) Targeting and killing the cancer cells directly via CB1 and CB2 activation of the endocannabinoid system for their respective functions in fighting off and killing tumors..
2) Boosting the immune system and attempting to restore homeostasis within the patient's body by correcting Clinical Endocannabinoid Deficiency (CED) in the patient by consuming cannabinoids.
3) Managing the other symptoms of cancer as well as the side effects of other possible medications and treatments being utilized in order to ease suffering and help to provide quality of life..

Daily Consumption and Dosing - Oral ingestion or direct application to a tumor cell site (topical application for melanoma skin cancers for example, or suppository application in the case of colon cancer).

In order to successfully cancer cells, a patient should consume 5-20 mg of THC and/or CBD per kg of his/her body weight.
(*This dose was borrowed from the US Patent Filing: Phytocannabinoids in the Treatment of Cancer*. Note that this patent actually experimented with doses of 1, 10, and 100 mg of THC per kg of body weight. The 5-20 mg range is a bit more practical for patient use).

Eg. A 175 lb man weighs roughly 79 kg. The minimum recommended dose at 5mg x 79 kg = 395 mg THC and/or CBD daily. If we use the high dosing, that same patient will be taking 20 mg x 79 kg = 1580 mg THC and/or CBD daily. Note that these doses are easier to achieve with THCA which is also non psychoactive - consuming raw cannabis or raw cannabis concentrate will achieve these high doses as well.

Proposed Treatment Options

High Cannabinoid Dosing for Killing Cancer Cells (there are options):

Utilizing high doses of cannabinoids, the goal with any of the following proposals is to outright kill cancer cells and prevent them from spreading with daily consumption of cannabis medicine. Again this will not outright cure cancer; the aim is to outpace the growth and proliferation by directly targeting tumors and cancer cell growth - cannabinoids can and will kill these cells, but may not always be sufficient if the disease has progressed too far. Increasing the dose with patients further progressed into their disease may not be a bad idea especially where raw cannabinoids are concerned.

- **Juicing Raw Cannabinoids** such as THCA, CBDA, and CBGA: 500-2000 mg or more daily**.**
- **High CBD with minimal THC consumption.** Possible with capsules & pills, tinctures: 300-2000 mg CBD or more daily. There needs to be a small amount of THC in the medicine so that the full effects of CBD will occur - this was discussed in the Entourage Effect in Chapter 3.
- **Full Extract Oil/Rick Simpson's Oil - high THC and or CBD:** 300-500 mg THC and 300-500 mg CBD (if possible) daily. Note that these doses of THC can be very inebriating even with the presence of CBD and this can cause temporary disability throughout the day. Best if this mode of consumption is done at night to help induce and maintain sleep.

Cannabis Options for Managing Specific Symptoms:

Depending on the type of cancer an individual has, he/she will no doubt experience a number of debilitating symptoms that may or may not be shared from one cancer patient to another. Cannabis can be used as a multifaceted tool to help manage many of these. Note that effective dosing will vary from individual to individual. Experimentation and self-titration will have to be done on the part of the patient in order to find what dose best works for him or her. The nice thing about cannabis, experimenting or increasing the dose won't kill an individual, nor will a patient develop a physical addiction dependency to cannabis medicine (you can't say that about opiates)! The following list offers recommended options for handling any of the possible symptoms of cancer and/or side-effects of cancer treatment. **Note that capsules and pills can be replaced with properly dosed edibles!*

- **Potential Chronic Pain**
    - **CBD(+/or)THC Capsules/Pills. Throughout the day.**
    - **CBD(+/or)THC Tinctures. Throughout the day or as needed.**
    - **Vaping "heavier" strains of cannabis: Flower, Cartridges, Concentrates. As Needed.** Terpene profiles that contain high testing amounts of Linalool, Myrcene, Borneol, Citronellol will contribute to a an anti-insomnia effect.
    - **Topical Lotions or Transdermal Patches with THC, CBD, CBN, CBG, for surface and skin pain. Applied throughout the day.** Terpene profiles that contain high testing amounts of α-Pinene, β-Caryophyllene, Myrcene, and Humulene will contribute to analgesic and anti-inflammatory effects.

- **Potential Insomnia**
    - **THC, CBD, CBN Capsules/pills. In the evenings as needed.**
    - **THC, CBD, CBN Tinctures. In the evenings as needed.**
    - **Vaping "heavier" strains of cannabis: Flower, Cartridges, Concentrates. As Needed.** Terpene profiles that contain high testing amounts of Linalool, Myrcene, Borneol, Citronellol will contribute to a an anti-insomnia effect.

- **Potential Anxiety and/or Depression**
    - **Vaping CBD: Flower, Cartridges, Concentrates. As Needed.**
    - **CBD (with minimal THC) Capsules/Pills. Throughout the day.**
    - **CBD (with minimal THC) Tinctures. Throughout the day or as needed.**

- **Potential Nausea and Vomiting**
    - **Vaping CBD: Flower, Cartridges, Concentrates. As Needed.**
    - **CBD capsules/pills. Throughout the day.**
    - **CBD tinctures. Throughout the day or as needed.**

- **Potential Appetite Loss and Wastings Syndrome**
    - **Vaping THC: Flower, Cartridges, Concentrates. As Needed.**
    - **THC Tinctures. As needed.**

- **Potential Complications with Nerve Damage or Nerve Pain**
    - **Vaping THC, THCV, CBD: Flower, Cartridges, Concentrates. As Needed.**
    - **CBD, THC, THCV Capsules/Pills. Throughout the day.**
    - **CBD, THC, THCV Tinctures. Throughout the day or as needed.**

- **Potential Symptoms of Inflammation Caused by the Cancer**
    - **For internal inflammation: CBD, THC, THCV, CBN, CBG Capsules/Pills. Throughout the day.**
    - **For external inflammation: Topical Lotions or Transdermal Patches with CBD,THC, THCV, CBN, CBG, for surface and skin pain. Applied throughout the day.** Terpene profiles that contain high testing amounts of α-Pinene, β-Caryophyllene, Myrcene, and Humulene will contribute to an anti-inflammatory effect.

- **Potential Complications of Irregular Blood Activity (Eg. Leukemia)**
    - **CBD Capsules/Pills. Throughout the day.**

Note that any of the aforementioned CBD medications should always contain a small amount of THC, and ideally other cannabinoids from the whole plant. These medical compounds work synergistically with each other for the best possible effect on the body.

Some Dosing Guidelines for THC Oral Consumption

(more was covered in the previous chapter 4 but for easy reference, these doses are a good starting point for individuals to consider when incorporating cannabis medicine such as capsules, pills, tinctures, and edibles into their regiments)

- **New User: 2.5 mg - 5 mg of THC**
- **Intermediate User: 10 mg - 30 mg THC**
- **Experienced User/Patient In Need of High Dose: 30+mg of THC**

If these doses are found to be ineffective, increase THC in 5-10 mg increments and self-titrate over several days to determine which is tolerable. CBD will be easier to experiment with due to its non-psychoactive nature, but keep in mind that a small amount of THC should be contained in the medicine to ensure that the full effects of CBD and the Entourage Effect are received. Again, CBD isolate is nowhere near as effective without accompanying cannabinoids.

Daily Maintenance Dose During and Post Cancer

In addition to outright attacking the cancer cells and tumors, one of the goals with utilizing cannabis medicine is to help promote homeostasis within one's own body; that is, an optimally and healthy functioning system. The cannabinoids contained within the cannabis plant, ones that a patient will already be consuming daily, help to stimulate and upregulate the endocannabinoid system, which scientists are finding is responsible for keeping a considerable number of bodily functions working properly. (See chapter 3's section on the endocannabinoid system for more details).

In order to correct Clinical Endocannabinoid Deficiency (also covered in chapter 3), the patient must simply continue to consume a steady dose of cannabinoids throughout the day. This can be in the form of eating cannabis edibles, continuing to juice cannabis raw, taking a daily regimen of consuming cannabis pills or tinctures, or even consuming other plants and vegetables that contain cannabinoids (this was also listed in chapter 3). Idealistically, once the cancer tumors have been killed or controlled, the patient can wean down from high doses of cannabinoids and take a fraction of the several hundred mg requirements. Symptoms should continue to be managed as needed in each individual patient, however, and dosing increases can be done without lethal harm to the individual if there is a sudden need to go back to high dosing.

Example Daily Regimens

Consider and imagine a couple of examples to illustrate how two patients with different forms of cancer may go about using cannabis to fight their ailment and symptoms.

- Patient 1 Jack has stage 3 prostate cancer that has not metastasized or spread yet. He is already feeling more and more sick since he was diagnosed and complains of the following problems: 1) he has chronic abdominal pain, 2) he is suffering from anxiety attacks, bouts of depression, and as a result is having problems sleeping. 3) the chemotherapy drugs he is currently taking are causing him nausea and to vomit, 4) he is having trouble working up an appetite and even when he does eat, he is unable to keep his food down.

- Patient 2 Jill has has stage 4 breast cancer that has metastasized to her skin and lymph nodes. Her situation is getting dire and she has already undergone chemotherapy and radiation therapy to which both have caused damage to her liver and her skin respectively. She also had to undergo breast removal surgery. Her primary symptoms include: 1) chronic pain throughout her body, both nerve and physical pain, 2) she is also suffering from the triad of anxiety, depression, and insomnia, 3) radiation therapy and her weakened immune system have caused her to develop rashes and parts of her skin are inflamed, 4) her drugs are causing her nausea and to vomit, 5) she is also having trouble with eating and keeping food down, 6) the aggressive spread of her cancer has caused her doctors to give up on trying conventional approaches. Her case has been classified as terminal and her medical care's goal is to now make her as comfortable as possible.

Both examples parallel real circumstances in cancer sufferers today, and while we are dealing with two very different forms of cancer, with Patient 2 having progressed more into her disease, both cases can be approached with medical cannabis. One of the approaches we utilized within the private consultation team was to break down a patient's disease by what symptoms he/she was suffering from in order to attempt to effectively treat them.

- Patient 1 Jack, after having done some extensive research into cannabis as a medicine, decides that he wishes to tackle attacking his prostate tumors by consuming large doses of CBD capsules with minimal amounts of THC on a daily basis. He weighs around 200 lbs (90 kg) and understands that he needs to take at least 5 mg of CBD (with small amounts of THC) per kg of his body weight. This translates to about 450 mg of CBD (along with small amounts of THC) on a daily basis. He decides to start with an increased dose and purchases CBD pills from his favorite dispensary. He decides to take 500 mg of these CBD pills (that contain small amounts of THC) daily. He breaks up his consumption of these pills to 3 times daily with each of his meals. He also decides to carry a CBD vape pen with him in case he starts suffering from sudden panic attacks or anxiety. Before meals, Jack likes to vape “daytime” cannabis flower strains with his PAX. At night an hour before bed, he also takes an edible with 50 mg of THC in order to help him go to and maintain his sleep. Last but not least, deciding that he is willing to do whatever it takes to fight his cancer, he also obtains 100 mg CBD suppositories (these also have a small amount of THC) from a medical cannabis dispensary and decides to apply them daily right before bed.

  With his thorough consumption of CBD during various parts of the day, the cannabinoids will actually contribute to most if not all of his 4 aforementioned symptoms: abdominal pain; his triad of anxiety, depression, and insomnia (the THC edible will also significantly help in this area); his nausea and vomiting; and even his appetite (vaping many strains of cannabis gives you the munchies as we all know). In an ideal scenario, so long as Jack maintains a healthy lifestyle and continues to consume his cannabis medicine daily, his tumors may actually shrink and his cancer go into recession. Note that this has actually happened in numerous case studies of prostate cancer patients who decided to experiment with cannabis.

- Patient 2 Jill after hearing that her Breast Cancer has progressed to stage 4 which has spread to her lymph nodes and parts of her skin, seeks desperate help from one of her friends who is a regular cannabis user. Having heard of positive results regarding Rick Simpson’s Oil/Full Extract Oil, she has her friend grab her 60 grams worth of the crude oil from a dispensary. She decides to take a gram of oil each day which contains approximately 500 mg of THC and 250 mg of CBD per gram. She starts consuming a gram of oil each night to help her sleep and she hopes to help deal with all of her cancer symptoms. In addition to the gram of oil each day, she also begins applying THC topical lotion made with coconut oil onto her rashes and lesions to help with the pain and inflammation caused by them. Last but not least, she tries to take several drops of CBD tinctures throughout the day to help her deal with the “hangovers” and grogginess caused by the high THC doses she is consuming.

  Throughout Jill’s treatment, with regular testing, doctors and scientists may actually find that some of her cancer cells and tumors are dying. However, even with her regular usage of Full Extract Oil, the damage already caused by her cancer, the surgeries and treatments she had to undergo, and the aggressive spread of her cancer to other parts of her body, it may actually be too late to save the patient’s life (though there are indeed cases of cannabis patients surviving various stage 4 cancers). Due to the high amounts of THC as well, she may very well be unconscious and asleep for much of the day. This may be a good thing, as she had previously not been able to comfortably maintain sleep and even during her waking hours, she is surprisingly feeling physically good; she may display a renewed sense of humor, enjoy eating and keeping her food down, and she is better able to deal with bouts of anxiety and depression.

A Word on Rick Simpson's Oil/Full Extract Oil

There are numerous case studies and success stories involving Rick Simpson's oil, a crude and simple but effective extraction of the cannabis plant's trichomes and cannabinoids. These oils are made using a grain alcohol to extract the medicine. The alcohol is then typically boiled off leaving a thick tarish oil (unfortunately many of the valuable terpenoids are also lost in the creation of the oil, but it is still an effective way to consume large amounts of THC and even CBD). More information about Rick Simpson can be found on pheonixtears.ca/ and the documentary "Run From the Cure". Credit should be given here as this documentary has helped to spark the conversation of cannabis as a cancer cure in the public eye. The oil is typically very potent when made. Unfortunately the medical and scientific community does not currently recognize these oils as official medications for the treatment of cancer.

Anti-Cancer Fruits and Vegetables to Juice with Cannabis

There is significant attention being given to the practice of juicing not only cannabis, but other fruits and vegetables for the various health benefits associated with this rising trend. Research into this particular field, especially as it pertains to cannabis, is still new, but there are a significant amount of case studies, especially by Dr William Courtney out in Mendocino county, where patients with life threatening diseases such as Lupus have seen a significant benefit in either saving their lives or at the very least providing a better quality of life for those wishing to try juicing. This may be a viable method of treatment for cancer patients who wish to try consuming large amounts of cannabinoids - the raw acidic forms of these compounds are non-psychoactive making it easier to consume large doses. An excellent resource for this is the documentary [LEAF]: The Health Benefits of Juicing Cannabis.

The following list covers some of the most recommended fruits and vegetables associated with combating cancer.

Blueberries

- **Anthocyanin** compounds in blueberries make it one of the most rich fruits that contain antioxidants that may also help with memory and with preventing cognitive problems associated with aging.

Cruciferous Vegetables - Broccoli, Cabbage, Collards, Kale

- This class of vegetables contains **diindolylmethane, sulforphane, and selenium** compounds.
- **Diindolylmethane** - helps to protect against breast, uterine, and colorectal cancer. Reduces enlarged prostate.
- **Sulforphane** - helps to protect against prostate cancer.
- **Selenium** - helps to protect against breast and prostate cancer. Potent antioxidant.

Fresh Mangoes

- High in **Myrcene** which has anti-cancerous properties.
- Contains **antioxidants quercetin, isoquercitrin, astragalin, fisetin, gallica acid, and methylgallat** which help to protect against colon, breast, leukemia, and prostate cancers.
- The **vitamins C** and **A** in mangoes and the various carotenoids help to strengthen your immune system.

Fresh Oranges and Orange Rind (the white stuff)

- **Vitamin C** is a powerful antioxidant.
- The **herperidin** molecule is a **flavanoid** found in the inner white pulp of the orange; it contains powerful anti-inflammatory properties and is being studied for anti-cancerous properties currently.
- Said to help with reducing cardiovascular disease (CVD) and with preventing stomach cancers.

Raw Carrots!

- **Carotenoid** compounds in carrots possess powerful antioxidant properties.
- Studies have shown that carrots can also significantly help reduce cardiovascular disease (CVD).
- Contains **polyacetylenes** which have been shown to help inhibit the growth of colon cancer cells.

Dr William Courtney Juicing Cannabis.

The Reality of Cannabis and Cancer

Cannabis has been studied for the treatment of cancer for the past 40 years and there are volumes of medical and scientific literature calling for further research, double blind clinical trials, and for the rescheduling of cannabis as a drug. Some of these can be found at the end of the chapter. While this may open up a can of worms for people who may be furious at learning that scientists, doctors, and even the government knew about the anti-cancer properties of cannabis since the 70s, here it is again, from 1975 published in the Journal of the National Cancer Institute, Antineoplastic activity of cannabinoids. It should be stressed that as more research is done and as more individual case studies/success stories come forward, it is going to be increasingly hard for society to continue to turn a blind eye to this powerful medicine. Has an egregious and inhumane injustice been committed by keeping the general public in the dark about how medically powerful the cannabis herb really is? Could we have saved the lives of countless cancer sufferers if the War on Drugs never happened and government lies were not used to manipulate people into believing racist propaganda? These haunting questions, while hard to fathom, should indeed be asked by people around the world. Think of those you know who suffer from this disease, and consider that hundreds of thousands of individuals die each year from various types of cancer. It is one of the most difficult set of conditions to treat and yet here we have this herbal superplant that could significantly ease suffering in most if not all cancer sufferers. It is a tough notion to ponder, but let's all do so and move forward - there are people out there who desperately need this plant.

Incorporating cannabis into the medical arsenal for combating cancer is something that we should hope to see in the future - our experiences as cannabis consultants allowed us to see firsthand the success stories, the survivors, and the real patients that have made the courageous choice to try an alternative approach. There is daily proof of the medical efficacy of this plant, and it is seen throughout the world and success stories with this amazing herb are becoming more and more common.

Alzheimer's Disease (AD)

Alzheimer's Disease is a neurodegenerative disorder characterized by the progressive degeneration of an individual's brain tissue. It is the most common form of dementia and symptoms of the disease typically begin with memory impairment which then progress to cognitive dysfunction, difficulties with comprehension, loss of physical coordination, speech impairment, possible psychosis, severe mental decline, and ultimately death. How quickly the disease progresses varies from individual to individual and unfortunately the symptoms of the disease are often mistaken for "signs of age" in sufferers.

Although the disease mostly affects people over the age of 65, the disease is not a natural result of aging. The exact causes of Alzheimer's Disease are still unknown, and sadly there is currently no known cure.

- **More than 5 million Americans are living with Alzheimer's. By 2050 this number could be as high as 16 million.**
    - Every 66 Seconds someone in the United States develops the disease.
    - **1 in 3 seniors dies with Alzheimer's or another dementia. It is the 6th leading cause of death in the United States. It kills more than breast and prostate cancer combined**.

(Source: Alzheimer's Association, www.alz.org/facts)

Using Cannabis to Treat Alzheimer's Disease

Cannabis is a complex medicinal plant that may actually be used to treat a variety of debilitating symptoms caused by a surprisingly large number of ailments. It's usefulness as a non-lethal medicine (you cannot die from an overdose of cannabis) cannot be overstated and it's versatility in terms of how it can be consumed and as to how it can be useful for so many illnesses is something to be excited about. However, it is important to remember that consulting with your primary care physician should be your first priority when considering incorporating cannabis into one's medical regiment and that cannabis is to be used as an adjunct therapy and not a replacement. It is also your responsibility to communicate with your doctor as to how your use of cannabis has affected your health and of your progress with utilizing medical cannabis.

It is exciting to know that the number of medical studies surrounding cannabis as a potential treatment for Alzheimer's disease has grown over the past decade. Currently, there is a lot of interest in the neuroprotective properties of both Tetrahydrocannabinol (THC) and Cannabidiol (CBD), and one study published in the British Journal of Pharmacology by Campbell, et al in Jan 2009 concluded that, "...cannabinoids offer a multi-faceted approach for the treatment of Alzheimer's disease by providing neuroprotection and reducing neuroinflammation, whilst simultaneously supporting the brain's intrinsic repair mechanisms by augmenting neurotrophin expression and neurogenesis."

In general, scientific studies have shown that Cannabis may be quite useful for treating individuals suffering from Alzheimer's disease for the following reasons: **slowing disease progression; reducing anxiety; mood enhancing for dealing with depression; preventing possible psychosis; reducing agitation and night time tossing and turning; and stimulating appetite to aid with weight gain.**

Beneficial Cannabinoids and Terpenoids Useful for Treating Alzheimer's:

The cannabis plant offers a plethora of therapeutic benefits and contains cannabinoids and terpenoid compounds that are useful in the treatment of Alzheimer's disease. Once again, THC and CBD have been the focus of much attention when it comes to medical research into the ailment, and it is important to remember that there are still other cannabinoids and even terpenoids that may help with treating the disease.

The following list denotes which cannabinoids and terpenoids work synergistically with each other for possible therapeutic benefit:

Anti-Insomnia

CBD
CBC
CBN
Borneol
Citronellol
Linalool
Myrcene
Nerolidol
Phytol
Terpinolene

Anti-Depressant

CBD
CBC
CBG
Cineol
Limonene
Linalool

Neuroprotective

THC
THCV
CBD

Appetite Stimulant

THC

Anti-Anxiety

Δ-8 THC
CBD
Linalool
Limonene

Anti-Psychotic

CBD

Cannabis Options for Managing Specific Symptoms:

Cannabis can be used as a multifaceted tool to help manage many of these. Note that effective dosing will vary from individual to individual. Experimentation and self-titration will have to be done on the part of the patient in order to find what dose best works for him or her. The nice thing about cannabis, experimenting or increasing the dose won't kill an individual, nor will a patient develop a physical addiction dependency to cannabis medicine (you can't say that about opiates)! The following list offers recommended options for handling any of the possible symptoms of cancer and/or side-effects of cancer treatment. **Note that capsules and pills can be replaced with properly dosed edibles!*

- **Potential Insomnia**
    - **THC, CBD, CBN Capsules/pills. In the evenings as needed.**
    - **THC, CBD, CBN Tinctures. In the evenings as needed.**
    - **Vaping "heavier" strains of cannabis: Flower, Cartridges, Concentrates. As Needed.** Terpene profiles that contain high testing amounts of Linalool, Myrcene, Borneol, Citronellol will contribute to a an anti-insomnia effect.

- **Potential Anxiety and/or Depression**
    - **Vaping CBD: Flower, Cartridges, Concentrates. As Needed.**
    - **CBD (with minimal THC) Capsules/Pills. Throughout the day.**
    - **CBD (with minimal THC) Tinctures. Throughout the day or as needed.**

- **Potential Psychosis**
    - **Vaping CBD: Flower, Cartridges, Concentrates. As Needed.**
    - **CBD (with minimal THC) Capsules/Pills. Throughout the day.**
    - **CBD (with minimal THC) Tinctures. Throughout the day or as needed.**

- **Potential Appetite Loss and Wastings Syndrome**
    - **Vaping THC: Flower, Cartridges, Concentrates. As Needed.**
    - **THC Tinctures. As needed.**

- **Potential Complications with Nerve Damage or Nerve Pain**
    - **Vaping THC, THCV, CBD: Flower, Cartridges, Concentrates. As Needed.**
    - **CBD, THC, THCV Capsules/Pills. Throughout the day.**
    - **CBD, THC, THCV Tinctures. Throughout the day or as needed.**

Some Dosing Guidelines for THC Oral Consumption

(more was covered in the previous chapter 4 but for easy reference, these doses are a good starting point for individuals to consider when incorporating cannabis medicine such as capsules, pills, tinctures, and edibles into their regiments)

- **New User: 2.5 mg - 5 mg of THC**
- **Intermediate User: 10 mg - 30 mg THC**
- **Experienced User/Patient In Need of High Dose: 30+mg of THC**

If these doses are found to be ineffective, increase THC in 5-10 mg increments and self-titrate over several days to determine which is tolerable. CBD will be easier to experiment with due to its non-psychoactive nature, but keep in mind that a small amount of THC should be contained in the medicine to ensure that the full effects of CBD and the Entourage Effect are received. Again, CBD isolate is nowhere near as effective without accompanying cannabinoids.

Note that any of the aforementioned CBD medications should always contain a small amount of THC, and ideally other cannabinoids from the whole plant. These medical compounds work synergistically with each other for the best possible effect on the body.

Anxiety Disorder

While all human beings experience anxiety throughout their lives, Anxiety Disorders are a set of mental illnesses characterized by chronic and overwhelming emotions of fear, anxiousness, restlessness, and crippling worrying. Examples of Anxiety Disorders include: Panic Disorder (which may cause complications of the heart); Social Anxiety Disorder; Selective Mutism (an inability to speak during specific but otherwise normal situations); various Phobias; Agoraphobia; Anxiety associated with Post Traumatic Stress Disorder (PTSD); Substance Induced Anxiety (alcohol abuse; drug abuse; opiate abuse; and even medication induced); and Generalized Anxiety Disorders which run the gamut of social hangups; disproportionate thinking; unhealthy obsessions; and so on.

These ailments are very debilitating and they are a major obstacle that sufferers face preventing them from leading a normal life. Resulting symptoms of these disorders include: problems with sleeping (insomnia); excessive sweating; irrational panicking; physical numbness; dizziness and nausea; heart palpitations; an inability to stay still and stay calm; painful muscle tensions and cramps; shortness of breath; and an inability to act or perform simple tasks.

Anxiety Disorders may either be developed through significant stressful incidents or situations in a sufferer's life, or they may be hereditary. Thankfully, there are numerous therapies and medications that may help an individual treat and possibly rid themselves of their disorder.

Using Cannabis to Treat Anxiety Disorders:

Cannabis is a complex medicinal plant that may actually be used to treat a variety of debilitating symptoms caused by a surprisingly large number of ailments. It's usefulness as a non-lethal medicine (you cannot die from an overdose of cannabis) cannot be overstated and it's versatility in terms of how it can be consumed and as to how it can be useful for so many illnesses is something to be excited about. However, it is important to remember that consulting with your primary care physician should be your first priority when considering incorporating cannabis into one's medical regiment and that cannabis is to be used as an adjunct therapy and not a replacement. It is also your responsibility to communicate with your doctor as to how your use of cannabis has affected your health and of your progress with utilizing medical cannabis.

Currently, much of the ongoing research regarding Cannabis' ability to help with reducing anxiety has been focused on the powerful anxiolytic (anti-anxiety and anti-panic) properties of Cannabidiol (CBD). Overall, exciting studies have shown that Cannabis may be quite useful for treating individuals suffering from Anxiety Disorders for the following reasons: **significantly reducing anxiety itself; helping to manage possible depression associated with the anxiety disorder; helping to reduce nausea during a panic attack; assisting with sleep should the anxiety disorder cause insomnia; and with preventing possible psychosis.**

Beneficial Cannabinoids and Terpenoids Useful for Treating Anxiety Disorders:

The cannabis plant offers a plethora of therapeutic benefits and contains cannabinoids and terpenoid compounds that are useful for treating some of the possible symptoms caused by an Anxiety Disorder. While much of the interest in treating an Anxiety Disorder with cannabis involves CBD, the following chart denotes which cannabinoids and terpenoids also work synergistically with each other for possible therapeutic benefit:

Anti-Anxiety	*Anti-Depressant*	*Anti-Emetic*	*Anti-Insomnia*	*Anti-Psychotic*
Δ-8 THC	CBD	CBD	CBD	CBD
CBD	CBC		CBC	
Linalool	CBG		CBN	
Limonene	Cineol		Borneol	
	Limonene		Citronellol	
	Linalool		Linalool	
			Myrcene	
			Nerolidol	
			Phytol	
			Terpinolene	

Cannabis Options for Managing Specific Symptoms:

Cannabis can be used as a multifaceted tool to help manage many of these. Note that effective dosing will vary from individual to individual. Experimentation and self-titration will have to be done on the part of the patient in order to find what dose best works for him or her. The nice thing about cannabis, experimenting or increasing the dose won't kill an individual, nor will a patient develop a physical addiction dependency to cannabis medicine (you can't say that about opiates)! The following list offers recommended options for handling any of the possible symptoms of cancer and/or side-effects of cancer treatment. **Note that capsules and pills can be replaced with properly dosed edibles!*

- **Anxiety and/or Depression**
    - **Vaping CBD: Flower, Cartridges, Concentrates. As Needed.**
    - **CBD (with minimal THC) Capsules/Pills. Throughout the day.**
    - **CBD (with minimal THC) Tinctures. Throughout the day or as needed.**
- **Potential Insomnia**
    - **THC, CBD, CBN Capsules/pills. In the evenings as needed.**
    - **THC, CBD, CBN Tinctures. In the evenings as needed.**
    - **Vaping "heavier" strains of cannabis: Flower, Cartridges, Concentrates. As Needed.** Terpene profiles that contain high testing amounts of Linalool, Myrcene, Borneol, Citronellol will contribute to a an anti-insomnia effect.
- **Potential Nausea and Vomiting**
    - **Vaping CBD: Flower, Cartridges, Concentrates. As Needed.**
    - **CBD capsules/pills. Throughout the day.**
    - **CBD tinctures. Throughout the day or as needed.**

- **Potential Appetite Loss and Wastings Syndrome**

    - **Vaping THC: Flower, Cartridges, Concentrates. As Needed.**
    - **THC Tinctures. As needed.**

- **Potential Psychosis**

    - **Vaping CBD: Flower, Cartridges, Concentrates. As Needed.**
    - **CBD (with minimal THC) Capsules/Pills. Throughout the day.**
    - **CBD (with minimal THC) Tinctures. Throughout the day or as needed.**

Some Dosing Guidelines for THC Oral Consumption

(more was covered in the previous chapter 4 but for easy reference, these doses are a good starting point for individuals to consider when incorporating cannabis medicine such as capsules, pills, tinctures, and edibles into their regiments)

- **New User: 2.5 mg - 5 mg of THC**
- **Intermediate User: 10 mg - 30 mg THC**
- **Experienced User/Patient In Need of High Dose: 30+mg of THC**

If these doses are found to be ineffective, increase THC in 5-10 mg increments and self-titrate over several days to determine which is tolerable. CBD will be easier to experiment with due to its non-psychoactive nature, but keep in mind that a small amount of THC should be contained in the medicine to ensure that the full effects of CBD and the Entourage Effect are received. Again, CBD isolate is nowhere near as effective without accompanying cannabinoids.

Note that any of the aforementioned CBD medications should always contain a small amount of THC, and ideally other cannabinoids from the whole plant. These medical compounds work synergistically with each other for the best possible effect on the body.

Depression (Major/Clinical Depression)

While most individuals experience sadness and even depression from time to time given life events and circumstances, Clinical or Major Depression is a form of developed mental illness that severely affects individuals. The symptoms of the ailment include significant loss of energy, feelings of worthlessness and guilt on a daily basis, difficulties in making decisions, lack of interest in personal responsibilities, chronic restlessness, insomnia and/or excessive sleep, persistent feelings of sorrow or loss, significant gain or loss of weight, and chronic thoughts of suicide and death.

Major/Clinical Depression can last for years, even the lifespan of the sufferer; Dysthymia, a type of chronic long lasting depression often accompanies Major Depression. The illness makes living a normal life for the individual very difficult and unfortunately there is no set cure or therapy that will remedy the ailment. There are, however, a wide variety of psychological therapies and medications that may help the sufferer cope with and ultimately get past the ailment and it's debilitating symptoms.

- **The most commonly diagnosed form of depression is Major Depressive Disorder. Depression is the leading cause of disability in the United States among people ages 15-44.**

    - There are approximately 25 million Americans who suffer from depression every year.
    - Over 50 percent of all people who die by suicide suffer from major depression.
    - More Americans suffer from depression than coronary heart disease, cancer, and HIV/AIDS.

    (Source: American Foundation for Suicide Prevention, https://afsp.donordrive.com/index)

Using Cannabis to Treat Depression:

Cannabis is a complex medicinal plant that may actually be used to treat a variety of debilitating symptoms caused by a surprisingly large number of ailments. It's usefulness as a non-lethal medicine (you cannot die from an overdose of cannabis) cannot be overstated and it's versatility in terms of how it can be consumed and as to how it can be useful for so many illnesses is something to be excited about. However, it is important to remember that consulting with your primary care physician should be your first priority when considering incorporating cannabis into one's medical regiment and that cannabis is to be used as an adjunct therapy and not a replacement. It is also your responsibility to communicate with your doctor as to how your use of cannabis has affected your health and of your progress with utilizing medical cannabis.

With that said, exciting studies have shown that Cannabis and the non-psychoactive compound Cannabidiol (CBD) may be quite useful for treating individuals suffering from Depression for the following reasons: **elevating mood levels to combat depression; reducing anxiety; and aiding with sleep to battle insomnia.**

Beneficial Cannabinoids and Terpenoids Useful for Treating Depression:

The cannabis plant offers a plethora of therapeutic benefits and contains cannabinoids and terpenoid compounds that are useful for tackling the symptoms of Clinical Depression.

The following chart denotes which cannabinoids and terpenoids work synergistically with each other for possible therapeutic benefit:

Anti-Depressant	*Anti-Anxiety*	*Anti-Insomnia*
CBD	Δ-8 THC	CBD
CBC	CBD	CBC
CBG	Linalool	CBN
Cineol	Limonene	Borneol
Limonene		Citronellol
Linalool		Linalool
		Myrcene
		Nerolidol
		Phytol
		Terpinolene

Cannabis Options for Managing Specific Symptoms:

Cannabis can be used as a multifaceted tool to help manage many of these. Note that effective dosing will vary from individual to individual. Experimentation and self-titration will have to be done on the part of the patient in order to find what dose best works for him or her. The nice thing about cannabis, experimenting or increasing the dose won't kill an individual, nor will a patient develop a physical addiction dependency to cannabis medicine (you can't say that about opiates)! The following list offers recommended options for handling any of the possible symptoms of cancer and/or side-effects of cancer treatment. **Note that capsules and pills can be replaced with properly dosed edibles!*

- **Depression and/or Anxiety**
    - **Vaping CBD: Flower, Cartridges, Concentrates. As Needed.**
    - **CBD (with minimal THC) Capsules/Pills. Throughout the day.**
    - **CBD (with minimal THC) Tinctures. Throughout the day or as needed.**

- **Potential Insomnia**
    - **THC, CBD, CBN Capsules/pills. In the evenings as needed.**
    - **THC, CBD, CBN Tinctures. In the evenings as needed.**
    - **Vaping "heavier" strains of cannabis: Flower, Cartridges, Concentrates. As Needed.** Terpene profiles that contain high testing amounts of Linalool, Myrcene, Borneol, Citronellol will contribute to a an anti-insomnia effect.

Some Dosing Guidelines for THC Oral Consumption

(more was covered in the previous chapter 4 but for easy reference, these doses are a good starting point for individuals to consider when incorporating cannabis medicine such as capsules, pills, tinctures, and edibles into their regiments)

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- **Experienced User/Patient In Need of High Dose: 30+mg of THC**

If these doses are found to be ineffective, increase THC in 5-10 mg increments and self-titrate over several days to determine which is tolerable. CBD will be easier to experiment with due to its non-psychoactive nature, but keep in mind that a small amount of THC should be contained in the medicine to ensure that the full effects of CBD and the Entourage Effect are received. Again, CBD isolate is nowhere near as effective without accompanying cannabinoids.

Note that any of the aforementioned CBD medications should always contain a small amount of THC, and ideally other cannabinoids from the whole plant. These medical compounds work synergistically with each other for the best possible effect on the body.

Epilepsy (Seizure Disorder)

Epilepsy is a neurological disorder characterized by irregular and unusual electrical activity in the sufferer's brain and central nervous system; the resulting seizure symptoms come in many varieties and they can range from simple unusual behavior, to uncontrollable blinking, confusion spells, a high chance of loss of consciousness, uncontrollable jerking and moving of one's arms and legs (twitching and spasming), to a high possibility of self harm (biting one's tongue or harming one's body by hitting something during a seizure). Further symptoms include nausea and vomiting after a seizure; depression and anxiety resulting from having to manage the ailment; insomnia and migraines; and even psychosis. There are many types of seizures and they range from mild to the more notorious grand mal seizures that can have life threatening potential.

While the cause of most cases of Epilepsy are unknown, it is possible to develop the ailment through brain damage or injury, complications at birth, brain cancer, stroke, and through alcohol and drug abuse. While seizures can be managed by a number of therapies and medications, there is currently no known cure for Epilepsy.

- In 2015 the CDC recorded 1.2% of the US population as having epilepsy. This accounts for 3.4 million people nationwide. Broken down, this translates to roughly 3 million adults, and 470,000 children.

  (Source: The Centers for Disease Control CDC, www.cdc.gov/epilepsy/data)

Using Cannabis to Treat Epilepsy:

Cannabis is a complex medicinal plant that may actually be used to treat a variety of debilitating symptoms caused by a surprisingly large number of ailments. It's usefulness as a non-lethal medicine (you cannot die from an overdose of cannabis) cannot be overstated and it's versatility in terms of how it can be consumed and as to how it can be useful for so many illnesses is something to be excited about. However, it is important to remember that consulting with your primary care physician should be your first priority when considering incorporating cannabis into one's medical regiment and that cannabis is to be used as an adjunct therapy and not a replacement. It is also your responsibility to communicate with your doctor as to how your use of cannabis has affected your health and of your progress with utilizing medical cannabis.

It is both exciting and important to know that medical cannabis is currently being heavily studied for a number of therapeutic effects that may treat this ailment; most noteworthy, the cannabinoid compounds Tetrahydrocannabinol (THC), Cannabidiol (CBD), CBN (Cannabinol) and even THCV (Tetrahydrocannabivarin) for their ability to manage and reduce seizures in those suffering from Epilepsy.

Overall, medical and scientific studies throughout the past several years and even decades have shown that Cannabis may be quite useful for treating individuals suffering from Epilepsy for the following reasons: **reducing the frequency of seizures; protecting the brain from further damage and degeneration; assisting with possible psychosis; helping to manage depression; easing possible anxiety; aiding with sleep; and providing significant pain relief.**

Beneficial Cannabinoids and Terpenoids Useful for Treating Epilepsy:
The cannabis plant offers a plethora of therapeutic benefits and contains cannabinoids and terpenoid compounds that are useful for treating the symptoms of Epilepsy.

The following chart denotes which cannabinoids and terpenoids work synergistically with each other for potential therapeutic benefit.

Analgesic	*Anti-Convulsive*	*Anti-Spasmotic*	*Neuroprotective*	*Anti-Depressant*
CBGA THC CBD CBC CBG CBN Borneol Myrcene	THCV CBD CBN Linalool	THCA THC CBD Citronellol Myrcene	THC THCV CBD	CBD CBC CBG Cineol Limonene Linalool

Anti-Anxiety	*Anti-Psychotic*	*Anti-Emetic*	*Anti-Insomnia*
Δ-8 THC CBD Linalool Limonene	CBD	CBD	CBD CBC CBN Borneol Citronellol Linalool Myrcene Nerolidol Phytol Terpinolene

Cannabis Options for Managing Specific Symptoms:

Cannabis can be used as a multifaceted tool to help manage many of these. Note that effective dosing will vary from individual to individual. Experimentation and self-titration will have to be done on the part of the patient in order to find what dose best works for him or her. The nice thing about cannabis, experimenting or increasing the dose won't kill an individual, nor will a patient develop a physical addiction dependency to cannabis medicine (you can't say that about opiates)! The following list offers recommended options for handling any of the possible symptoms of cancer and/or side-effects of cancer treatment. **Note that capsules and pills can be replaced with properly dosed edibles!*

- **Potential Tremors and or Seizures**
    - **CBD(+/or)THC Capsules/Pills. Can also try adding CBN and THCV. Throughout the day.**
    - **CBD(+/or)THC Tinctures. Can also try adding CBN and THCV. Throughout the day or as needed.**
    - **Vaping "heavier" strains of cannabis: Flower, Cartridges, Concentrates. As Needed.** Terpene profiles that contain high testing amounts of Linalool, Myrcene, Citronellol will contribute to managing seizures and tremors.

- **Potential Chronic Pain**
    - **CBD(+/or)THC Capsules/Pills. Throughout the day.**
    - **CBD(+/or)THC Tinctures. Throughout the day or as needed.**
    - **Vaping "heavier" strains of cannabis: Flower, Cartridges, Concentrates. As Needed.** Terpene profiles that contain high testing amounts of Linalool, Myrcene, Borneol, Citronellol will contribute to a an anti-insomnia effect.
    - **Topical Lotions or Transdermal Patches with THC, CBD, CBN, CBG, for surface and skin pain. Applied throughout the day.** Terpene profiles that contain high testing amounts of α-Pinene, β-Caryophyllene, Myrcene, and Humulene will contribute to analgesic and anti-inflammatory effects.

- **Potential Insomnia**
    - **THC, CBD, CBN Capsules/pills. In the evenings as needed.**
    - **THC, CBD, CBN Tinctures. In the evenings as needed.**
    - **Vaping "heavier" strains of cannabis: Flower, Cartridges, Concentrates. As Needed.** Terpene profiles that contain high testing amounts of Linalool, Myrcene, Borneol, Citronellol will contribute to a an anti-insomnia effect.

- **Potential Anxiety and/or Depression**
    - **Vaping CBD: Flower, Cartridges, Concentrates. As Needed.**
    - **CBD (with minimal THC) Capsules/Pills. Throughout the day.**
    - **CBD (with minimal THC) Tinctures. Throughout the day or as needed.**

- **Potential Nausea and Vomiting**
    - **Vaping CBD: Flower, Cartridges, Concentrates. As Needed.**
    - **CBD capsules/pills. Throughout the day.**
    - **CBD tinctures. Throughout the day or as needed.**

- **Potential Appetite Loss and Wastings Syndrome**

    - **Vaping THC: Flower, Cartridges, Concentrates. As Needed.**
    - **THC Tinctures. As needed.**

- **Potential Complications with Nerve Damage or Nerve Pain**

    - **Vaping THC, THCV, CBD: Flower, Cartridges, Concentrates. As Needed.**
    - **CBD, THC, THCV Capsules/Pills. Throughout the day.**
    - **CBD, THC, THCV Tinctures. Throughout the day or as needed.**

Some Dosing Guidelines for THC Oral Consumption

(more was covered in the previous chapter 4 but for easy reference, these doses are a good starting point for individuals to consider when incorporating cannabis medicine such as capsules, pills, tinctures, and edibles into their regiments)

- **New User: 2.5 mg - 5 mg of THC**
- **Intermediate User: 10 mg - 30 mg THC**
- **Experienced User/Patient In Need of High Dose: 30+mg of THC**

If these doses are found to be ineffective, increase THC in 5-10 mg increments and self-titrate over several days to determine which is tolerable. CBD will be easier to experiment with due to its non-psychoactive nature, but keep in mind that a small amount of THC should be contained in the medicine to ensure that the full effects of CBD and the Entourage Effect are received. Again, CBD isolate is nowhere near as effective without accompanying cannabinoids.

Note that any of the aforementioned CBD medications should always contain a small amount of THC, and ideally other cannabinoids from the whole plant. These medical compounds work synergistically with each other for the best possible effect on the body.

Fibromyalgia Syndrome (FM or FMS)

Fibromyalgia syndrome, or simply Fibromyalgia is a chronic pain condition and is characterized by a set of multiple symptoms that include widespread muscle and joint pain, a heightened and painful response to pressure (allodynia), anxiety and or depression, debilitating and incapacitating fatigue, and severe insomnia.

The exact cause of Fibromyalgia is unknown but it is theorized that it involves psychological, genetic, neurobiological, and environmental factors. Due to the fact that the ailment is more a set of multiple symptoms rather than being a single disease, and that Fibromyalgia is NOT an inflammatory disease sometimes makes it hard to diagnose and especially treat. More than 12 million Americans suffer from Fibromyalgia, a majority of them being women, and there is no known cure to date.

- "The National Institutes of Health (NIH) estimates up to 23.5 million Americans suffer from autoimmune disease and that the prevalence is rising. **We at AARDA say that 50 million Americans suffer from autoimmune disease**. Why the difference? The NIH numbers only include 24 diseases for which good epidemiology studies were available."

- "Researchers have identified 80-100 different autoimmune diseases and suspect at least 40 additional diseases of having an autoimmune basis. These diseases are chronic and can be life-threatening."

  (Source: American Autoimmune Related Diseases Association, Inc. (AARDA), www.aarda.org /news-information/statistics)

Using Cannabis to Treat Fibromyalgia:

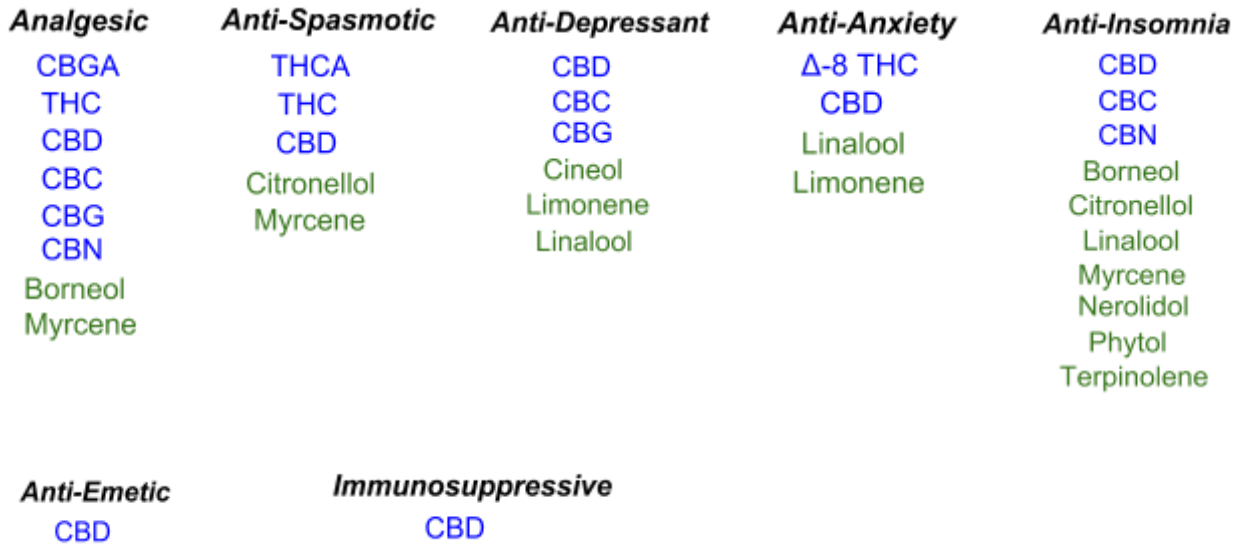
Cannabis is a complex medicinal plant that may actually be used to treat a variety of debilitating symptoms caused by a surprisingly large number of ailments. It's usefulness as a non-lethal medicine (you cannot die from an overdose of cannabis) cannot be overstated and it's versatility in terms of how it can be consumed and as to how it can be useful for so many illnesses is something to be excited about. However, it is important to remember that consulting with your primary care physician should be your first priority when considering incorporating cannabis into one's medical regiment and that cannabis is to be used as an adjunct therapy and not a replacement. It is also your responsibility to communicate with your doctor as to how your use of cannabis has affected your health and of your progress with utilizing medical cannabis.

With that said, many of the current medical studies surrounding medical Cannabis and Fibromyalgia are focused on the analgesic (pain relieving) effects of Tetrahydrocannabinol (THC). These studies include randomized trials and surveys with individuals who suffer from the syndrome. Patients from those surveys who utilized cannabis as a supplemental treatment to their ailment report positive and significant pain relief along with seeing improvements in their quality of life.

Even more studies have shown that Cannabis may be quite useful for treating individuals suffering from Fibromyalgia for the following reasons: **significantly reducing pain and muscle stiffness; assisting with managing anxiety and or depression; reducing possible painful muscle spasms; and with improving the quality of sleep.**

Beneficial Cannabinoids and Terpenoids Useful for Treating Fibromyalgia

The cannabis plant offers a plethora of therapeutic benefits and contains cannabinoids and terpenoid compounds that are useful for mitigating the pain and debilitating symptoms caused by Fibromyalgia syndrome. As suggested above, THC may be of significant help to those looking for pain relief.
With that said, the following chart denotes which cannabinoids and terpenoids also work synergistically with each other for possible therapeutic benefit:



Cannabis Options for Managing Specific Symptoms:

Cannabis can be used as a multifaceted tool to help manage many of these. Note that effective dosing will vary from individual to individual. Experimentation and self-titration will have to be done on the part of the patient in order to find what dose best works for him or her. The nice thing about cannabis, experimenting or increasing the dose won't kill an individual, nor will a patient develop a physical addiction dependency to cannabis medicine (you can't say that about opiates)! The following list offers recommended options for handling any of the possible symptoms of cancer and/or side-effects of cancer treatment. **Note that capsules and pills can be replaced with properly dosed edibles!*

- **Potential Chronic Pain**
    - **CBD(+/or)THC Capsules/Pills. Throughout the day.**
    - **CBD(+/or)THC Tinctures. Throughout the day or as needed.**
    - **Vaping "heavier" strains of cannabis: Flower, Cartridges, Concentrates. As Needed.** Terpene profiles that contain high testing amounts of Linalool, Myrcene, Borneol, Citronellol will contribute to a an anti-insomnia effect.
    - **Topical Lotions or Transdermal Patches with THC, CBD, CBN, CBG, for surface and skin pain. Applied throughout the day.** Terpene profiles that contain high testing amounts of α-Pinene, β-Caryophyllene, Myrcene, and Humulene will contribute to analgesic and anti-inflammatory effects.

- **Potential Tremors and or Seizures**
    - **CBD(+/or)THC Capsules/Pills. Can also try adding CBN and THCV. Throughout the day.**
    - **CBD(+/or)THC Tinctures. Can also try adding CBN and THCV. Throughout the day or as needed.**
    - **Vaping "heavier" strains of cannabis: Flower, Cartridges, Concentrates. As Needed.** Terpene profiles that contain high testing amounts of Linalool, Myrcene, Citronellol will contribute to managing seizures and tremors.

- **Potential Insomnia**
    - **THC, CBD, CBN Capsules/pills. In the evenings as needed.**
    - **THC, CBD, CBN Tinctures. In the evenings as needed.**
    - **Vaping "heavier" strains of cannabis: Flower, Cartridges, Concentrates. As Needed.** Terpene profiles that contain high testing amounts of Linalool, Myrcene, Borneol, Citronellol will contribute to a an anti-insomnia effect.

- **Potential Anxiety and/or Depression**
    - **Vaping CBD: Flower, Cartridges, Concentrates. As Needed.**
    - **CBD (with minimal THC) Capsules/Pills. Throughout the day.**
    - **CBD (with minimal THC) Tinctures. Throughout the day or as needed.**

- **Potential Nausea and Vomiting**

    - **Vaping CBD: Flower, Cartridges, Concentrates. As Needed.**
    - **CBD capsules/pills. Throughout the day.**
    - **CBD tinctures. Throughout the day or as needed.**

- **Potential Appetite Loss and Wastings Syndrome**

    - **Vaping THC: Flower, Cartridges, Concentrates. As Needed.**
    - **THC Tinctures. As needed.**

- **Potential Complications with Nerve Damage or Nerve Pain**

    - **Vaping THC, THCV, CBD: Flower, Cartridges, Concentrates. As Needed.**
    - **CBD, THC, THCV Capsules/Pills. Throughout the day.**
    - **CBD, THC, THCV Tinctures. Throughout the day or as needed.**

Some Dosing Guidelines for THC Oral Consumption

(more was covered in the previous chapter 4 but for easy reference, these doses are a good starting point for individuals to consider when incorporating cannabis medicine such as capsules, pills, tinctures, and edibles into their regiments)

- **New User: 2.5 mg - 5 mg of THC**
- **Intermediate User: 10 mg - 30 mg THC**
- **Experienced User/Patient In Need of High Dose: 30+mg of THC**

If these doses are found to be ineffective, increase THC in 5-10 mg increments and self-titrate over several days to determine which is tolerable. CBD will be easier to experiment with due to its non-psychoactive nature, but keep in mind that a small amount of THC should be contained in the medicine to ensure that the full effects of CBD and the Entourage Effect are received. Again, CBD isolate is nowhere near as effective without accompanying cannabinoids.

Note that any of the aforementioned CBD medications should always contain a small amount of THC, and ideally other cannabinoids from the whole plant. These medical compounds work synergistically with each other for the best possible effect on the body.

Insomnia

Insomnia, a clinical sleep disorder, is characterized by the sufferer's inability to fall asleep and or stay asleep. The disorder comes in two forms: Primary Insomnia where the individual's sleep problems are not the result of another ailment or disorder, and Secondary Insomnia where the sleep problems are the result of another ailment, disease, or disability - examples include chronic pain conditions such as arthritis or fibromyalgia; anxiety and or depression; epilepsy; recovery from chemotherapy; HIV/AIDS; recovery from addiction; psychological issues; stress, and even some side effects from medication can result in Insomnia.

Insomnia can be very debilitating and can lead to drastically lowered energy levels and tiredness throughout the day, difficulties concentrating, problems with memory, irritability, and it can even cause and or exacerbate depression. At the worst, chronic lack of sleep or sleep deprivation can cause neurological problems in the brain.

There are a number of medications and treatments that help tackle insomnia, and it is relieving to know that some cases of insomnia may not even need medical intervention.

- **50-70 million US adults have a sleep disorder. Insomnia is the most common specific sleep disorder, with short term issues reported by about 30% of adults and chronic insomnia by 10%.**

    - 37% of 20-39 year-olds report short sleep duration.
    - 40% of 40-59 year-olds report short sleep duration.
    - Drowsy driving is responsible for 1,550 fatalities and 40,000 nonfatal injuries annually in the United States.
    - 100,000 deaths occur each year in US hospitals due to medical errors and sleep deprivation has been shown to make a significant contribution.

    (Source: American Sleep Association, www.sleepassociation.org/sleep/sleep-statistics/)

Using Cannabis to Treat Insomnia:

Cannabis is a complex medicinal plant that may actually be used to treat a variety of debilitating symptoms caused by a surprisingly large number of ailments. It's usefulness as a non-lethal medicine (you cannot die from an overdose of cannabis) cannot be overstated and it's versatility in terms of how it can be consumed and as to how it can be useful for so many illnesses is something to be excited about. However, it is important to remember that consulting with your primary care physician should be your first priority when considering incorporating cannabis into one's medical regiment and that cannabis is to be used as an adjunct therapy and not a replacement. It is also your responsibility to communicate with your doctor as to how your use of cannabis has affected your health and of your progress with utilizing medical cannabis.

Much of the recent research surrounding Cannabis and its usefulness in treating insomnia is focused on the sedative effects of both Cannabidiol (CBD), Cannabinol (CBN), and even Tetrahydrocannabinol (THC). It is important to note, however, that the sedative effects often associated with THC are due to the synergistic Terpenoids that work with it to provide a therapeutic effect useful for insomnia.

Overall, exciting studies have shown that Cannabis may be quite useful for treating individuals suffering from Insomnia for the following reasons: **assisting with falling asleep and overall quality of sleep; helping to manage possible anxiety and or depression; and with protecting the brain from possible damage and degeneration.**

Beneficial Cannabinoids and Terpenoids Useful for Treating Insomnia:

The cannabis plant offers a plethora of therapeutic benefits and contains numerous cannabinoids and terpenoid compounds that are useful for managing insomnia.

The following chart denotes which cannabinoids and terpenoids work synergistically with each other for possible therapeutic benefit:

Anti-Insomnia	*Neuroprotective*	*Anti-Depressant*	*Anti-Anxiety*
CBD	THC	CBD	Δ-8 THC
CBC	THCA	CBC	CBD
CBN	CBD	CBG	Linalool
Borneol		Cineol	Limonene
Citronellol		Limonene	
Linalool		Linalool	
Myrcene			
Nerolidol			
Phytol			
Terpinolene			

Cannabis Options for Managing Specific Symptoms:

Cannabis can be used as a multifaceted tool to help manage many of these. Note that effective dosing will vary from individual to individual. Experimentation and self-titration will have to be done on the part of the patient in order to find what dose best works for him or her. The nice thing about cannabis, experimenting or increasing the dose won't kill an individual, nor will a patient develop a physical addiction dependency to cannabis medicine (you can't say that about opiates)! The following list offers recommended options for handling any of the possible symptoms of cancer and/or side-effects of cancer treatment. **Note that capsules and pills can be replaced with properly dosed edibles!*

- **Insomnia**

    - **THC, CBD, CBN Capsules/pills. In the evenings as needed.**
    - **THC, CBD, CBN Tinctures. In the evenings as needed.**
    - **Vaping "heavier" strains of cannabis: Flower, Cartridges, Concentrates. As Needed.** Terpene profiles that contain high testing amounts of Linalool, Myrcene, Borneol, Citronellol will contribute to a an anti-insomnia effect.

- **Potential Anxiety and/or Depression**

    - **Vaping CBD: Flower, Cartridges, Concentrates. As Needed.**
    - **CBD (with minimal THC) Capsules/Pills. Throughout the day.**
    - **CBD (with minimal THC) Tinctures. Throughout the day or as needed.**

- **Potential Complications with Nerve Damage or Nerve Pain**

    - **Vaping THC, THCV, CBD: Flower, Cartridges, Concentrates. As Needed.**
    - **CBD, THC, THCV Capsules/Pills. Throughout the day.**
    - **CBD, THC, THCV Tinctures. Throughout the day or as needed.**

Some Dosing Guidelines for THC Oral Consumption

(more was covered in the previous chapter 4 but for easy reference, these doses are a good starting point for individuals to consider when incorporating cannabis medicine such as capsules, pills, tinctures, and edibles into their regiments)

- **New User: 2.5 mg - 5 mg of THC**
- **Intermediate User: 10 mg - 30 mg THC**
- **Experienced User/Patient In Need of High Dose: 30+mg of THC**

    If these doses are found to be ineffective, increase THC in 5-10 mg increments and self-titrate over several days to determine which is tolerable. CBD will be easier to experiment with due to its non-psychoactive nature, but keep in mind that a small amount of THC should be contained in the medicine to ensure that the full effects of CBD and the Entourage Effect are received. Again, CBD isolate is nowhere near as effective without accompanying cannabinoids.

Note that any of the aforementioned CBD medications should always contain a small amount of THC, and ideally other cannabinoids from the whole plant. These medical compounds work synergistically with each other for the best possible effect on the body.

Multiple Sclerosis (MS)

Multiple Sclerosis or MS is an inflammatory autoimmune disease in which the sufferer's own immune system attacks and damages the individual's brain and spinal cord - the two primary components of the central nervous system. Symptoms of this severely debilitating ailment vary from individual to individual, dependent on how long and how far the disease has progressed but they include: loss of sensitivity or changes in sensitivity throughout various parts of one's body; significant weakness and or stiffness in the muscles; very pronounced reflexes; muscle spasms; difficulty with moving parts of one's body; difficulties with balance and motor coordination (ataxia); visual problems; difficulties controlling one's bladder and bowels; chronic pain and the resulting fatigue. Depression, insomnia, and anxiety typically accompany the symptoms of MS.

The exact cause of MS is currently unknown but it is theorized that genetics, environmental factors, and even infections may all contribute to the development and progression of the disease. Sadly there is no known cure yet, but there are a number of medications and experimental treatments aimed at tackling the symptoms of the ailment.

- Multiple sclerosis affects about 400,000 people in the United States, and about 2 ½ million worldwide.

- "Autoimmune disease is one of the top 10 leading causes of death in female children and women in all age groups up to 64 years of age."

- "**Commonly used immunosuppressant treatments lead to devastating long-term side effects**."

  (Source: American Autoimmune Related Diseases Association, Inc. (AARDA), www.aarda.org /news-information/statistics)

Using Cannabis to Treat Multiple Sclerosis:

Cannabis is a complex medicinal plant that may actually be used to treat a variety of debilitating symptoms caused by a surprisingly large number of ailments. It's usefulness as a non-lethal medicine (you cannot die from an overdose of cannabis) cannot be overstated and it's versatility in terms of how it can be consumed and as to how it can be useful for so many illnesses is something to be excited about. However, it is important to remember that consulting with your primary care physician should be your first priority when considering incorporating cannabis into one's medical regiment and that cannabis is to be used as an adjunct therapy and not a replacement. It is also your responsibility to communicate with your doctor as to how your use of cannabis has affected your health and of your progress with utilizing medical cannabis.

Much of the focus surrounding cannabis as a possible therapy for MS has been aimed at exploring the usefulness of both Tetrahydrocannabinol (THC) and Cannabidiol (CBD) in treating numerous symptoms of the ailment. In fact, one review by Baker et al., published at the *Department of Neuroinflammation* in April 2003 states, "Cannabinoids provide a novel therapeutic target, not only for controlling symptoms, but also slowing disease progression through inhibition of neurodegeneration, which is the cause of accumulating irreversible disability."

Exciting studies in general have shown that Cannabis may be quite useful for treating individuals suffering from MS for the following reasons: **significantly reducing pain, spasticity, and tremors; helping to manage nausea; helping to deal with incontinence; reducing possible anxiety; combatting depression and the resulting fatigue; and with delaying the onset and progression of the disease.**

Beneficial Cannabinoids and Terpenoids Useful for Treating MS:

Although much of the research thus far concerning cannabis as an adjunct therapy to MS has been focused on THC and CBD, it is important to remember that the cannabis plant offers a plethora of therapeutic benefits and contains cannabinoids and terpenoid compounds that are useful for treating some of the other symptoms of Multiple Sclerosis.

The following chart denotes which cannabinoids and terpenoids work synergistically with each other for significant therapeutic benefit.

Anti-Spasmotic	*Anti-Convulsive*	*Anti-Depressant*	*Anti-Anxiety*	*Analgesic*
THCA	THCV	CBD	Δ-8 THC	CBGA
THC	CBD	CBC	CBD	THC
CBD	CBN	CBG	Linalool	CBD
Citronellol	Linalool	Cineol	Limonene	CBC
Myrcene		Limonene		CBG
		Linalool		CBN
				Borneol
				Myrcene

Immunosuppressive	*Anti-Emetic*
CBD	CBD

Cannabis Options for Managing Specific Symptoms:

Cannabis can be used as a multifaceted tool to help manage many of these. Note that effective dosing will vary from individual to individual. Experimentation and self-titration will have to be done on the part of the patient in order to find what dose best works for him or her. The nice thing about cannabis, experimenting or increasing the dose won't kill an individual, nor will a patient develop a physical addiction dependency to cannabis medicine (you can't say that about opiates)! The following list offers recommended options for handling any of the possible symptoms of cancer and/or side-effects of cancer treatment. **Note that capsules and pills can be replaced with properly dosed edibles!*

- **Potential Tremors and or Seizures**
    - **CBD(+/or)THC Capsules/Pills. Can also try adding CBN and THCV. Throughout the day.**
    - **CBD(+/or)THC Tinctures. Can also try adding CBN and THCV. Throughout the day or as needed.**
    - **Vaping "heavier" strains of cannabis: Flower, Cartridges, Concentrates. As Needed.** Terpene profiles that contain high testing amounts of Linalool, Myrcene, Citronellol will contribute to managing seizures and tremors.

- **Potential Chronic Pain**
    - **CBD(+/or)THC Capsules/Pills. Throughout the day.**
    - **CBD(+/or)THC Tinctures. Throughout the day or as needed.**
    - **Vaping "heavier" strains of cannabis: Flower, Cartridges, Concentrates. As Needed.** Terpene profiles that contain high testing amounts of Linalool, Myrcene, Borneol, Citronellol will contribute to a an anti-insomnia effect.
    - **Topical Lotions or Transdermal Patches with THC, CBD, CBN, CBG, for surface and skin pain. Applied throughout the day.** Terpene profiles that contain high testing amounts of α-Pinene, β-Caryophyllene, Myrcene, and Humulene will contribute to analgesic and anti-inflammatory effects.

- **Potential Insomnia**
    - **THC, CBD, CBN Capsules/pills. In the evenings as needed.**
    - **THC, CBD, CBN Tinctures. In the evenings as needed.**
    - **Vaping "heavier" strains of cannabis: Flower, Cartridges, Concentrates. As Needed.** Terpene profiles that contain high testing amounts of Linalool, Myrcene, Borneol, Citronellol will contribute to a an anti-insomnia effect.

- **Potential Anxiety and/or Depression**
    - **Vaping CBD: Flower, Cartridges, Concentrates. As Needed.**
    - **CBD (with minimal THC) Capsules/Pills. Throughout the day.**
    - **CBD (with minimal THC) Tinctures. Throughout the day or as needed.**

- **Potential Nausea and Vomiting**

    - **Vaping CBD: Flower, Cartridges, Concentrates. As Needed.**
    - **CBD capsules/pills. Throughout the day.**
    - **CBD tinctures. Throughout the day or as needed.**

- **Potential Appetite Loss and Wastings Syndrome**

    - **Vaping THC: Flower, Cartridges, Concentrates. As Needed.**
    - **THC Tinctures. As needed.**

Some Dosing Guidelines for THC Oral Consumption

(more was covered in the previous chapter 4 but for easy reference, these doses are a good starting point for individuals to consider when incorporating cannabis medicine such as capsules, pills, tinctures, and edibles into their regiments)

- **New User: 2.5 mg - 5 mg of THC**
- **Intermediate User: 10 mg - 30 mg THC**
- **Experienced User/Patient In Need of High Dose: 30+mg of THC**

If these doses are found to be ineffective, increase THC in 5-10 mg increments and self-titrate over several days to determine which is tolerable. CBD will be easier to experiment with due to its non-psychoactive nature, but keep in mind that a small amount of THC should be contained in the medicine to ensure that the full effects of CBD and the Entourage Effect are received. Again, CBD isolate is nowhere near as effective without accompanying cannabinoids.

Note that any of the aforementioned CBD medications should always contain a small amount of THC, and ideally other cannabinoids from the whole plant. These medical compounds work synergistically with each other for the best possible effect on the body.

Pain (Chronic and/or Neuropathic)

Chronic Pain, classified as pain that persists for longer than three to six months is a common debilitating condition that affects hundreds of millions of people each and every day. The severity of chronic pain varies but extreme cases can be completely incapacitating. Due to how long Chronic Pain can persist, both an emotional and physical toll are taken on the sufferer. Common causes and examples of chronic pain include but are not limited to: headaches; joint pain (arthritis); pain from injuries or accidents; back pain resulting from complications of the spine; tendonitis; carpal tunnel syndrome; pain caused by other ailments or infections; and even some medical therapies and treatments may result in long lasting, substantial pain. Oftentimes anger, anxiety, and depression accompany Chronic Pain.

Neuropathic pain is characterized as a pain state caused in the sufferer's nervous system. With this condition, an individual's nerves may be damaged, dysfunctional, or separated completely. Causes and examples of Neuropathic Pain include but are not limited to: alcoholism, amputation and the resulting phantom limb syndrome, skeletal and muscular problems (pinched nerves), chemotherapy, diabetes, genetics, HIV/AIDS, Multiple Sclerosis, shingles, spinal injury, and even surgery.

Using Cannabis to Treat Chronic/Neuropathic Pain:

Cannabis is a complex medicinal plant that may actually be used to treat a variety of debilitating symptoms caused by a surprisingly large number of ailments. It's usefulness as a non-lethal medicine (you cannot die from an overdose of cannabis) cannot be overstated and it's versatility in terms of how it can be consumed and as to how it can be useful for so many illnesses is something to be excited about. However, it is important to remember that consulting with your primary care physician should be your first priority when considering incorporating cannabis into one's medical regiment and that cannabis is to be used as an adjunct therapy and not a replacement. It is also your responsibility to communicate with your doctor as to how your use of cannabis has affected your health and of your progress with utilizing medical cannabis.

With that said, studies have shown that Cannabis may be quite useful for treating individuals suffering from Neuropathic Pain for the following reasons: **significantly reducing the pain itself; assisting with sleep should the pain cause insomnia; and with dealing with possible depression and or anxiety should the individual suffer from it as a result.**

Beneficial Cannabinoids and Terpenoids Useful for Treating Neuropathic Pain:

The cannabis plant offers a plethora of therapeutic benefits and contains cannabinoids and terpenoid compounds that are useful for treating pain in general. In fact one study that analyzed both Tetrahydrocannabinol (THC) and Cannabidiol (CBD) published in a 2008 article in *Therapeutics and Clinical Risk Management* states that, "Cannabinoid analgesics have generally been well tolerated in clinical trials with acceptable adverse event profiles. Their adjunctive addition to the pharmacological armamentarium for treatment of pain shows great promise."

The following chart denotes which cannabinoids and terpenoids work synergistically with each other for possible therapeutic benefit:

Anti-Inflammatory	*Analgesic*	*Anti-Depressant*	*Anti-Insomnia*	*Anti-Anxiety*
CBGA	CBGA	CBD	CBD	Δ-8 THC
CBGVA	THC	CBC	CBC	CBD
THCA	CBD	CBG	CBN	Linalool
THCVA	CBC	Cineol	Borneol	Limonene
CBDA	CBG	Limonene	Citronellol	
CBDVA	CBN	Linalool	Linalool	
CBCA	Borneol		Myrcene	
CBCVA	Myrcene		Nerolidol	
THC			Phytol	
CBD			Terpinolene	
CBC				
CBNA				
CBN				
CBLA				
α-Pinene				
β-Caryophyllene				
Cineol				
Citronellol				
Humulene				
Myrcene				

Cannabis Options for Managing Specific Symptoms:

Cannabis can be used as a multifaceted tool to help manage many of these. Note that effective dosing will vary from individual to individual. Experimentation and self-titration will have to be done on the part of the patient in order to find what dose best works for him or her. The nice thing about cannabis, experimenting or increasing the dose won't kill an individual, nor will a patient develop a physical addiction dependency to cannabis medicine (you can't say that about opiates)! The following list offers recommended options for handling any of the possible symptoms of cancer and/or side-effects of cancer treatment. **Note that capsules and pills can be replaced with properly dosed edibles!*

- **Potential Chronic Pain**
    - **CBD(+/or)THC Capsules/Pills. Throughout the day.**
    - **CBD(+/or)THC Tinctures. Throughout the day or as needed.**
    - **Vaping "heavier" strains of cannabis: Flower, Cartridges, Concentrates. As Needed.** Terpene profiles that contain high testing amounts of Linalool, Myrcene, Borneol, Citronellol will contribute to a an anti-insomnia effect.
    - **Topical Lotions or Transdermal Patches with THC, CBD, CBN, CBG, for surface and skin pain. Applied throughout the day.** Terpene profiles that contain high testing amounts of α-Pinene, β-Caryophyllene, Myrcene, and Humulene will contribute to analgesic and anti-inflammatory effects.

- **Potential Complications with Nerve Damage or Nerve Pain**

    - **Vaping THC, THCV, CBD: Flower, Cartridges, Concentrates. As Needed.**
    - **CBD, THC, THCV Capsules/Pills. Throughout the day.**
    - **CBD, THC, THCV Tinctures. Throughout the day or as needed.**

- **Potential Anxiety and/or Depression**

    - **Vaping CBD: Flower, Cartridges, Concentrates. As Needed.**
    - **CBD (with minimal THC) Capsules/Pills. Throughout the day.**
    - **CBD (with minimal THC) Tinctures. Throughout the day or as needed.**

- **Potential Insomnia**

    - **THC, CBD, CBN Capsules/pills. In the evenings as needed.**
    - **THC, CBD, CBN Tinctures. In the evenings as needed.**
    - **Vaping "heavier" strains of cannabis: Flower, Cartridges, Concentrates. As Needed.** Terpene profiles that contain high testing amounts of Linalool, Myrcene, Borneol, Citronellol will contribute to a an anti-insomnia effect.

Some Dosing Guidelines for THC Oral Consumption

(more was covered in the previous chapter 4 but for easy reference, these doses are a good starting point for individuals to consider when incorporating cannabis medicine such as capsules, pills, tinctures, and edibles into their regiments)

- **New User: 2.5 mg - 5 mg of THC**
- **Intermediate User: 10 mg - 30 mg THC**
- **Experienced User/Patient In Need of High Dose: 30+mg of THC**

If these doses are found to be ineffective, increase THC in 5-10 mg increments and self-titrate over several days to determine which is tolerable. CBD will be easier to experiment with due to its non-psychoactive nature, but keep in mind that a small amount of THC should be contained in the medicine to ensure that the full effects of CBD and the Entourage Effect are received. Again, CBD isolate is nowhere near as effective without accompanying cannabinoids.

Note that any of the aforementioned CBD medications should always contain a small amount of THC, and ideally other cannabinoids from the whole plant. These medical compounds work synergistically with each other for the best possible effect on the body.

Parkinson's Disease (PD)

Parkinson's Disease is a debilitating neurodegenerative disorder that mostly affects the elderly, but may also develop in younger individuals. It is characterized by the degeneration of nerve cells in the brain that control movement. Symptoms of the disorder gradually worsen over time and they typically begin with and lead to: weakness in one's muscles; muscle spasms and uncontrollable shaking; rigidity; significant slowing of movement; and then difficulty walking and with maintaining balance. Oftentimes these result in difficulties with sleep, carrying out basic tasks like writing, and maintaining a normal life. These symptoms will typically cause a sufferer to develop behavioral and psychological issues including: depression, difficulty thinking, and even psychosis.

While the disorder is not life threatening, it can be incapacitating and painful to live with, and there is no known cure. There are a number of medications and therapies, however, that may help with dealing with the symptoms of Parkinson's Disease.

- **More than 10 million people worldwide are living with Parkinson's disease.**
    - Approximately 60,000 Americans are diagnosed with PD each year..
    - By 2020, an estimated 930,000 people in the US will be diagnosed with PD.

(Source: Parkinson's Foundation, www.parkinson.org)

Using Cannabis to Treat Parkinson's Disease:

Cannabis is a complex medicinal plant that may actually be used to treat a variety of debilitating symptoms caused by a surprisingly large number of ailments. It's usefulness as a non-lethal medicine (you cannot die from an overdose of cannabis) cannot be overstated and it's versatility in terms of how it can be consumed and as to how it can be useful for so many illnesses is something to be excited about. However, it is important to remember that consulting with your primary care physician should be your first priority when considering incorporating cannabis into one's medical regiment and that cannabis is to be used as an adjunct therapy and not a replacement. It is also your responsibility to communicate with your doctor as to how your use of cannabis has affected your health and of your progress with utilizing medical cannabis.

Much of the past and ongoing research looking into Cannabis' usefulness in treating Parkinson's Disease has been focused on the therapeutic versatility of both Cannabidiol (CBD) and Tetrahydrocannabinol (THC); in fact, numerous surveys and studies have shown that both compounds aid with controlling the tremors associated with the ailment, and that CBD can even help with possible psychosis resulting from PD.

Overall, scientific studies have shown that Cannabis may be quite useful for treating individuals suffering from the symptoms of Parkinson's Disease for the following reasons: **significantly reducing pain, spasticity, and incontinence; helping to manage uncontrollable tremors; combatting depression and or anxiety; assisting with nausea and the resulting fatigue; battling insomnia; preventing possible psychosis; and with protecting the brain from further degeneration.**

Beneficial Cannabinoids and Terpenoids Useful for Treating Parkinson's Disease:
The cannabis plant offers a plethora of therapeutic benefits and contains cannabinoids and terpenoid compounds that are useful for treating the symptoms of Parkinson's Disease. While most of the ongoing research focuses on CBD and THC, the following list also denotes which cannabinoids and terpenoids work synergistically with each other for possible therapeutic benefit:

Analgesic	*Anti-Spasmotic*	*Anti-Convulsive*	*Anti-Anxiety*	*Anti-Depressant*
CBGA	THCa	THCv	Δ-8 THC	CBD
THC	THC	CBD	CBD	CBC
CBD	CBD	CBN	Linalool	CBG
CBC	Citronellol	Linalool	Limonene	Cineol
CBG	Myrcene			Limonene
CBN				Linalool
Borneol				
Myrcene				

Anti-Insomnia	*Neuroprotective*	*Anti-Psychotic*	*Anti-Emetic*
CBD	THC	CBD	CBD
CBC	THCv		
CBN	CBD		
Borneol			
Citronellol			
Linalool			
Myrcene			
Nerolidol			
Phytol			
Terpinolene			

Cannabis Options for Managing Specific Symptoms:

Cannabis can be used as a multifaceted tool to help manage many of these. Note that effective dosing will vary from individual to individual. Experimentation and self-titration will have to be done on the part of the patient in order to find what dose best works for him or her. The nice thing about cannabis, experimenting or increasing the dose won't kill an individual, nor will a patient develop a physical addiction dependency to cannabis medicine (you can't say that about opiates)! The following list offers recommended options for handling any of the possible symptoms of cancer and/or side-effects of cancer treatment. **Note that capsules and pills can be replaced with properly dosed edibles!*

- **Potential Chronic Pain**
    - **CBD(+/or)THC Capsules/Pills. Throughout the day.**
    - **CBD(+/or)THC Tinctures. Throughout the day or as needed.**
    - **Vaping "heavier" strains of cannabis: Flower, Cartridges, Concentrates. As Needed.** Terpene profiles that contain high testing amounts of Linalool, Myrcene, Borneol, Citronellol will contribute to a an anti-insomnia effect.
    - **Topical Lotions or Transdermal Patches with THC, CBD, CBN, CBG, for surface and skin pain. Applied throughout the day.** Terpene profiles that contain high testing amounts of α-Pinene, β-Caryophyllene, Myrcene, and Humulene will contribute to analgesic and anti-inflammatory effects.

- **Potential Tremors and or Seizures**
    - **CBD(+/or)THC Capsules/Pills. Can also try adding CBN and THCV. Throughout the day.**
    - **CBD(+/or)THC Tinctures. Can also try adding CBN and THCV. Throughout the day or as needed.**
    - **Vaping "heavier" strains of cannabis: Flower, Cartridges, Concentrates. As Needed.** Terpene profiles that contain high testing amounts of Linalool, Myrcene, Citronellol will contribute to managing seizures and tremors.

- **Potential Complications with Nerve Damage or Nerve Pain**
    - **Vaping THC, THCV, CBD: Flower, Cartridges, Concentrates. As Needed.**
    - **CBD, THC, THCV Capsules/Pills. Throughout the day.**
    - **CBD, THC, THCV Tinctures. Throughout the day or as needed.**

- **Potential Anxiety and/or Depression**
    - **Vaping CBD: Flower, Cartridges, Concentrates. As Needed.**
    - **CBD (with minimal THC) Capsules/Pills. Throughout the day.**
    - **CBD (with minimal THC) Tinctures. Throughout the day or as needed.**

- **Potential Insomnia**

    - **THC, CBD, CBN Capsules/pills. In the evenings as needed.**
    - **THC, CBD, CBN Tinctures. In the evenings as needed.**
    - **Vaping "heavier" strains of cannabis: Flower, Cartridges, Concentrates. As Needed.** Terpene profiles that contain high testing amounts of Linalool, Myrcene, Borneol, Citronellol will contribute to a an anti-insomnia effect.

- **Potential Nausea and Vomiting**

    - **Vaping CBD: Flower, Cartridges, Concentrates. As Needed.**
    - **CBD capsules/pills. Throughout the day.**
    - **CBD tinctures. Throughout the day or as needed.**

Some Dosing Guidelines for THC Oral Consumption

(more was covered in the previous chapter 4 but for easy reference, these doses are a good starting point for individuals to consider when incorporating cannabis medicine such as capsules, pills, tinctures, and edibles into their regiments)

- **New User: 2.5 mg - 5 mg of THC**
- **Intermediate User: 10 mg - 30 mg THC**
- **Experienced User/Patient In Need of High Dose: 30+mg of THC**

If these doses are found to be ineffective, increase THC in 5-10 mg increments and self-titrate over several days to determine which is tolerable. CBD will be easier to experiment with due to its non-psychoactive nature, but keep in mind that a small amount of THC should be contained in the medicine to ensure that the full effects of CBD and the Entourage Effect are received. Again, CBD isolate is nowhere near as effective without accompanying cannabinoids.

Note that any of the aforementioned CBD medications should always contain a small amount of THC, and ideally other cannabinoids from the whole plant. These medical compounds work synergistically with each other for the best possible effect on the body.

Post Traumatic Stress Disorder (PTSD)

Post Traumatic Stress Disorder, or PTSD for short, is a mental disorder in a person who undergoes a severe traumatic experience which may or may not involve physical harm. Events that occur in war, vehicular accidents, injuries, domestic violence, rape, the death of a loved one and so on can all potentially cause PTSD in an individual. The disorder can cause chronic and inexplicable fear, feelings of helplessness, anxiety, insomnia, nervousness, uncontrollable anger, and even crippling guilt. The disorder makes it difficult for those who suffer from PTSD from living a normal life and can persist for months, years, and even the lifespan of some individuals.

While there are numerous psychological therapies out there, along with various medications available to those diagnosed with PTSD, there is no known effective cure, and oftentimes the particulars of PTSD as a mental disorder is so specific to the individual that it can be difficult to diagnose and properly treat.

- 70% of adults in the U.S. have experienced some type of traumatic event at least once in their lives. This equates to approximately 223.4 million people. Up to 20% of these people go on to develop PTSD. **As of today, that equates to approximately 44.7 million people who were or are struggling with PTSD**.

    - An estimated 8% of Americans - 24.4 million people - have PTSD at any given time. That is equal to the total population of Texas.
    - An estimated one out of every nine women develops PTSD, making them twice as likely as men.
    - PTSD is recognized as a psychobiological mental disorder that can affect survivors not only of combat experience, but also terrorist attacks, natural disasters, serious accident, assault or abuse, or even sudden and major emotional losses.

    (Source: PTSD United, www.ptsdunited.org/ptsd-statistics-2/)

    - **Roughly 20 veterans a day commit suicide nationwide, according to new data from the Department of Veteran Affairs**.
    - In 2014, the latest year available, more than 7,400 veterans took their lives, accounting for 18 percent of all suicides in America.

    (Source: MilitaryTimes.com, https://www.militarytimes.com/veterans/2016/07/07/new-va-study-finds-20-veterans-commit-suicide-each-day/)

Using Cannabis to Treat PTSD:

Cannabis is a complex medicinal plant that may actually be used to treat a variety of debilitating symptoms caused by a surprisingly large number of ailments. It's usefulness as a non-lethal medicine (you cannot die from an overdose of cannabis) cannot be overstated and it's versatility in terms of how it can be consumed and as to how it can be useful for so many illnesses is something to be excited about. However, it is important to remember that consulting with your primary care physician should be your first priority when considering incorporating cannabis into one's medical regiment and that cannabis is to be used as an adjunct therapy and not a replacement. It is also your responsibility to communicate with your doctor as to how your use of cannabis has affected your health and of your progress with utilizing medical cannabis.

With that said, much of the current research surrounding cannabis as a potential treatment for PTSD has been focused on the usefulness of Cannabidiol (CBD) - recent lab tests with animal models, individual case studies, and even statewide surveys in New Mexico showcase that this specific cannabinoid is vastly helpful to those utilizing it as a treatment for fear, traumatic memories, anxiety, and even helping with troubled and restless sleep.

Overall, many exciting studies have shown that Cannabis may be quite useful for treating individuals suffering from PTSD for the following reasons: **relieving anxiety; enhancing one's mood to combat depression; helping to manage possible nausea associated with "episodes"; preventing possible psychosis; and significantly aiding with sleep.**

Beneficial Cannabinoids and Terpenoids Useful for Treating PTSD:

The cannabis plant offers a plethora of therapeutic benefits and contains cannabinoids and terpenoid compounds that are useful for a variety of ailments. Once again, many of the current studies surrounding cannabinoids and PTSD are focused on CBD, but do remember that the other possible compounds in cannabis do possess other beneficial properties. The following list denotes which cannabinoids and terpenoids work synergistically with each other for possible therapeutic benefit in treating the symptoms of PTSD:

Anti-Depressant	*Anti-Anxiety*	*Anti-Insomnia*	*Anti-Psychotic*	*Anti-Emetic*
CBD	Δ-8 THC	CBD	CBD	CBD
CBC	CBD	CBC		
CBG	Linalool	CBN		
Cineol	Limonene	Borneol		
Limonene		Citronellol		
Linalool		Linalool		
		Myrcene		
		Nerolidol		
		Phytol		
		Terpinolene		

Cannabis Options for Managing Specific Symptoms:

Cannabis can be used as a multifaceted tool to help manage many of these. Note that effective dosing will vary from individual to individual. Experimentation and self-titration will have to be done on the part of the patient in order to find what dose best works for him or her. The nice thing about cannabis, experimenting or increasing the dose won't kill an individual, nor will a patient develop a physical addiction dependency to cannabis medicine (you can't say that about opiates)! The following list offers recommended options for handling any of the possible symptoms of cancer and/or side-effects of cancer treatment. **Note that capsules and pills can be replaced with properly dosed edibles!*

- **Potential Anxiety and/or Depression**
    - **Vaping CBD: Flower, Cartridges, Concentrates. As Needed.**
    - **CBD (with minimal THC) Capsules/Pills. Throughout the day.**
    - **CBD (with minimal THC) Tinctures. Throughout the day or as needed.**

- **Potential Insomnia**
    - **THC, CBD, CBN Capsules/pills. In the evenings as needed.**
    - **THC, CBD, CBN Tinctures. In the evenings as needed.**
    - **Vaping "heavier" strains of cannabis: Flower, Cartridges, Concentrates. As Needed.** Terpene profiles that contain high testing amounts of Linalool, Myrcene, Borneol, Citronellol will contribute to a an anti-insomnia effect.

- **Potential Nausea and Vomiting**
    - **Vaping CBD: Flower, Cartridges, Concentrates. As Needed.**
    - **CBD capsules/pills. Throughout the day.**
    - **CBD tinctures. Throughout the day or as needed.**

- **Potential Appetite Loss and Wastings Syndrome**

    - **Vaping THC: Flower, Cartridges, Concentrates. As Needed.**
    - **THC Tinctures. As needed.**

- **Potential Psychosis**

    - **Vaping CBD: Flower, Cartridges, Concentrates. As Needed.**
    - **CBD (with minimal THC) Capsules/Pills. Throughout the day.**
    - **CBD (with minimal THC) Tinctures. Throughout the day or as needed.**

Some Dosing Guidelines for THC Oral Consumption

(more was covered in the previous chapter 4 but for easy reference, these doses are a good starting point for individuals to consider when incorporating cannabis medicine such as capsules, pills, tinctures, and edibles into their regiments)

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Note that any of the aforementioned CBD medications should always contain a small amount of THC, and ideally other cannabinoids from the whole plant. These medical compounds work synergistically with each other for the best possible effect on the body.

An Argument for Replacing Opiate Drugs with Cannabis Medicine

With Cannabis, we're looking at an herbal medicine that can significantly relieve pain and reduce inflammation. However, unlike opiates, cannabinoids cannot kill you and patients can increase their dosing without fear of killing themselves. Furthermore, cannabis is not physically addictive and will not cause dangerous withdrawals within an individual like many opiate drugs do. Continued research into this subject is desperately needed throughout the world, but it should be stressed that there already are a number of individuals who are successfully weaning off of their opiate prescriptions with medical cannabis!

An excellent guide on How to Use Cannabis to Reduce and Replace Opioid Medicine by Dr. Dustin Sulak, Co-Founder o Healer.com can be found on the link provided. There are also a number of medical and scientific papers and news outlets investigating the potential of cannabis' ability to combat opiate addiction and societal harm, and while a list of these studies is provided at the end of the chapter, some of the more noteworthy ones are provided below:

Is Cannabis Part of the Solution to the Opioid Epidemic
Sulak, Dustin.
Osteopathic.org. Online slide presentation.

Opioid Use Lower In States That Eased Marijuana Laws
Harris, Richard.
NPR: Public Health. 2018 Apr 2, online article.

Cannabis and the Opioid Crisis
Piomelli, Daniele, et al.
Cannabis and Cannabinoid Research. 2018 Apr 1, 3(1): 108-116.

Could We Beat the Opioid Epidemic by Easing Pain with Marijuana
Weiseberger, Mindy, et al.
Live Science. 2018 Feb 8, online article.

Opioids Out, Cannabis In: Negotiating the Unknowns in Patient Care for Chronic Pain
Choo, Esther, et al.
Journal of the American Medical Association (JAMA). 2016 Nov 1, online article.

Cannabinoid and opioid interactions: Implications for opiate dependence and withdrawal
Scavone, JL, et al.
Neuroscience. 2013 Sep 17, 248: 637-654.

Important things to know when transitioning from opiates to cannabis based medicines

- **Consult with the patient's primary care giver.**
- **Seek out multiple opinions.**
- **Transition slowly. Never cold turkey.**
- **Keep a journal to document the progress.**

Note that every day more than 90 Americans die from overdosing on opiods. Every 12 minutes someone dies from an opioid overdose.

Giving Patients Back Their Quality of Life and Preventing Disease

The recommendations and suggestions presented throughout this chapter were all real suggestions that we as a team made to the patients we saw. They were based on our collective understanding of cannabis. Some of our extensive and combined research is actually presented at the end of the chapter; though a lot of studies have been carried out since our team left the club. We were more than just stoners, many of our team actually took the time to sit and review the many scientific articles that had come out regarding cannabis medicine. We actually loved the plant and what it could do for society and for the many patients we saw throughout the years of our time there. They weren't perfect recommendations, they certainly were not double blind clinical trials (we never claimed them to be so), but for us to simply offer a helping hand and to share our knowledge of cannabis as we studied it and learned throughout our day to day interactions within the cannabis industry, we were able to witness lives change, and amazing quality of life being given back to patients who could not find relief in the current medical system. Our time as private consultants made us believers in what cannabis could do, and on behalf of our team, it my pleasure in sharing all this with you the reader.

I would be remiss not to give credit to this amazing team. And I have reserved the end of this chapter to list out each of their individual names:

1st Team: Kyle (Fiddle) Lorigo, Kyle Pappas, Randy (Brian) Rios, Jennifer Ruperto, Ariana Schmidt, Lauren Winters, Eric Yu.

2nd Team: Hadley Clark, Mitchell Davis, Katy Gerome, Eric Gronli, Katie Harrington, Christopher Johnson, Rae Jonathans, Sammy (Sriracha) Klebanov, Austin (Alison) Merdian, Christian Pantoja, Justin Rice, Justin Sweat, Perla Silva.

To all of you, thank you from the bottom of my heart. We did amazing and magical things together that I will never forget. You all made my time working with you golden. I really hope you cherish the experiences you and your patients provided as much as I do.

End of Chapter Addendum - References and Resources to the Ailments Covered

Cannabis and Cancer Medical Studies:

US Patent Filing US 2013/0059018 A1: Phytocannabinoids in the Treatment of Cancer

General Cancer

Human rights, public health and medicinal cannabis use
Bone, Melssa and Seddon, Toby.
Critical Public Health. 2016, 26(1).

Use of medical cannabis to reduce pain and improve quality of life in cancer patients
Cudmore, Jessica, et al.
Journal of Clinical Oncology. 2015 Oct 10, 33(29): 198.

Cannabis in cancer care
Abrams, DI and Guzman, M.
Clincal Pharmacology & Therapeutics. 2015 Mar 16, online article.

Cananbinoids as therapeutic agents in cancer: current status and future implications
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Oncotarget. 2014 Aug, 5(15): 5852-5872, online article.

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Chapter 6 - Recreational cannabis usage: safety, education, risks, and a case for preventative care.

Sunsets and Cannabis. Forbidden Fruit grown by JacketGeorge, WarlockGlass, and the author.

A look at the recreational legalization of cannabis in the United States

Regardless of how you feel about the recreational usage of cannabis, you must understand that people have been enjoying the plant for pleasure for more than a thousand years despite whatever legal status it may have had in whatever culture or country we're looking at. Farmers more than likely smoked the plant soon after humanity began to cultivate it and people first had to experiment with consuming it before it was officially classified as a medicine. Indian cultures mixed cannabis with milk to make a drink known as "bhang" and the practice of making hashish, the very first "concentrate," was popularized in several countries throughout the middle east over a thousand years ago.

Despite prohibition and the war on drugs, 52% of Americans have admitted to at least trying marijuana at some point in their lives. Subcultures have formed as a result of the plant, civil rights movements organized to fight for its legality, and black markets have risen across the world trafficking its presence throughout society and even pop culture whether you like it or not.

Things have definitely changed, however, and voters in 9 states have currently legalized cannabis for recreational use, and a majority of the rest of the union acknowledges the plant's medical necessity for some individuals. Now, while the legal recreational shift has recently occurred, its ways of usage and societal image are nothing new, though it does continue to rapidly evolve. There absolutely is a venerable culture that surrounds and somewhat reveres this herb and it encompasses people from many walks of

life: old hippies, underground growers and farmers, hood dealers and pushers, celebrities and pop icons, activists and legitimate medical patients, and the many new faces of industry supporters and workers who help to currently build this budding and booming industry.

From street narcotic to a cash crop rivaling wine, the acceptance by society to give the recreational marijuana industry a chance is exciting for many, scary for some, but represents a social experiment of our time that you can't help but anxiously watch to see how it all unfolds.

Legal Cannabis State Statistics as of 2018

While the following numbers may have entrepreneurs salivating over the potential economic impact cannabis could have in the near future, and they should, it is also important to consider that these taxable sales are already being put to positive use where communities are concerned, especially in states where these said taxes are directly spent on education, infrastructures including roads and state police, programs to treat substance abusers, scientific and medical research, and more. Should the societal acceptance for the recreational usage of marijuana expand throughout the country and even the rest of the world, you can imagine that these numbers will be dwarfed within the next decade.

Total Cannabis Sales as of 2018

Alaska	**$39.5 million**
California	**$2.75 billion**
Colorado	**$1.56 billion**
District of Columbia	**$17.7 million**
Maine	**$83.4 million**
Massachusetts	**$106 million**
Nevada	**$102.7 million**
Oregon	**$777.6 million**
Washington	**$1 billion**

(source: Forbes)

- Between 2015 to 2017, Colorado distributed $230 million to the Department of Education to fund school construction, early literacy, bullying prevention, and behavioral health.
- Oregon allocates 40% of marijuana tax revenue to its state school fund, depositing $34 million so far. 20% of taxes also go towards alcohol and drug treatment.
- Washington dedicates 25% of their cannabis taxes to substance use disorder treatment, education, and prevention. The state also distributes 55% of tax revenues to fund basic health plans.
- Nevada's 15% wholesale tax is projected to bring in $56 million over the next two years to help fund state schools.
- California and Massachusetts will invest a share of their marijuana taxes towards communities most adversely impacted by drug arrests and incarceration, particularly low-income communities of color, to help repair the harms of unequal drug law enforcement.

(source: DrugPolicy.org)

Understanding the differences between Medical Cannabis Usage and Recreational Cannabis Usage.



There is a distinction for sure, and recreational usage of cannabis is based on intent for fun and pleasure; medical consumption of cannabis is the methodical experimentation with the medicine to find what works best for an individual's symptoms. Here are some examples to illustrate:

Medical Cannabis intent

- ✚ Daily management of pain
- ✚ Aiding with going to and maintaining sleep
- ✚ Dealing with social anxiety
- ✚ Managing seizures
- ✚ Helping to recover from surgery
- ✚ Surviving chemo and fighting cancer
- ✚ Fighting Depression
- ✚ Using topicals to fight eczema

Recreational Cannabis intent

- $ Burning on a day off with your homies
- $ Dabbing hard before a buffet
- $ Low temping some "live resin"
- $ Pressing and dabbing "5 star full melts"
- $ Scoping out the clubs for some "firrre"
- $ Getting lit for a hike, beach day, or party
- $ Sampling the new arrivals at a club
- $ Microdosing edibles for a videogame session

+many many more!

I'm sure some of you readers can come up with more creative examples, but I hope the point made is clear. Experimenting with the cannabis plant, whether by smoking top shelf flower, dabbing and vaping terpy concentrates, cooking or baking bomb edibles, should be a fun learning experience of experimentation for many as the industry grows and evolves. Already, unique and eccentric products that aim to make an innovative splash upon the competitive industry continue to be invented and sold, while cannabis tech startups pop up throughout the country.

The markets are only continuing to ramp up and cannabusinesses across the legal states are feverishly fighting for their brandings, stake and share in the Green Rush. Although the initial high taxes are daunting for both consumer and business operator, current legal efforts and movements within the industry aim to help create fair pricing and to help small business thrive and grow. Exciting times for sure, and cannabis legalization throughout not just America but the rest of the world represents a colossal and monumental cultural shift for humanity.

The Risks and Side Effects of Cannabinoid Consumption

Cannabis IS NOT a harmless plant as some stoners and hippies would like to believe. Remember that smoking cannabis does create carcinogens that can be irritating and harmful to one's lungs. This is nowhere near as harmful as cigarette smoking, however it is important to note for safety reasons. While it is indeed a non-lethal medicine that will not kill a user, it does have significant side effects that, although not permanent, can and will negatively impair someone who is not prepared to handle the side effects of either smoking or eating too much THC and being overly "high."

This is also especially true for cannabis edibles, where **THC-Toxicity** can definitely occur even in experienced smokers. When an individual eats THC, the cannabinoid produces a metabolite within his/her body called 11-Hydroxy-THC. A person not used to this compound can and will experience severe nausea, disorientation, possible paranoia, and both physical and mental discomfort. This can last for several hours and can be severely debilitating to the point of ruining someone's day. This is not ideal for anyone and as such it should be stressed that caution and proper education with cannabis should be had before consuming it in any form.

From a medical perspective, avoidance of these side effects for any patient will be a significant goal when considering recommending cannabis to the individual. He/she should be educated about the very real side effects of cannabis and that low to moderate dosing of the medicine should be started and practiced with. This goes for edibles, pills, tinctures, vaping, and topicals where applicable. Last but not least, should a "THC" overdose occur, reminding the individual that they will not die and that the effects will pass goes a long way in calming that person down.

Below is a list of the possible side effects of cannabis and also potential ways to deal with some of them should they occur:

- Dry Mouth - Drink water
- Nausea - Take some CBD to counteract the effects of THC
- Vomiting - Expel what you can and drink water. Try taking CBD
- Dry or Red Eyes - Eye Drops
- Impaired Mental Function - Relax and listen to calming music. Drink water.
- Headache - Lie down, warm wet cloth on head, try taking CBD.
- Dizziness - Lie down and relax, try taking CBD.
- Panic Attacks - Sit down, drink water, talk to someone, try taking CBD.
- Severe Anxiety - Try taking CBD, drink water, find a quiet calm place.

**note that CBD may not always correct some of the side-effects of THC Toxicity.*

As some of the above advice implies, CBD can indeed work to counteract some of the impairing side effects of consuming too much THC. While consuming CBD will not guarantee to "fix" these side effects, the anti-anxiety and calming effects of CBD are actually significant enough in proper doses to help "balance" an individual's mental state - which can significantly help to correct some of the above list. An excellent article discussing this concept can be found on Leafly.com: Can CBD Undo the Anxious Side Effects of THC?

Remember to start with low doses of THC (2.5 - 5 mg at first) when eating cannabinoids; this may be in the form of capsules, pills, edibles, and even tinctures. When experimenting with CBD, a user can have less to worry from psychoactivity. Even still, the user should be aware of how much THC is in the medicine - on one hand, it is still possible to receive a psychoactive effect if there is a significant amount of THC in the medicine; on the other, even if it is a CBD dominant formulation of medicine, there should still be a small amount of THC mixed in for the medicine to be effective (see the section on the Entourage effect in chapter 3).

Cannabis responsible adult use and safety considerations - warnings come first.

- **Don't smoke and drive.** Remember that safety involves more than just you and what you think about your personal tolerance. There is no way that you are going to guarantee that every single person out there who smokes weed is a capable driver while he/she is high. Sure you might think that of yourself, but would you bet your life on the other person? In fact, there was indeed a study that showed, drivers with a low tolerance to cannabis showed signs of impairment, even though drivers with more marijuana experience showed no signs of impairment; the former is telling enough to show that smoking and driving is not recommended for valid safety concerns.
- **Don't smoke when pregnant.** This was also covered in chapter 3 but essentially this is strongly recommended against. The developing fetus in a pregnant woman can indeed be influenced by THC being consumed by the mother, and although the adverse effects of this definitely still need more research, several studies have already shown a correlation with smaller baby sizes and lower weights in children born from a mom who used cannabis while pregnant. Furthermore, the CDC even recommends abstinence during breastfeeding, as psychoactive THC may actually be passed onto an infant through the mother's milk.
- **Don't "mess somebody up" against their will. Don't ruin someone's experience with cannabis.** This goes without saying and this isn't cool no matter how fun some might think this is. Cannabis definitely has the potential to ruin someone's day, and any reasons involving wanting to do so are more than likely petty and in poor character.
- **Be careful with concentrates.** Indeed, they are manufactured to be 2-3x more potent than flower, and a majority of cannabis users, experienced ones included, can easily go off the deep end when it comes to consuming concentrates ranging from hash, to wax, to distillate, and especially to dabs. Consuming these can easily bring out the deep "stoniness" of THC, and there are countless stories of people taking a dab and being left blasted or zooted into slow motion spaciness and hard to manage short term memory recall. With concentrates, there is such a thing as smoking too much to function properly.
- **Be careful with edibles.** This was also covered in chapter 3 and above, but it should be reminded that ingesting cannabis and THC can lead to the production of the metabolite 11-hydroxy-THC in one's liver that can lead "THC Toxicity" if that individual is not used to the dosage he/she is consuming. This can lead to severe impairment and disorientation, nausea and vomiting, and these can easily disable a person for several hours. Having a high marijuana smoking tolerance will not help with this either. As such, proper caution and understanding of what one is eating and what dose of THC it contains is necessary where edibles are concerned.

More than just the effects of THC, indica and sativa - the near endless psychoactive possibilities of experience.

If you don't already know, there are several thousand different varietal strains of cannabis and you can find somewhat comprehensive lists of them on numerous websites: leafly.com , seedfinder.eu , marijuana.com , but keep in mind that the cannabis cultivation world is constantly growing with professional breeders crossing new strains every year. Some would argue that there are too many strains out there, and not everyone "gets" many of the comical names that growers have dubbed some of their flower. Menus with strain names like Alaskan Thunder Fuck, Agent Orange, 9lb Hammer, Death Star OG, Fucking Incredible, Bruce Banner, ACDC, Khalifa Kush, 707 Headband, BC Big Bud, Mr. Nice, Jack Skellington, God's Gift, Casey Jones, Purple Monkey Balls, Wet Dream, Scooby Snacks, Fruity Pebbles (and the list could seriously go on for dozens of pages), can be really overwhelming to those new to cannabis and who have no idea where to start. With that said, hopefully the next few sections will help breakdown what to look for when looking to try new strains of cannabis or other cannabis products like edibles and concentrates.

Understanding the "high" and "terps" of cannabis

The science behind how a specific strain or cannabis product is going to affect and individual (which was also covered in chapters 3 and 4) has more to do with the combination of what cannabinoids are present and what terpenes, or "terps" are included as well. Different combinations of terpenes and the potency of the cannabinoids result in varying psychoactive effects and experiences. Essentially THC (or even THCV) are what provide the psychoactive effect, terpenes modulate and significantly help to determine what kind of effect that is - a sleepy euphoric one that puts you in a good mood, or an extra boost of energy that somehow comes with a surge of creativity, or perhaps that same energy and alertness mixed with physical euphoria, and there are so many more to be sure. This ability for cannabis to be so diverse is a fascinatingly complex side to the plant that has piqued the interest of this community and has given rise to weed nerds, critics and growers alike constantly looking and hunting for new strains, and even world renowned competitions to determine which cultivars were the best year after year.

To simplify the several thousand strains out there which all have varying effects, the cannabis industry currently uses the classification system of Indica, Sativa, and Hybrids. While these terms are not scientifically accurate, the community has recognized these terms for decades and are how they sort the strains that they know into different categories. Indicas are typically more heavy, sedative, calming, and relaxing, while Sativas carry the more energetic, uplifting, and creative qualities, and Hybrids are just that - combinations of both Indicas and Sativas.

If you have been reading the rest of the book (and it's ok if not, you probably skipped directly to this chapter), you may have noticed that I have avoided using these terms indica and sativa. This is primarily due to the fact that they are not accurate terms to classify which strains are "uplifting, creative, and energetic" vs "relaxing, euphoric, and sleepy." Chapter 3 discusses this at length, so take a look back there if you want the full scientific explanation of how those terms are erroneous. The short version is that they are horticulture terms to determine if a plant grows tall and long, or short, fat, and bushy but that this does not determine how a specific strain of cannabis is going to affect you; how the plant grows has nothing to do with this. It would almost be like saying all tall people should play basketball, and all short people shouldn't play sports.

So how do we determine then how to properly classify cannabis for consumers if the current terminology is scientifically inaccurate? That's not an easy question to answer but my two cents is that manufacturers should be reporting terpenes on packaging and providing proper descriptions of what these terpenes do. While it would be more complex to grasp for the end user, products would be more accurate in what they actually do.

Finding what you like.

This is going to be a unique and fun adventure for you if you're new to marijuana. For those of you who already have your favorite way of enjoying this plant, I'm sure you dedicate some time to trying out new things even though you already know what you like. It's all good either way, support this growing industry. One big tip is to smell the product and go for what is pleasing to your nose. It's almost like picking out fruits and vegetables at a grocery stand, but you're using your nose instead. Different people like different scents and classes of strains. Some people like purples, others like OGs, others like cookie strains, still others like myself enjoy racey heady strains such as Super Lemon Haze and Chem 4. The second tip would be to ask yourself what kind of experience you want out of your next smoking session - are you looking to chill or get turnt? Relay this to your budtender or look up strains online and shop for them accordingly. There really is more to it all than just lighting one up.

Experimentation and variety is the spice of life and you're probably gonna have to sample a few different things to determine what your personal favorites are. Not all alcohol drinkers like beer, wine, whisky, rum, gin, vodka, moonshine, sake, soju, and so on. Every stoner is different. I like dabs, one of my roommates likes blunts, the other likes vaping, and all three of us love bong rips. It also doesn't hurt to ask others what they like when it comes to smoking, vaping, or trying out edibles; some even simply enjoy the practice of cooking and baking with weed. Also remember that in this digital era, there are countless blogs, forums, ebooks, and even videos on youtube that show you how to get fancy with making your own rosin, edibles, or believe it or not, creative smoking apparatus and gadgets. There is a whole community of cannabis enthusiasts and each have their own favorite ways of getting elevated; in a short amount of time, you'll find yours as well.

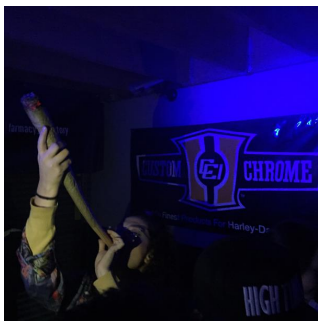
To help you out with a place to start if you want some guidance, the next few pages were written to break down some of the various ways to recreationally consume cannabis. While chapter 4 actually provided an extensive coverage of ways to prepare and consume cannabis for medicinal intent, this chapter was written a little more light hearted if you can't tell by now, and gives a comprehensive look at the various ways stoners have enjoyed consuming the plant both old and new.

Ways to get lit

From smoking, to vaping, to eating edibles, these are the three general ways of consuming cannabis, or more specifically THC, for the purposes of getting high. Each have their own subcategories, and the nuances between them are significant. (Also note that THC is actually not the only psychoactive cannabinoid compound. Tetrahydrocannabivarine - THCV has been reported to be more intense, though shorter lived in terms of psychoactivity than THC, making it a compound of recent interest to scientists and cannabis enthusiasts. More on this particular cannabinoid and the science behind how you get high was covered in chapter 3 and 4).

Smoking: Smoking weed is easily the most commonly recognized method of getting high and there are numerous iconic and fun ways to go about this.

- **Joints, also known as doobie's and doinks (RIP Young King Dave)**
  These are essentially paper rolled shredded cannabis. Rolling papers can range from hemp paper, to cigarette paper, and brands like RAW and Zig Zag are commonly used for this. They can come in different sizes and people often do get creative with papers to make things like tulip joints, crosses, and tridents (google search them).

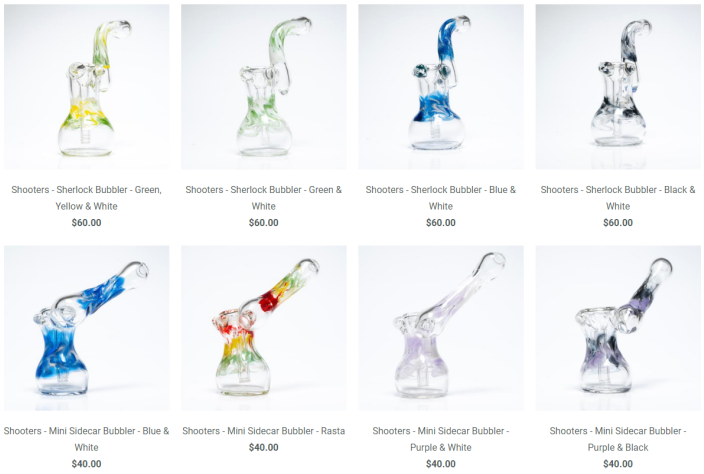
- **Spliffs** Essentially, these are joints with tobacco mixed in. A niche practice not for everyone.

- **Blunts** Marijuana rolled into cigar wrapping. Common brands include Swishers, Backwoods, Dutchmasters, and more.



- **Bongs** They come in many shapes and sizes but these are the big boy hitters when it comes to smoking flower. Glass is preferable to plastic. Some have ice catches to hold ice between the water chamber and the long neck mouthpiece.

- **Bubblers** Artsy versions of pipes that have a chamber for holding water, which helps cool the smoke as you hit the piece. Kind of like a mini bong...



Bubblers for sale from [The Cave Smoke Shop](#) in San Mateo.

- **Makeshift Apparatus** These include creative macgyvering of various objects like apples, 2 liter bottles (to make gravity bongs), special boxes, and even bread conchitas in order to smoke some herb.

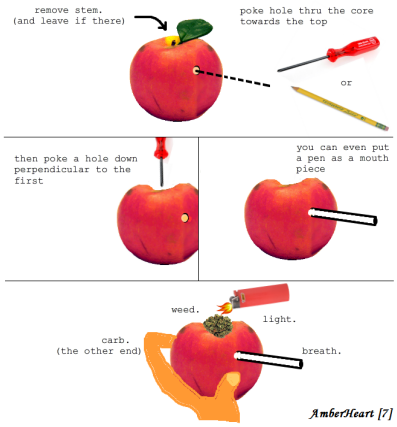
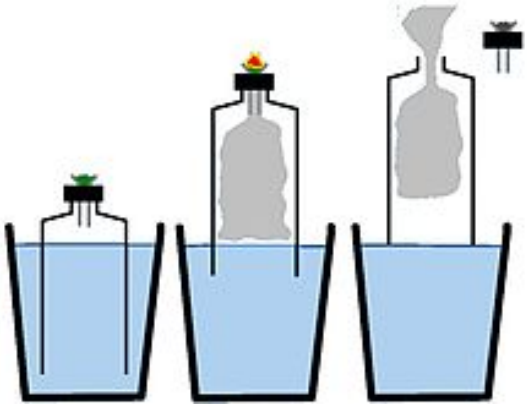


Image found on Reddit



Gravity Bong on Wikipedia

- **Pipes** These come in many varieties, from nice and simple to artistically ornate, and can be made from wood, glass, metal composites, and more. Sherlocks, chillums, miniature hand pipes, hallowed out pieces of wood - anything you can smoke tobacco out of, you can smoke weed out of.

Vaping: Compared to smoking, vaping is a relatively new way of consuming cannabis and typically involves gadgets like batteries and cartridges, handheld or even tabletop units, and lesser known, glass pieces known as oil rigs or dab rigs.

- **Cartridges** CO2 cartridges to be more specific, are a growing fad with general consumers, and it isn't hard to guess why. Discreet, easy to use, with virtually no smell, these little gadgets make it easy to sneak away for a relieving puff here and there. Oftentimes sold in half gram or full gram miniature containers that you put on top of a battery, these super convenient products have taken the industry by storm. Purists would say that it isn't the same as burning one, but it looks like these guys are here to stay and companies are making them better and better.

- **Vaporizers** These come in many designs as well and are engineered to be anywhere from simplistic and discreet, to fancy and high end, and they can be small handheld units, or large desktop units for at home seshes. They can be made to vaporize flower, concentrates, or both. To understand the differences between vaping and smoking, refer back to chapter 4 for a full scientific breakdown, but essentially vaporizing is a cleaner, more health conscious way of consuming cannabis. Instead of using a flame to touch the herb, which causes combustion and consequently carcinogens, the cannabis is heated to a specific temperature in order to not burn the herb. Only the cannabinoids and terpenes are vaporized to which they can be inhaled without irritating one's lungs or throat.

    - **Handheld** The PAX, The Magic Flight Launch Box, the Vaped ver. 1-4 pens, and many other gadgets on the market were engineered to fit in one's pocket so that users can elevate on the go. A specially designed chamber holds your cannabis and heats it to the right temperature for inhalation.

    - **TableTop** These are typically larger vaporizers that sit on your table, and also come in many varieties. The most commonly known is the Volcano (which is also used in some hospitals now), but other designs such as the Silver Surfer and old box vapes with hookah tubes are on the market.

    - **Dabbing** Considered to be the next level method of getting high, "taking fat dabs of terpy live resin on heady rigs" has become a subculture practice in the weed world, and involves a rig, sometimes a blowtorch (or an electronically heated nail), and either rosin, wax, sauce, honeycomb, even hash moonshine.

Edibles and drinks: These represent infinite possibilities. Given that cannabis can literally be infused into anything edible or drinkable, whatever favorite culinary dish, candy, snack, specialty mixed beverage at your favorite coffee or tea shop, beer, wine, cocktail of choice at a bar - you name it, cannabis can be infused into it without much difficulty. Imagine a fine dining experience at a five star restaurant where you're able to vape and eat a chef prepared cuisine infused with your favorite strain. Follow up with desert cocktail that has some CBD to bring you down smoothly, and have some organic gelato infused with a small amount of THC. The next day, wake up in the morning with some coffee infused with CBD and vape some Sour Diesel to get going.

Use your imagination, and yes people do get really creative here. Shows like Bong Appetit on Viceland and other chefs around the world call cooking with a cannabis an exciting and uncharted frontier that will only grow in the coming years.

One important thing to stress here however is safety and moderation. As has been mentioned throughout multiple areas in this chapter and rest of the book, edibles have the potential to cause significant harm despite the fact that it won't kill you. THC edible overdoses are not a pretty site and they can absolutely ruin someone's day.

Being a Connoisseur - how to tell what constitutes low grade to mids to top shelf.

While the specifics of what an individual's tastes constitute and what he/she enjoys consuming are subjective to that person, there are several clear distinctions in terms of product quality to determine whether a cannabis flower, concentrate, edible, or even medicine fit into what the industry categorizes as low grade, mid-shelf, high grade and top-shelf. Some of these may be obvious, but they are important to consider when either sourcing cannabis for yourself, or with understanding how the various marijuana distribution outlets price and display their inventory for consumers.

- **Freshness of flower/concentrate -** while cannabis can indeed be stored properly for long term preservation, much like fruits and vegetables, this will be one of the biggest determining factors in what a critic, dispensary buyer, or wholesale distributor will grade these at. When was the crop in discussion harvested? Obviously older crops will be found on the lower side of whatever grade system a person is using.
- **How was the flower grown -** another big determining factor when grading cannabis. Is it grown organically or synthetically? Outdoor? Greenhouse? Indoor? Was the crop attacked by bugs, did the grower have to spray something? Were there environmental stresses to stunt the plant? Was the crop harvested at the right time? Was the product cured properly? All these questions and more play a big role in deciding how "good" or "bad" cannabis flower is.
- **What strain is it** - The cultivar strains of cannabis is a deep world with, again, thousands of varieties and different individuals like different things; there's something out there for everyone, but there are certain specific strains that carry renown and are sought after by connoisseurs and even medical patients due to what that particular flower in question can do. Some strains are more sought after, others might be oversaturated.
- **Quality of Edible -** This has more to do with how the edible is made - professionally or amaturely? Is the cannabis taste masked properly or incorporated creatively into the dish? What ingredients were used to make the edible? When it comes to the endless possibilities with edibles, you can imagine that this particular point has just as wide range of grading.
- **Potency - more than just THC percentages, terpenes are just as important. Lab tests. -** While numbers aren't everything, consider varying alcohol percentages in beer, wine, and other spirits. There's also a flavor side to judging alcohol and with cannabis it comes down to the terpenes. How good is the "nose" on the flower? Remember that terpenes are a big determining factor in how a particular product is going to affect you and as such should be given much consideration with critiquing flower. With that said, high testing cannabinoid profiles, i.e. high percentages of THC or even CBD can be a strong indicator to the quality of the product being looked at.
- **Aesthetics and "Bag Appeal" -** Looks do mean quite a bit when it comes to shopping and obviously dispensaries, delivery services, and growers do their best to make sure that their product is visually appealing and eye catching. There is a culture that loves the look of bud and flower and the discerning eye of many of these people plays a significant role in pricing cannabis.
- **Quality of trim -** This could have gone under "bag appeal" but does deserve special mentioning of its own. The quality of the trim on the buds can actually make or break a crop and growers do their best to ensure that their flowers are manicured properly.
- **Quality of concentrate** - When dealing with concentrates the criteria for this asks just as many questions as determining flower quality does. Is the concentrate made from trim or nugs? Is the product clean of solvents and contaminants? How fresh or old is it? How was it made - rosin, bho, crystal distillate process? When it comes to hash, what is the texture like? Vibrancy of the product's color is also important. Indeed the world concentrates is just as vast as flowers.

Cannabis and creative outlets - Art, Music, Writing, and more.

Art by Alex Grey.

It is no secret that some strains of cannabis are known to provide creative energies and thought provoking musings that can be motivating, refreshingly out of the box, and even able to help people enter powerful flowstates . Many talented artists, actors, musicians, writers, and more over the past century have been known to use cannabis regularly for help with inspiration here and there. From celebrities like the Beatles, to Willie Nelson, to Snoop Dog, to Bob Marley, to Seth Rogan, to Oliver Stone, to Sarah Silverman, to Stephen Colbert, to Jennifer Lawrence, to Natalie Portman, to Rihanna, to George Carlin, to Dave Chapelle, to Morgan Freeman, to Stephen King, to Hunter S Thompson, to even William Shakespeare, and I'm sure you the reader can come up with more, you cannot deny that there are some very successful creatives out in the world and their usage of marijuana, cannabis, pot, weed, whatever you want to call it did quite the contrary of making them dumb and lazy. You should also understand that this entire book was written with the positive influence of cannabis - lots of dabs, joints, and bong rips.

For those of you looking to try combining weed with your personal outlet, look for really "heady" and thought provoking strains (ask the budtender for that) like Chem 4, Lamb's Bread, Jack Herer, Durban Poison, Headband, and Super Lemon Haze to name a few. Look for terpene profiles that contain high amounts of Cineol, Limonene, Nerolidol, β-Caryophyllene, and α-Pinene - these have been correlated with putting users in an uplifted, positive, and creative mindsets. Take it from me, there will be a bit of experimentation here and getting too blasted can be counterintuitive and non-productive. Try different strains and try not to go overboard with getting high if you honestly want to work on a project.

Cannabis and Sex - You should try it

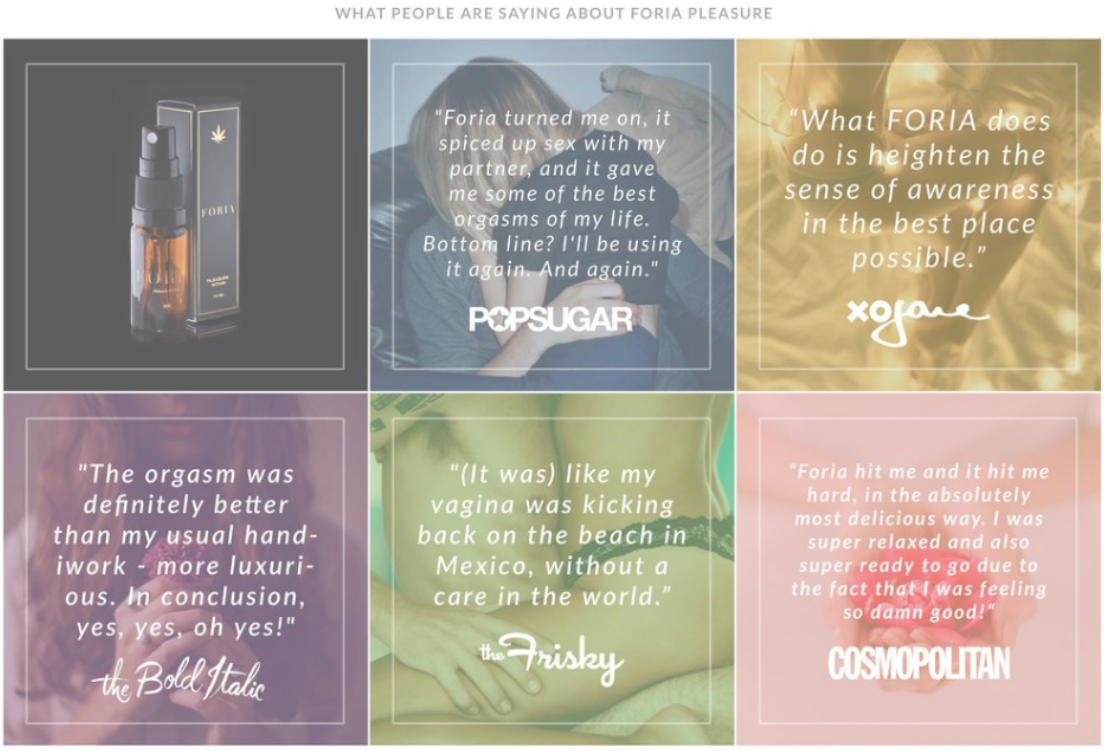


Image from Foria's Website.

Yes, go ahead, use your imagination. Feel free to even get pervy so long as you're not weird or offensive to other people about it. Practice with your partner safely, and have fun.

Essentially, cannabis topicals like Foria and other "specially" formulated lotions, can act as stimulants to sensitive parts of one's body. Certain strains of cannabis are known to provide euphoric physical sensations within people, and this can easily compliment the sensual physical nature of sexual intercourse. Edibles and concentrates can provide an even more potent and intense experience for those who can handle them while performing coitus, and it isn't hard to combine them with other aphrodisiacs out there. There are actually quite a number of testimonials recommending trying these things out, and the fact that cannabis can spice up one's sex life is just another boon that this plant can provide.

The surprising thing is that this is actually a relatively young facet within the cannabis industry and there will probably be more products down the road to fill and grow fill this specific niche. Entrepreneurs are bound to get creative here and the luring concept of combining "weed and sex" is a hard one to ignore. It should also be noted that a recent study from the Stanford University School of Medicine found that cannabis usage was correlated with increased sexual frequency in both men and women. Surprising? Not really, especially for those who already have a history with the plant.

For those looking for specific strains, or "sex weed" to add something extra in the bedroom, look for various OGs like Tahoe OG and Skywalker OG, Cookie crosses like Platinum Cookies and Animal Cookies, and other heavies like Bubba Kush, Grand Daddy Purple, Northern Lights, and God's Gift. Terpene profiles containing Myrcene, Linalool, β-Caryophyllene, Borneol and Cineol make for great euphoric experiences.

Working out and staying fit with cannabis

Arnold Swarzenegger smoking weed.

It's great and there are some amazing possibilities where this subject is concerned! Many people into this rave about the added euphoria during and after workouts, the easier, faster, and more enjoyable periods of exercise recovery, and this side of cannabis experimentation is a fun practice amongst many different athletic outlets - weightlifting, yoga, competitive sports, martial arts, surfing, skating, running and hiking, the list could go on. You'll never really know unless you try it yourself but if you do, or even already are into it, the following recommendations can help steer you in the right direction depending on what you're looking for.

Some people like smoking uplifting strains in order motivate themselves to go the gym. Energizers like Sour Diesel, Tangie, and Jack Herer, are a few examples; look for strains high in the terpenes α-Pinene, Limonene, and Cineol to get your extra workout boost.

Others like to chill and burn afterwards with a strong sesh of bong rips or dabs - ogs and purps would be great for these, and the following terps are what round these heavier flowers out: Myrcene, Linalool, Humulene, and β-Caryophyllene. This makes for an excellent way to relax and loosen up any sore muscles and to cap off a heavy workout. Just look at the above image.

It's also no secret that some people like to get high right before going into the sauna or steam room. It actually feels really amazing; just remember not to pass out and possibly bring some water with you - it tastes extra refreshing when you're high.

There are also uses for topicals, lotions, and other medical products for athletes in the near future, and cannabis based medicines may actually be safer alternatives to some of the drugs they are already taking. Remember that cannabis has potent anti-inflammatory properties when either topically applied or ingested, which helps ease pain across countless injuries and even workout wear and tear.

If you want to give this a try, just remember to be safe, and avoid doing anything stupid while you are working with heavy weights.

Cannabis as an Entheogen and Psychedelic - introspection, lateral thinking, and expanding your mind

Image borrowed from PsychedelicAdventure.net

Entheogen: a chemical substance, typically of plant origin, that is ingested to produce a non-ordinary state of consciousness for religious or spiritual purposes.

Psychedelic: relating to or denoting drugs that produce hallucinations and apparent expansion of consciousness. From the Greek “Psyche” and “Delos” which translates to mind/psyche and manifest/reveal - or “the mind manifesting or revealing itself.”

Let us make the distinction that utilizing cannabis for recreational purposes, i.e. having fun, is actually very different from using it as an entheogen. While religious sacrament with the cannabis herb may actually be an enjoyable experience, it is a far practice from simply smoking with one’s homies and having deep conversations.

It is also considered a mild psychedelic, in that it does not produce the same level of hallucinations other substances such as psilocybin, lsd, and dmt do. However, as the Rastafarians will swear by, smoking cannabis can indeed be enlightening and consciousness expanding. And anyone who has overdosed on an edible can attest, hallucinations can and will happen to someone who ingests way too much THC.

What does all this mean however, and why does it matter? Essentially that cannabis and other psychedelics can get you thinking out of the box, and in ways that you may not initially be used to. Perspectives on matters expand, things somehow make a little more sense, a little healthy introspection occurs, and one ponders and thinks upon big picture subjects - completely contrary to marijuana’s reputation for killing brain cells and making users dumb. For many, the effects of the psychoactive properties of cannabis makes them feel more “connected” - to nature, to themselves, to the now. It sounds weird sure, but ask any “woke” stoner and they’ll more than likely tell you the same thing. If you don’t understand, you’ll have to go through a few seshes first. Don’t worry, you’ll get it one day.

Socializing with cannabis and CBD for social anxiety.

Cannabis has a reputation for being a social bug, and it comes as no surprise - many a user has no doubt experienced what it's like to be a part of a smoke circle, or what happens when you hit a really "heady" strain that makes you talk and talk and talk, and even users who actually utilize CBD for its calming effects to be less socially anxious and more outgoing are all examples to illustrate how significantly cannabis can help an individual when it comes to communication and social interaction. The cannabis community is also notoriously known for special "seshes" where cannabis enthusiasts meet up at invite only location - these awesomely fun outings usually have a smorgesborge of quality marijuana products. They're also great networking opportunities, and going to one give you a glimpse of the social potential that could be once the industry really takes off. Cannabis centric parties, lounges, events, activities, and potential programs bring people together from all walks of life in order for them to share one of their passions.

Recreational usage not for kids. Plus a message for parents to tell their young ones.

Dear parents,

I know this may be a difficult conversation to have with your kids. But try having this talk with them if you trust yourself and them as well.

> There's this plant you may have heard of, and it goes by many names. It is called cannabis, marijuana, weed, and you may hear others call it by other names but it's important that you know what it really is. It is a medicinal plant that is used for treating sickness and disease for lots of people, some even your age. Much of the time this is for something serious and they may need that medicine.
>
> Now, you might hear adults talk about it a lot, and this is ok, there's nothing wrong with talking about it. Some people like to smoke the plant as well for either fun or medical reasons, and so long as they are an adult or are using it as a medicine, then that's okay too.
>
> Remember though, that smoking this plant is for adults only, just like alcohol, and if you mess around with this stuff at your age, you can actually slow the growth of your brain which will be bad for you later on in life. This includes vaping if you know what that is. You are young, and you'll get a chance to try these things later on in life. So, even if your friends or other people try to get you to give smoking a try, you should wait and say that you're not ready for that.
>
> Good luck kid, make good decisions in life.

I'm sure you as a parent can come up with something along those lines, and if you're not exactly feeling creative, go ahead and use that. It's pretty similar to what parents in the cannabis industry tell their kids. They don't want to lie about what they do, they're honest and provide a good education and understanding of what cannabis is. Being honest like this works wonders. Good luck with your kids, they'll understand.

Sincerely,
- A cannabis scientist who cares about the kids.

Just to be clear, smoking a crap ton of weed will not cure cancer or even prevent it. Utilizing cannabis for medicinal purposes is a lot more involved than just burning one when you feel sick. Read the rest of the book.

This is in bold letters for a reason. There are sadly countless stoners who feel that this is so, but it is 100% scientifically not true. While smoking a lot of weed can help reduce one's blood pressure and help that person lead a more chill life, and actually help with numerous symptoms; cannabis utilization for cancer treatment and many other serious diseases is methodical, and involves ingesting the cannabinoid medical compounds to activate both CB1 and CB2 receptors within a sick person's endocannabinoid system versus simply smoking THC to get high. Let's all be very clear on this.

Combining Cannabis with alcohol and/or other recreational drugs

They call it the crossfade and it isn't always recommended. Consider the fact that alcohol's inebriating properties compound and enhance the oftentimes intense psychoactivity of THC, not very many people have a tolerance for these kinds of excesses. And more than likely this type of consumption can lead to blackouts and potential self harm if the combination of both is too much to handle for an individual. Should more drugs become involved - opiates like cocaine and heroin, codeine heavy lean drinks, or even prescription medications, - all for questionable recreational use, please remember and understand that these can all potentially lead to severe health issues later on in life and that at the worse, life ending overdose. There are countless celebrities who have died because of this and their reality is a sobering wake up call to be safe with the consumption of any drug. It is true that this is common practice for college kids experimenting with marijuana, for hood pushers sampling product, and even for suburban alcoholics who have a newfound interest in weed. Vices are vices. Have your fun but remember to be responsible. To each their own, I'm sure there is another side to their story, a reason for substance abuse if that's what it becomes, but this portion was written as a cautionary reminder of the danger of all drugs, alcohol, opiates, prescriptions, and even cannabis included. Stay safe, seek help if you have an addiction problem.

A case for preventative care with cannabis

Many within the cannabis community, some who have only been experimenting with the plant for a short time, others for several years - individuals like myself and other medical patients, we all share these same curious questions: can cannabis be used on a daily basis for the purposes of staying healthy and preventing sickness and disease? Furthermore, can educating the masses on the actual and very real benefits of cannabis help to build a healthier society? Would there be less irrationally angry people in the world if more people used this plant?

At first glance, these questions might cause some to laugh and think about how ridiculous that sounds. Sure, a society filled with stoners toking up constantly doesn't exactly sound like a productive society, but as we've talked about throughout much of the book, cannabis can indeed be utilized properly with the right know how in order to not just treat symptoms of sickness, but prevent them as well.

Besides, we aren't really talking about a society of stoners. I'm talking about an educated society that knows what cannabis can do for them should they get sick, and better still, equipped with the knowledge that you can actually utilize the cannabis plant as a healthy herb - one that can be juiced for phytocannabinoid consumption without psychoactivity, eaten or smoked at night to chill and go to bed, or vaped to calm someone down after a stressful incident, and responsibly be experimented with in doses that individuals can handle - the possibilities here are actually quite exciting once you start to consider how creative incorporating cannabis into one's life can be.

By the way, did you know that the above theory is actually backed by science? If you go back and review chapters 3-4, you will remember the biological wonder that is the endocannabinoid system. Stimulating this system with cannabinoids, psychoactive THC included, actually helps to upregulate it and correct potential clinical endocannabinoid deficiency. This is a term to describe when the endocannabinoid system is deficient of compounds to fuel it, and has been correlated with multiple degenerative diseases including autoimmune diseases. To simplify all these sciency sentences, essentially, what they mean is that consuming cannabis, even vaping it, can indeed be a healthy practice! This does not mean that everyone should go out and chain smoke weed, far from that. This means that when cannabis is strategically consumed, with the intent as a health supplement, it can actually provide the user with some amazing health benefits. Is this hard science or hippy talk? A little of both to be honest, many case studies with regular users of cannabis show that oftentimes they are healthier than the average person - better blood pressure, slimmer waist lines despite weed's association with the munchies (go ahead look it up), more positive mindsets, healthier amounts of sleep, better sex life, and yes, less sickness and disease. While research into the endocannabinoid system is relatively young, it has been very telling in the world of medicine within the past few decades, that it is going to be a major player in the study of health and medicine in the years to come. Go ahead, look these things up, there's an entire section of research with clickable links that will take you directly to many of these scientific studies.

Sure, there are a lot of stoners out there, and many of them have their rituals and views of only wanting to burn the best chronic because their favorite rapper or artist liked it; but is there anything really wrong with this? It's a little disingenuine or naive to think these days that all stoners are lazy burnouts who eat chips on the couch. There is a much more diverse demographic of people who have been involved with cannabis for a long time as well as those new to this powerful herb. Is everyone who drinks alcohol an alcoholic? No, and this is likewise with people who use cannabis. After reading this chapter and the rest of the book, you also know that using this plant is a lot more involved than simply rolling and smoking joints.

Whatever your views of the recreational side of cannabis, whether you feverishly support it, or were ardently against it, you should realize that it is a much bigger world than you could have initially imagined, it's usage for pleasure has been around for thousands of years, and the modern cannabis community is always passionately finding ways, new and old, to enjoy their favorite flowers.

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Chapter 7 - Hemp: an industrial powerhouse.

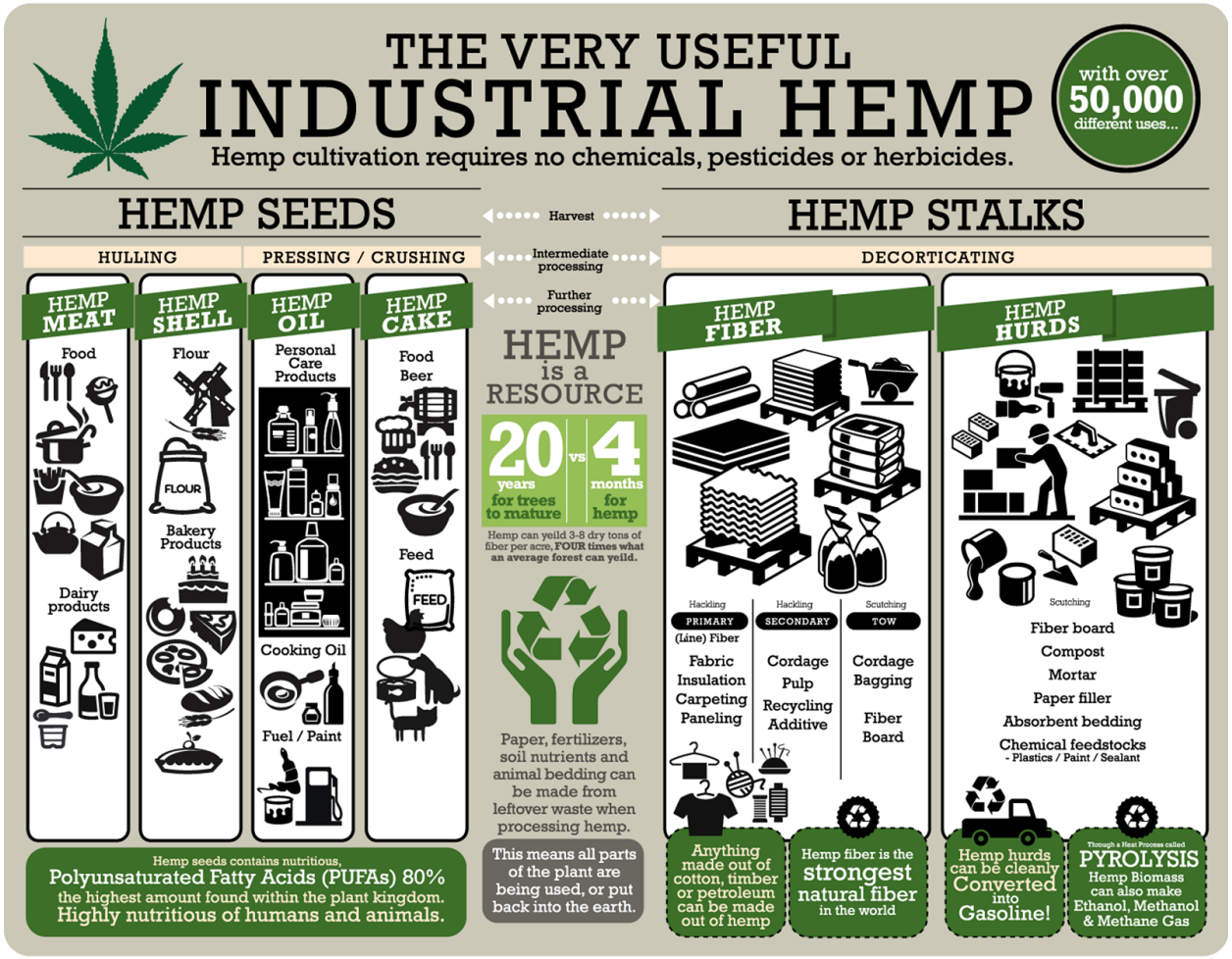


Image from the Internet

“Make the most of the Indian hemp seed and sow it everywhere.”

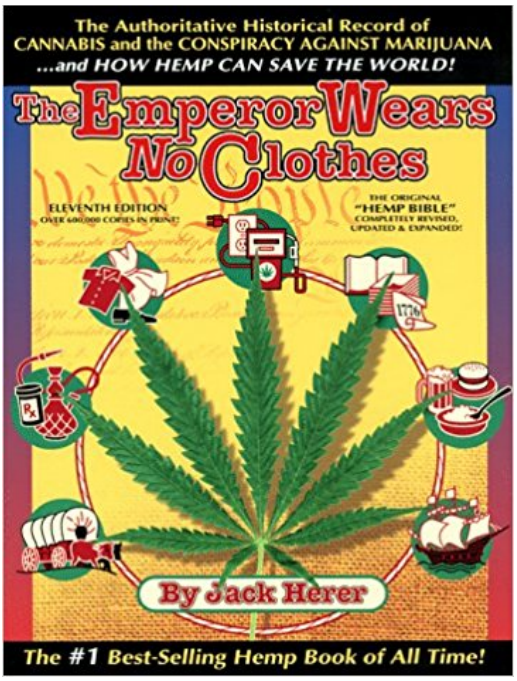
- George Washington

In his legendary book, "The Emperor Wears No Clothes," activist and author Jack Herer puts forward the notion that hemp could save the world. Sounds like a stoner's "high" musings and thoughts, and you may indeed laugh at the statement, but let's take a look at what his argument and book entails:

The story goes, that one night in 1974, when Jack was high, he experienced what he describes as a revelation. All his knowledge of the cannabis plant coalesced into a powerful vision - that hemp could save the world. In his vision, everything made from trees and petroleum could be made from hemp; that trees would never have to be cut down to produce paper; that clean burning fuel would be made from the biomass of hemp - this fuel could be used to run all fuel reliant technologies from cars, to factories, to power plants, to even our homes; that hemp could be grown and processed into cloth and paper utilizing only a fraction of the energy and toxic chemicals needed to process cotton and lumber. He pictured a world environment saved by the mass utilization of hemp - reversing the greenhouse effect, global warming, eliminating acid rain, and stopping deforestation.

A direct quote from the back of the book reads: "If all fossil fuels and their derivatives, as well as trees for paper and construction were banned in order to save the planet, reverse the Greenhouse Effect and stop deforestation; then there is only one known annually renewable natural resource that is capable of providing the overall majority of the world's paper and textiles; meet all of the world's transportation, industrial and home energy needs, while simultaneously reducing pollution, rebuilding the soil, and cleaning the atmosphere all at the same time...and that substance is -- the same one that did it all before -- Cannabis Hemp -- Marijuana!"

His argument may sound like a hippie's idealistic wish for a better world, but everything in his best selling book is actually well put together throughout 330 pages, is scientifically sound, and continues to this day as a powerful reference tool for activists in the fight against marijuana prohibition. It has been a favorite book of mine, and is one of the primary resources that got me into the cannabis movement. Check it out if you have time, it's available for free on the links provided.



What is Hemp?

Comparing the differences in growing hemp (left) vs growing medical/recreational cannabis (right).

Hemp is a cultivar variety of the cannabis sativa plant species. It is one of the fastest growing crops on the planet, and is recognizable by its thin, slender, and tall stature (some strains can reach upwards of 20 feet). Similar to it's many thousand strain cousin in the medical cannabis plant (whose many cultivar varieties belong to cannabis indica, cannabis sativa, and cannabis ruderalis), hemp produces flowers and trichomes carrying cannabinoids, though potency and concentrations are typically much lower especially where THC is concerned, and unlike medical cannabis, it is grown primarily for its fibrous stalk, immensely useful pulp, and it's seeds rather than it's bud and cannabinoid content.

It is a plant that has been with humanity for more than 10,000 years and is one of the first to be spun into useable fiber. Throughout history, various parts of the world, and in many cultures, it has been processed and refined into everyday goods such as paper, textiles, clothing, food, medicine, biodegradable plastics, biofuel, animal feed, building material, fiber, cordage, and more.

Hemp History

Hemp is one of the first crops humanity cultivated in mass. Earliest dated hemp use goes back as far as 8000 BCE in parts of Asia and old Mesopotamia (modern day Turkey), but anthropologists and historians argue and suggest that hemp was cultivated even further back. Carl Sagan, in his book "Dragons of Eden," even suggests that hemp may have been one of the first crops human civilizations ever planted. The plant's versatile use combined with its ability to be rapidly mass produced made it a staple crop to grow for many of history's people. Both US Presidents George Washington and Thomas Jefferson grew hemp on their plantations and it was only recently that hemp was removed from mass production in this country. It's current limited production and need to be imported from other countries is a shameful hurdle and hindrance to American society. A more definite timeline of hemp throughout history can be found in chapter 2, but for the purposes of repeating hemp's importance, know that this plant, which should have never been banned in the first place, has been with us and was an essential part of humanity's survival and evolution serving a multitude of purposes that will be covered in this chapter.

Prohibition (more info on this in the next chapter)

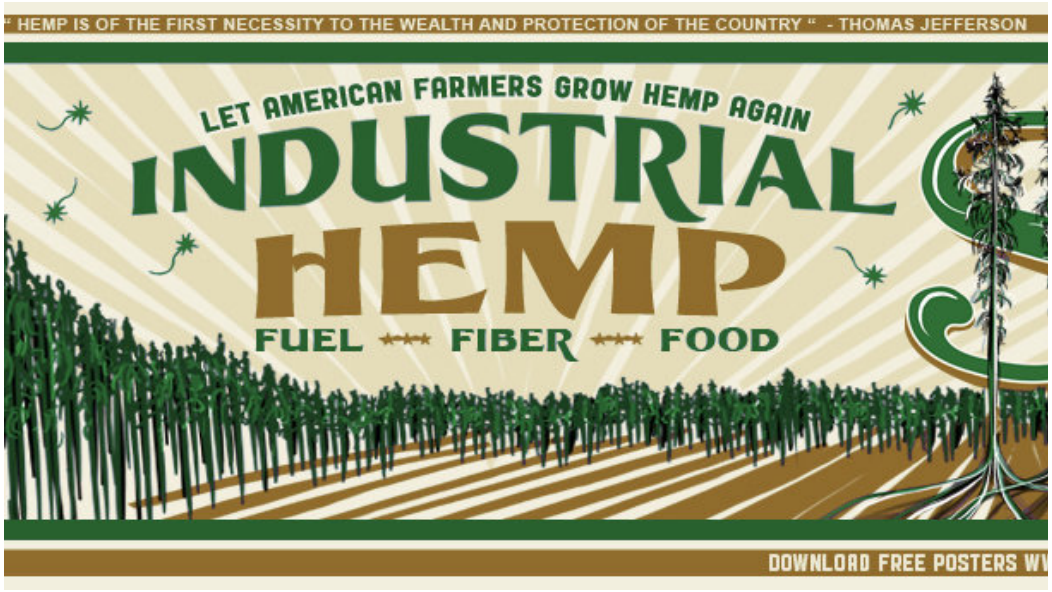


Image from change.org.

It really is sad and egregious that hemp was lumped in with marijuana prohibition; congress and most Americans at the time didn't even know they were effectively banning hemp from agricultural production with the Marihuana Tax Act in 1937.

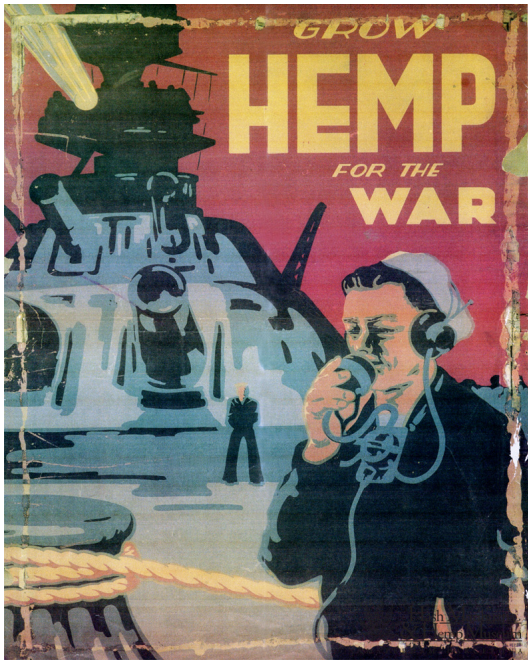
It is believed by many historians now that economics and politics are of the primary reasons hemp was put into prohibition. Essentially, a small but very powerful group of rich individuals including William Randolph Hearst, who owned newspapers and paper mills, politically and economically powerful Secretary of Treasury Andrew Mellon, and Federal Bureau of Narcotics Drug Czar Harry Anslinger, were successful in convincing the general public of a "marihuana" menace to society throughout the late 1920s and early 1930s. Congress, having to act under pressure but lacking sufficient knowledge and education into what exactly marihuana and hemp were, passed a tax law that effectively banned the production of both hemp and cannabis medicines.

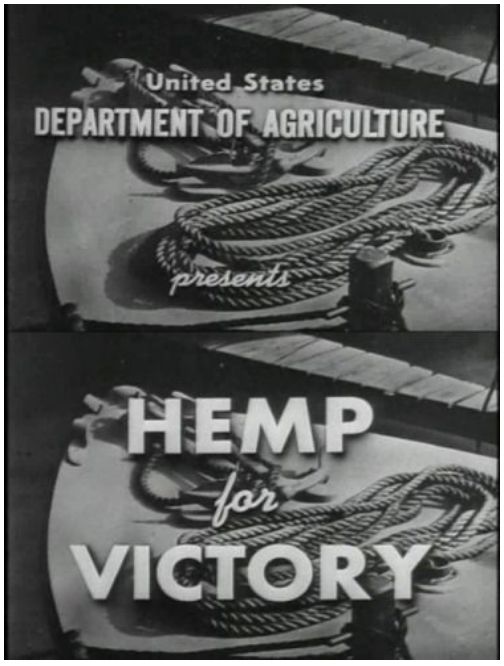
It comes as no surprise that the industries of alcohol, tobacco, chemical companies who were beginning to produce opiate and synthetic drugs, cotton, plastics, lumber, and more stood to gain in billions if not trillions since the enacting of prohibition.

To add to the irony of this, an article written in 1937 right before the passing of the tax act, titled Billion Dollar Crop was later published in Popular Mechanics in 1938. In it, many of the versatile usages of hemp were listed, the introduction of the decorticator machine which would allow farmers to more efficiently process hemp fields was discussed, and then economy experts predicted how it would massively benefit our society.

Sadly the political powers that were of the time and the rich influence of some powerful industries paved the way for a very different future.

Hemp for Victory





Despite all the strong efforts into demonizing and banning the cannabis plant, the United States Department of Agriculture actually released a short film, "Hemp For Victory" in 1942, in order to encourage farmers across America to grow the hemp plant for the wartime effort. The US Navy and the rest of the army needed hemp for cord and other reasons. The film, which is a little over 14 minutes, goes into great detail as to why the military needed farmers to grow hemp, as well as provided detailed methods on how to efficiently grow and harvest the plant. This was essentially a double standard by the US Government, and as strange as this all is, it's actually true. You can watch the whole documentary by clicking the link above!

Despite the release of this film however, after the war, prohibition remained in effect and even stepped up a notch in the 1970s with Nixon's infamous War on Drugs, invariably hurting would be hemp farmers and killing any possible industries that could benefit from the plant. The pressing social issue this is, much more information beyond the scope of this chapter can be found in the next one that aims to help with Ending Prohibition and the War on Drugs.

A Bajillion Practical Uses

Fig. 1. Major uses of industrial hemp.
https://www.hort.purdue.edu/newcrop/ncnu02/v5-284.html

Considering hemp as a rapidly growing renewable resource that can be used for a ton of things beneficial to society, it really is mind-boggling that this plant was put into prohibition in the first place. When bad political policy inevitably changes for the better, and it will, humanity will once again find amazing ways to incorporate this crop into our lives. Even with the current prohibition still in effect, and even against local restrictions where they are, hemp entrepreneurs and industrialists continue to develop and evolve their crafts and products. Technological advancements with cannabis have never stopped and are hungrily waiting for the renaissance day when society finally understands how much of a boon to the world this plant is. Over the next few pages, we'll examine some of the most significant products possible from hemp.

Building Material

There are 3 primary components to the industrial hemp plant and these include: the outer fiber, the inner hurd and pulp, and the seeds which can actually be pressed in order to produce oil. All 3 of these can be used and combined in order to develop a wide list of products that can resemble concrete, plastics, and wood materials! Hemp building materials include but are not limited to: fiberboards, wallboards, roofing, insulation, plastic materials strong enough for piping, insulation, paneling, bricks, and even hempcrete! It is actually possible to build an entire home from hemp materials!

Fiber

Did you know that hemp fiber, when harvested properly, is actually stronger than steel? Go ahead, look it up. It can literally hold nearly twice the weight that steel can before it cracks and breaks and it can bend and mend almost six times better! Plus, it can actually be more readily available than steel itself! Just a few of its potential uses that the plant can be woven and shaped into are shown in the above image. In fact, many modern construction experts are already screaming for more regular usage of hemp where building projects are concerned.

Hempcrete

Hempcrete is a fire resistant, mold resistant, pest resistant, rot resistant, as well as a carbon negative building material that can be rapidly grown and manufactured. It is also a breathable material, one that can store and release warm air for insulation, which allows the building to maintain an optimal temperature. It also hardens over time, and lasts longer than homes and buildings made from wood. By combining hemp shivs and limestone, architects and builders have available to them an immensely useful material that is actually superior in many ways to conventional concrete! An excellent clip from National Geographic discussing hempcrete can be found here.

Cloth & Fabric

Image from the internet.

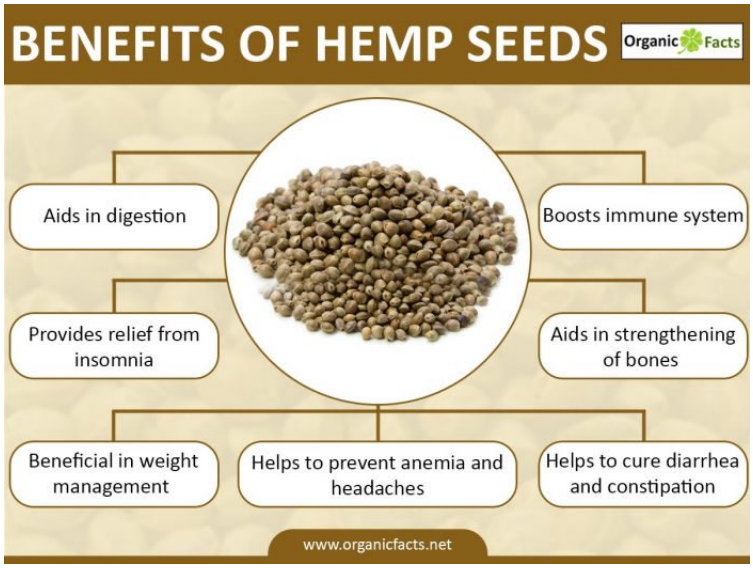
Hemp cloth and fabric are actually not new to society, and humanity has been utilizing it for clothing, paper, rope, ship sails, canvas, holding sacks and bags, and much much more for thousands of years. While some of the most important characteristics of hemp cloth in comparison to cotton are illustrated in the above image, some of the most important nuances of hemp deserve discussion.

As a fabric, hemp has been tested at being 8x stronger and more durable than cotton fabric. It is more cost effective water-wise and chemical-wise to grow than cotton, requires less labor to harvest and refine, does not require toxic chemicals to process, and hemp as a strong eco-friendly fabric already has extensive historical usage due to its versatile superiority over other cloths.

Hemp material has also been known to possess hypo-allergenic and UV resistant properties! What this essentially means is that hemp fabric can literally fight off infections such as staph, and bacteria similar to how true indigo fabrics are. Being able to be woven into thicker and more resilient fibers and cords than cotton, hemp cloth is also an effective protectant from the sun and it's UV rays. As a breathable material, it also makes for a great choice of clothing during hot weathers and humid climates.

While some may openly criticize the coarse feel of hemp, know that it can also be woven with other more pleasing fabrics in order to create hybrid materials that may actually be superior in feel and utility to what clothes current fashion designers are familiar with. Indeed, the world of hemp fabric is destined to see a reemergence and renaissance that could easily take the world by storm!

Food



Hemp as a food comes from both the direct product or byproduct of its seed. Scientists and researchers have found it to be one of the most nutritious superfoods currently known to humanity and this is due to the fact that it possesses a great balance of omega-3 and omega-6, has a healthy assortment of essential fatty acids, is packed with protein, and is also gluten, soy, and wheat free. Lesser known is the fact that hempseed also contains a significant amount of the protein edestin - a compound needed by us to produce essential antibodies.

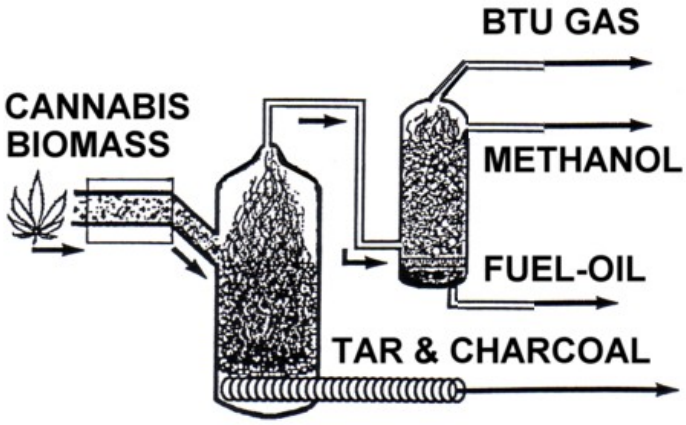
Hemp food products are already available and come in a few primary forms: raw whole hemp seeds are a popular item that contains protein, vitamins, and minerals that are beneficial to any diet and is sought after primarily for its high fiber content.

Shelled hemp seed, where the skin and shell of the seed are removed, is actually a more popular choice among health geeks and may be easier to utilize and incorporate into more recipes than it's raw whole seed alternative. It is considered to be better tasting and digestible than soy protein, and can also be refined into hemp milk and even ice cream!

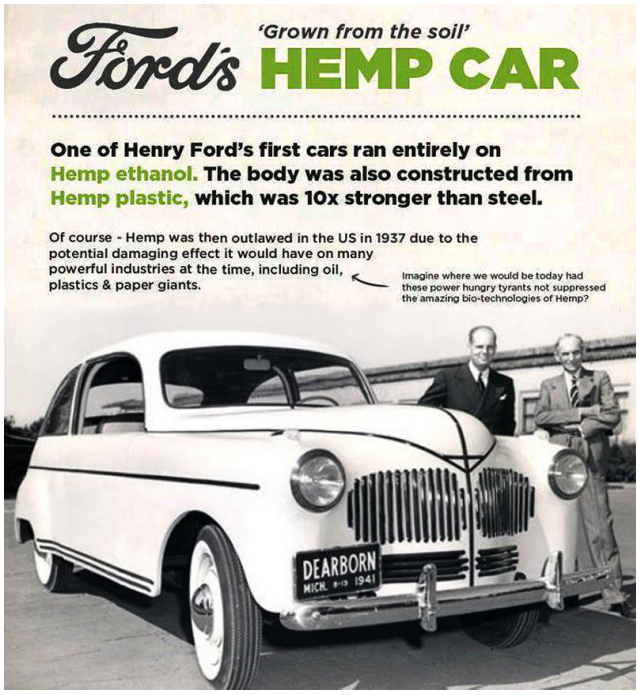
Hemp oil, which can be produced by pressing the hemp seed, represents another versatile and healthy byproduct from the hemp plant. It can be used as a topping for salads, vegetables, and other dishes, or even be used a substitute replacement for butters or any other types of cooking oil.

Last but not least as a food supplement, hemp protein extract or protein powder can be seen as an alternative to conventional protein consumption. It is cholesterol free, is plant based and can be eaten by vegetarians and vegans, and last but not least, actually be utilized as an ingredient in brewing beer and other alcohol spirits!

Fuel



Biodiesel and biofuels come from the oils and fats of plants and vegetables and are not a new topic of discussion where worldwide sustainability is concerned. In fact, in the late 1800s and early 1900s, Dr Rudolf Diesel, the inventor of the diesel engine, demonstrated numerous motors that could be run on peanut and vegetable oil. Hemp seed oil, which can be mass produced with relative ease, can also be utilized in BioDiesel Engines that could be used for our cars and various other vehicles, as well as generators for our homes! The hemp plant, being immensely versatile, is actually capable of producing two types of fuel: hemp biodiesel as well as ethanol/methanol. BioFuels are far less toxic and burn cleaner than petroleum based oils, and virtually eliminate the possibility of contributing to acid rain. The clean burning properties of biodiesel also means cleaner running engines with much less wear and tear. Even lesser known is the fact that hemp biodiesel and other biofuels will already run in any conventional, unmodified diesel engine meaning the societal switch to biofuels is much much easier to do and closer than you may think!



[Henry Ford even built a car that ran on hemp fuel and was made from hemp plastic!]

Medicine (we kind of talk about this throughout most of the book…)

Old 1900s tinctures and medicines derived from hemp. Cannabis oil was made from both cannabis sativa and cannabis indica back then. Image from The Hemp Farm.

As has been mentioned throughout the other chapters, cannabis and hemp based medicines have been with humanity for thousands of years. The earliest record of its medical usage comes from the Chinese emperor Shennong around 2700 BCE, and its versatility and powerful therapeutic properties have been helping people all over the world throughout multiple cultures and civilizations. The plant was smoked, combined with milk to make bhang, combined with wine, used as an anaesthetic, utilized to stop an Assyrian prince's seizures, the roots boiled into a potion to help with inflammation and gout, tinctures were made and used for Queen Victoria's menstrual cramps, medical manuals in both China and Greece were written about the many uses of cannabis, speculation suggests that Jesus' healing holy anointing oil was made from cannabis oil, the knight and medical doctor Sir William O'Shaughnessy introduced cannabis as a medicine to the Western World, Novascotian farmer Rick Simpson discovered a cancer killing oil by extracting it from the hemp plant, and the list goes on…(check out chapter 2 for even more)!

There was a time in both Europe and America when pharmaceutical companies were manufacturing and producing cannabis based medicines from both cannabis indica and cannabis sativa varieties (the hemp plant included). Parke-Davis, Eli Lilly, Grimault & Company, and more were regular distributors of cannabis tinctures, pills, and even cigarettes! Some so called snake oil salesmen throughout America during the 1800s to the early 1900s may actually have been trying to sell highly effective cannabis oil.

It really wasn't until the 1920s and 1930s when pharmaceutical and chemical companies began manufacturing opiate and synthetic drugs, that cannabis began to decline as a medicine in Western Pharmacopeia. The Marihuana Tax Act of 1937 and prohibition dealt a heavy blow to the plant's place in society, and it's banning has arguably set the medical world back decades by not having this herbal wonder available for research and for patients who may have needed it in the past. Consider all of the individuals that suffered from countless ailments and symptoms since the 1930s, and remember that effective non-lethal cannabis based medications could have made a significant difference in healing them and providing them quality of life. With that said, the future of medicine will no doubt have a lot to be gained from the social acceptance and normalization of this plant.

Hemp CBD

There is an unfortunate amount of confusion where hemp derived CBD is concerned. There is a misconception that hemp CBD is different and less superior to medical cannabis CBD and this is a false statement that continues to be debated by stoners and less knowledgeable cannabis enthusiasts. Here's the real answer:

As a chemical molecule, hemp CBD, cannabis CBD, and even synthetic CBD share all of the same molecular structures, with the same number of carbons, and yes the same list of therapeutic characteristics. So no, pure CBD from the medical cannabis plant is not superior to CBD from the hemp plant - from a molecular standpoint, they are the same.

Now, pure isolate CBD that is not accompanied by other cannabinoids such as THC, CBGA, CBN, and what not, whether it is derived from hemp, medical cannabis, or is synthesized in a lab will never be as effective or potent as CBD that has other accompanying cannabinoids. This is discussed in the Entourage Effect (see chapter 3) and essentially means that in order to receive the full effects of CBD, there must be other cannabinoids present for it to work properly.

Hemp plants do indeed produce CBD with other cannabinoids so they can be viable sources of medicine for patients. However, medical cannabis strains do produce much higher concentrations of all cannabinoids as well as terpenoids, and from a volume perspective of producing medicine, this is where medical cannabis is superior. Remember that hemp is bred and grown primarily for its stalk, hurd, pulp, fiber, and even seeds, not for their flowers - concentrations of cannabinoids in the hemp plant are much lower compared to the many strains of medical cannabis.

One other factor to consider with hemp based CBD medicines - if such medications are produced with other cannabinoids, then again they are viable options for patients and individuals looking for sources of CBD. However, consumers should consider where the hemp plants are grown and if they are grown with clean regulated practices. When it comes to the conversation of cultivating medicine for people, the highest standards of cleanliness and safety should be adhered to when growing the plant whether it be medical cannabis or hemp. If the medicine a patient is consuming comes from badly grown hemp, or if the hemp is imported from a country that does not regulate how their crops are grown, then the quality of the medicine at hand is in question.

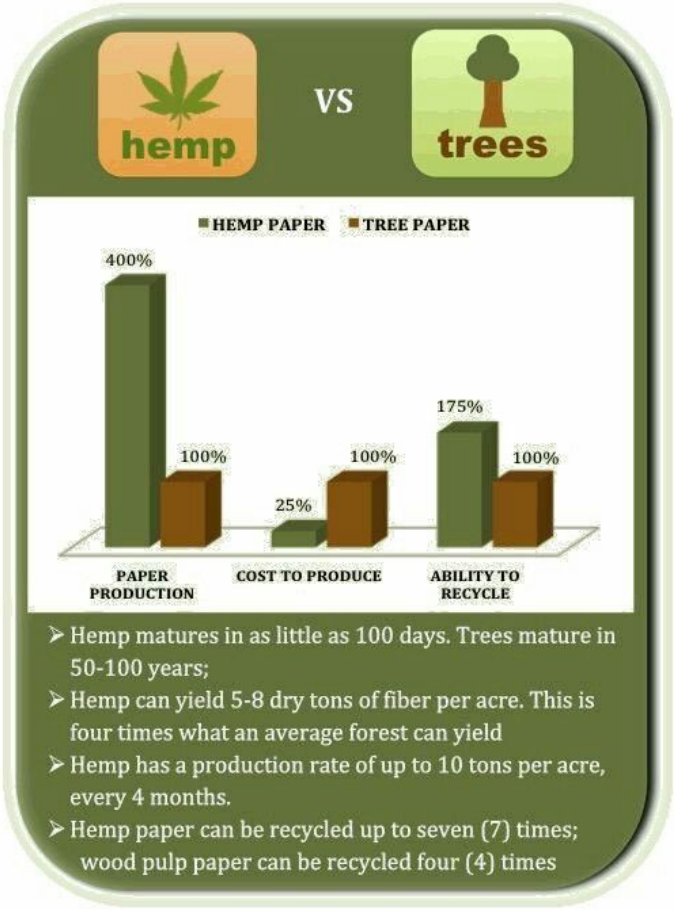
No doubt, there will be a place down the road for both medical cannabis derived medicines as well as hemp derived medicines. However, proper education and awareness regarding this topic needs to be stressed and provided to consumers and would be patients.

Natural Biodegradable Plastics

Nearly all of the plastic on earth has been made from toxic petrochemical methods that extract cellulose from petroleum oil. Most, if not all of these plastics take centuries to break down and plastic pollution presents a significantly dangerous challenge to humanity in the immediate years to come. It is estimated that roughly 8 million metric tons of plastic end up in the ocean each year killing countless marine wildlife and jeopardizing a large fraction of the world's food supply. True horror tales like the "pacific garbage patch" continue to worsen and the world's landfills have already reached sizes of several hundred to even several thousand acres (the largest in Apex Regional, Las Vegas, Nevada is 2,200 acres of non-biodegradable trash)!

There are solutions to this and future made plastics can actually be derived from plant cellulose. Little known fact is that hemp actually happens to be the greatest cellulose producing crop on the planet (hemp hurds can produce up to 85% cellulose)! Plant based plastics can be made to be either durable and long lasting or quickly biodegradable in the case of disposable items. Modern scientific advancements in plant plastics are currently limited though very real, and various new techniques include: combining hemp hurd with cornstarch to make strong but biodegradable materials that can be molded into virtually anything; the development of hemp-plastic resin known as hempstone; and even hemp plastic composites that are less expensive to develop but of the same grade and quality as fiberglass materials - all of these are undergoing continued research in countries outside of the restriction heavy United States.

Paper



"Anything trees can do, hemp can do better," has been a mantra of hemp supporters for decades now, and the statement is not too far from being true. The big topic of conversation here where trees are concerned are lumber for either building material, which we covered earlier, or paper which is still an essential part of everyday life. Cell phones, tablets, laptop computers, and even services such as Kindle and Amazon may have significantly reduced our dependence on paper cut from trees, but the fact remains that humanity still needs paper.

Experts, cannabis historians, and especially hippies argue that we should have been using hemp paper all along. The Declaration of Independence was written on hemp, and these individuals all share the same speculation that it was William Randolph Hearst's fault that we missed out on taking advantage of hemp paper - he invested millions if not billions into the lumber industries for his newspapers and he stood to lose his fortunes if he and other paper mills had to compete with the emerging industrial supercrop, the hemp plant.

Times have indeed changed however, and as you the reader along with the rest of the world learn more and more about what the hemp plant can really do for the human race, we can all collectively work towards correcting irrational fears spawned by the 1930s reefer madness era. Like Jack proposed, humanity may never have to cut another tree down for the purposes of lumber once it begins to re-incorporate hemp into world industries.

Cultivating Hemp

Cultivating hemp is relatively easy and while processing limitations once held mass manufacturing back prior to it's banning in the 1930s, modern technological advances have since surpassed the decorticator (which would have helped hemp become the billion dollar crop it could have been), which means that farmers are already enjoying the ability to help produce cutting edge hemp products in places where there aren't such harsh restrictions on growing the plant. The demand, however, is growing, and there will be opportunities for farmers all over the world to bring a renaissance to hemp.

Some of the important nuances of cultivating hemp deserve pointing out and they are all attractive reasons for society to revive production with this plant.

- **Hemp is a fast crop and only takes 4 months to grow!** Compare this to trees which take many years to grow. What trees can do, hemp can do as well, and this obviously helps to limit or even potentially halt deforestation.
- **Can be grown in relatively rugged climates.** Unlike sensitive varieties of medical cannabis, hemp can actually be grown in a variety of locations and climates including many places in the northern hemisphere such as Canada, parts of Europe, and even parts of Russia.
- **No pesticides needed.** This drastically limits the amount of chemicals that find their way not only into plants of all kind, but also the precious soil that needs to be kept healthy for future crops.
- **Hemp can even help clean heavy metals and radiation from soil!** Yes you are reading this correctly. Hemp can actually be planted in soils saturated with heavy metals, or even soils polluted with radiation, and throughout the lifespan of that crop, help clean out and sequester the contaminants. Experiments with growing hemp in radioactive Chernobyl are underway and demonstrate that this superplant can actually help to decontaminate it in a process called phytoremediation (the utilization of plants to remediate and clean up pollution)!
- **Can be grown with clean organic, renewable, and sustainable practices.** Regenerative farming is a growing practice of interest in the agricultural world, and organic techniques that involve combining vermicropping with recycling plant material into the soil such as no-till living soil systems make it entirely possible to cultivate hemp while at the same time helping to regenerate and even improve the earth!

The bandwagon is already here, unfortunately the United States and most parts of the world are being held back by their own ignorance and bad political policies.

The United States is currently sourcing hemp products from outside America

Currently, China is the world's biggest producer of hemp stalks, producing nearly half of the world's legal supply and even owning more than half of the world patents on cannabis and hemp. Their industry is estimated to be worth just over $200 million. While that number may not sound like a lot comparatively to other giant industries, there are a few things to remember when looking at this: 1) The United States currently imports a significant chunk of hemp from China, Canada, and Russia when it could be growing its own, 2) the world perception of hemp is still in the dark about the ticking time bomb that hemp proverbially represents, and both of these mean 3) that there is a screaming opportunity worldwide to capitalize on a global hemp industry. Until then, like many of the renewable industries and technologies currently available to the world, hemp and those who support the plant wait anxiously for proper recognition and acceptance.

Building a Future With Hemp

Let's revisit the not so crazy proposal that Jack Herer had spent so many years and decades of his life, alongside other brave activists out there put forward - that hemp could save our world.

Let's use our imagination and play with what we now know about the cannabis and hemp plant and actually combine that with what is possible with science and modern technology.

I believe Jack perceived a world that was sustainable and that did not depend on depletable fossil fuels. Hemp Biofuel (alongside other clean burning natural biofuels), advances in solar, wind, and water undercurrent technologies, experimental power cells capable of storing massive amounts of energy - these could all work towards evolving how humanity manages electrical power. The world actually already has what it needs to correct the energy crisis. No joke.

Jack also envisioned a world that no longer needed to cut trees down for paper and lumber; that hemp could help bring an end to deforestation and that it could prove to be a more effective and resilient building material than wood. True, the digital era is already helping to reduce society's need and dependence on paper, but Herer felt that hemp paper, which is more durable and recyclable, could outright replace ones made from wood vastly reducing how many trees would be cut down worldwide.

This would have an even larger scale positive impact to the planet - halting deforestation will work towards helping to fix the greenhouse effect associated with global warming. Growing more and more hemp would also help sequester CO2 from the atmosphere, replenish oxygen to the air, and surprisingly, even clean up metal and radioactive pollutants from the earth.

Professional health and nutritional experts are also now more in line with praising the many benefits of hemp foods and seeds. The availability of such foods could indeed contribute to healthier people in our society. And this chapter isn't even designated to the medical aspects of our favorite plant (the rest of the book is).

Last but not least, struggling farmers and manufacturers can find new lease and purpose by having access to quality grown and massively available hemp. Having access to new materials to work with and potentially more effective products opens up new possibilities where markets and everyday household goods are concerned. There would be new jobs, new industries, new goods to invent and manufacture, and lasting positive economic influence when hemp is once again widely accepted by society. Interestingly enough, there was a time not so long ago, when farmers and their plots of land were a major source of the world's fiber, food, fuel, and medicine; a term called "chemurgy" closely describes this and it is actually not a difficult feat to bring this practice back.

While all of this may sound utopian and overly idealistic, remember that everything discussed in this chapter and even book is possible and is backed by both history and modern scientific study. The stigma driven paralysis and hesitancy on the parts of society, current governments, people in places of wealthy power, and even the average person, are ignorant and dated perspectives that will no doubt evolve and correct themselves with time and evidence - there is already too much benefit to lose and too much at stake for all of humanity to collectively ignore the potential of hemp and cannabis.

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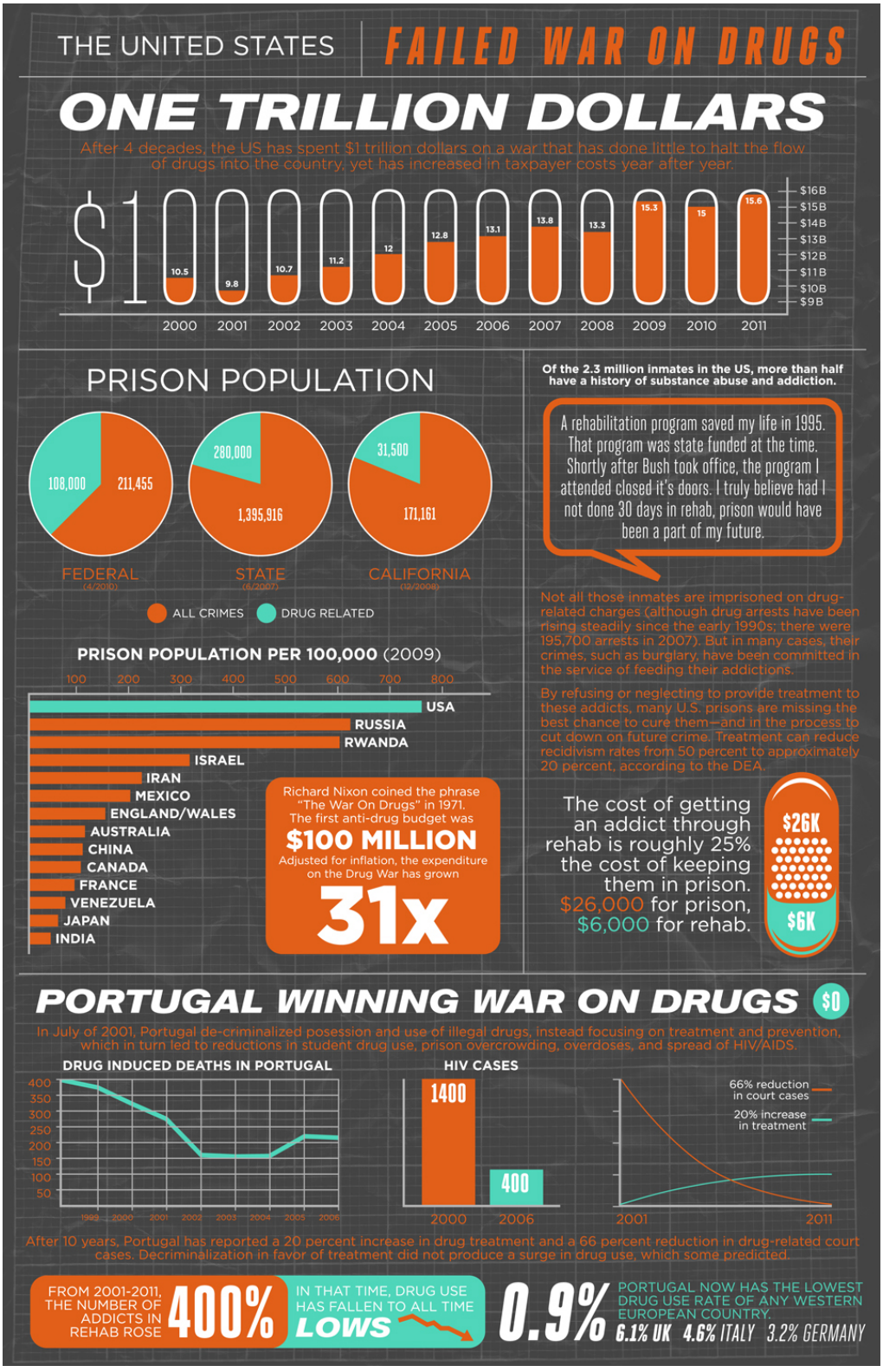
Chapter 8 - Ending prohibition and the War on Drugs.



Internet image found with a google search. From the site, "Filming Cops"

Prohibition: (noun) The action of forbidding something, especially by force of law.

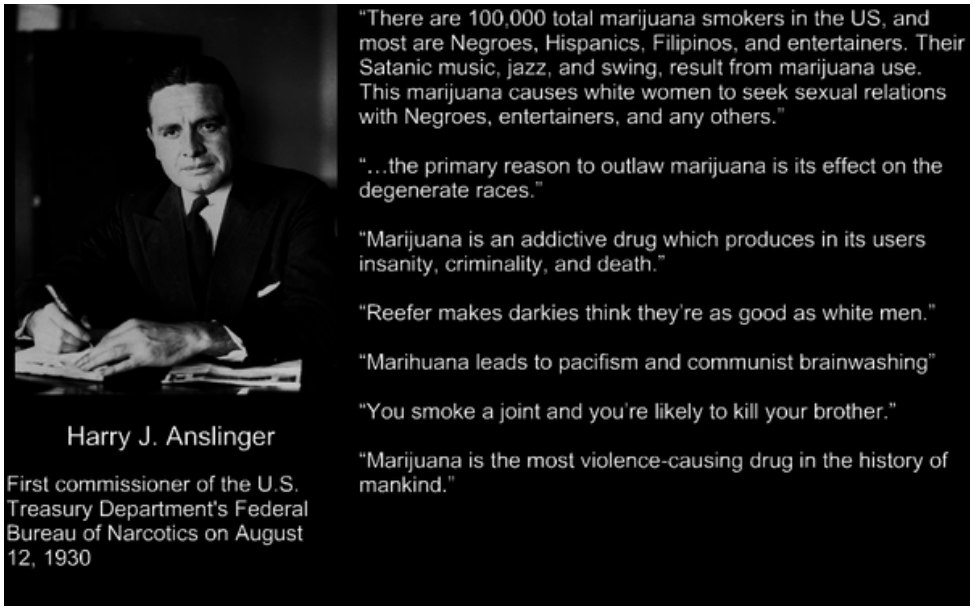
Did you know that God created the first prohibition? When he commanded Adam and Eve that they should not eat of the fruit of the tree of knowledge of good and evil? God only needed to watch two individuals. He treated them well even, and gave them everything they needed. And they still broke prohibition...

- Paraphrased from the “Union: The Business Behind Getting High.”

Why is there a marijuana prohibition?

This is a loaded question that will no doubt spark varying opinions from every individual presented with it. However, the fact is there are a number of compounding reasons as to why we’re in this mess in the first place - and the primary reasons are not pretty. There is much speculation behind these, and this section of this chapter aims to clarify several of the main reasons as to why we as a society are still in “marijuana” prohibition.

Political History



First, we should look at the political reasons as to why this plant was put into it in the first place. Historians speculate that just before the end of alcohol prohibition which ended in 1933, newly appointed First Commissioner of the Federal Bureau of Narcotics (now the DEA) Harry J Anslinger had support and funding from Treasury Secretary Andrew Mellon, the DuPont family, William Randolph Hearst, and more than likely numerous racist political entities in creating a mission to rid America of all drugs, starting with marijuana (more on all these assholes soon). Him and his staff knew beforehand that alcohol prohibition was coming to an end, but, with the intent of looking to keep the drug enforcement office going and to keep his job, along with his ulterior motives of disenfranchising people of color, black people and mexican immigrants especially, he did everything he could to associate hemp and cannabis with the slang term marihuana so that he could begin going after “drug dealers” and “drug users.”

How and why did he get so much support? What exactly did he do?

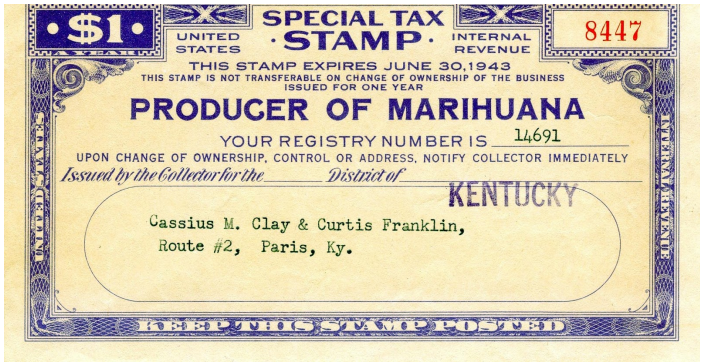
Racist Propaganda

In the 1930s, Harry Anslinger was straight up racist against all people of color especially Mexican immigrants, and strangely enough, he also hated entertainers, musicians, and actors (who tended to be more liberal and progressive). Abusing his political power, he decided to work against these people for financial and political gain; after all he was friends with some very very wealthy lobbyists and cronies who shared his racism.

With their powers combined, Anslinger, some of the wealthiest men in America including newspaper and lumber mill mogul William Randolph Hearst, and politically powerful Andrew Mellon, they acted in concert to confuse the general public in order to associate a Mexican weed called “marihuana” with cannabis and hemp. Being successful in this by utilizing yellow journalism (which Hearst was pivotal in helping with), they published numerous fake news about the plant. In 1936, the morality film Reefer Madness came out and it helped to solidify in the general public’s mind that marihuana was a lethal menace to society.

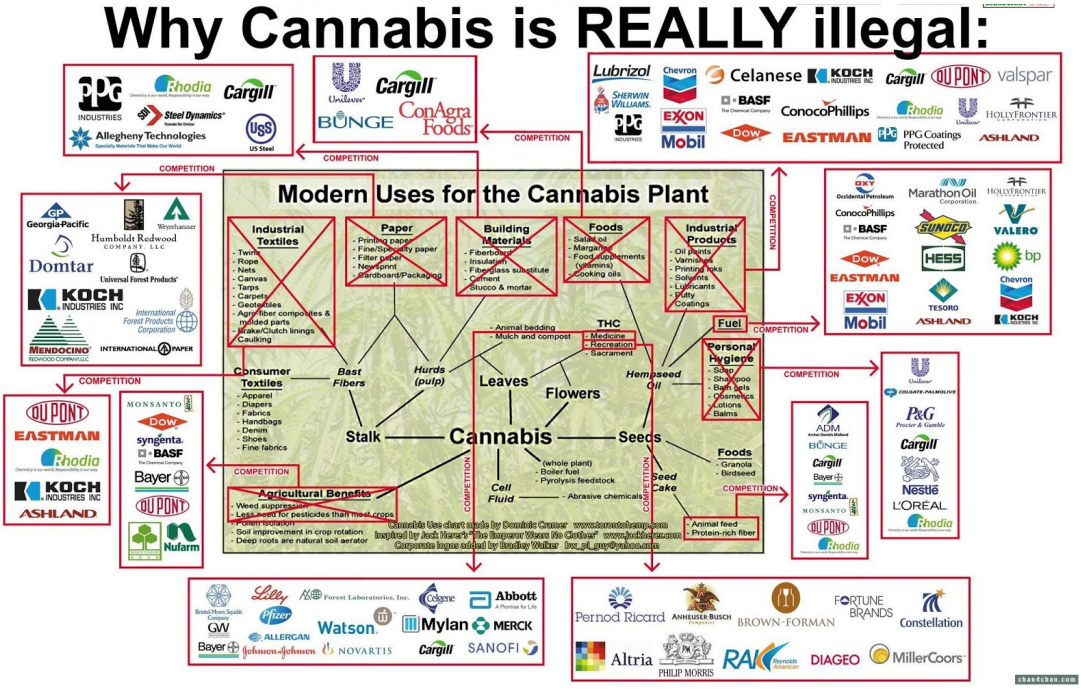
With the American people blindly convinced of a threat looming over them and their kids, congress acted, created a heavy taxing system to prevent individuals from growing “marihuana,” and passed The Marihuna Tax Act of 1937. Sadly, most of them didn’t even know they were effectively banning cannabis and hemp.

The Marihuana Tax Act of 1937



But why all the trouble to go after hemp and cannabis? There had to be more of a reason than racism and anti-immigration to try and wipe out a plant right?

Threat to Alcohol, Lumber, Petrochemical, Pharmaceutical, Textile, and Tobacco Industries



[To quote Joe Rogan in one of his podcasts](), “The only reason it’s illegal is because of economics. There’s like, a thousand different things that marijuana would fix and it would costs companies billions and billions of dollars.”

Overly simple statement? Not really; yes it’s a bit more complex than that previous sentence, but the point made is true. Let’s take a look at the many industries that felt threatened by the cannabis/hemp plant:

DuPont Chemical Companies and other petrochemical companies (big oil) wanted to produce a number of textile and industrial products ranging from cloth, to plastics, to nylon, to various industrial use chemicals. Hemp, whose amazing versatile use was discussed in the previous chapter, was a dangerous competitive textile product especially with the new invention of the decorticator - a farming machine that could effectively and efficiently process the hemp plant and it’s valuable hurd. As was covered in the previous chapter, Popular Mechanics even published an article titled, “Billion Dollar Crop,” which detailed how hemp could be a booming industrial giant across the country. Unfortunately, the industrial powers of the time favored products that could be made inside of factories utilizing chemicals, instead of supporting farmers and agriculture.

We already mentioned William Randolph Hearst who felt that his lumber mills and paper companies were in danger from the competition possible from hemp. He really did a good job of protecting his interests and his efforts were effective across all of America by printing fake news.

Pharmaceutical companies began developing and experimenting with cheaper synthetic and opiate based medicines around this time as well. Cannabis medicine was also a direct threat to this and in 1942, was removed altogether from the US Pharmacopeia.

Let’s also remember that tobacco companies benefited big by the banning of cannabis. They actually still do.

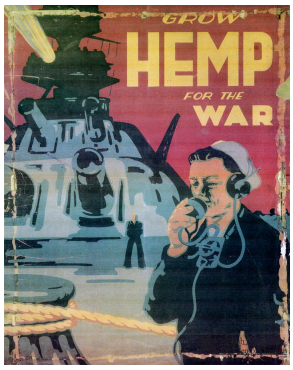
Last but not least, the Partnership for a Drug Free America organization was formed and is sponsored by Alcohol companies - which produces the drug alcohol...yes alcohol is a drug.

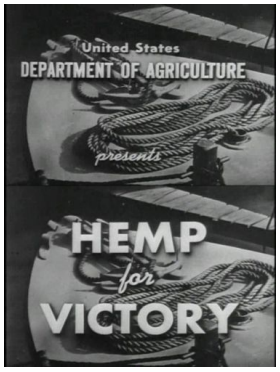
The La Guardia Report

Commissioned in 1939 in response to the Marihuana Tax Act, the New York Academy of Medicine was given the task by New York City Mayor at the time Fiorello LaGuardia to conduct the first United States based medical study on marihuana. 5 years later in 1944, after having studied cannabis use throughout America, they released their findings stating that marihuana did indeed have medical benefit, and that it's demonization and prohibition was misplaced and erroneous. This matched a previous investigation into cannabis, the Indian Hemp Drugs Commission, which was done by the UK.

This report infuriated Harry Anslinger who then condemned the study as "unscientific." He began to arrest high profiled Hollywood actors throughout the 40s such as Robert Mitchum who promoted the plant in order to further deter and demonize those who consumed cannabis.

Hemp for Victory





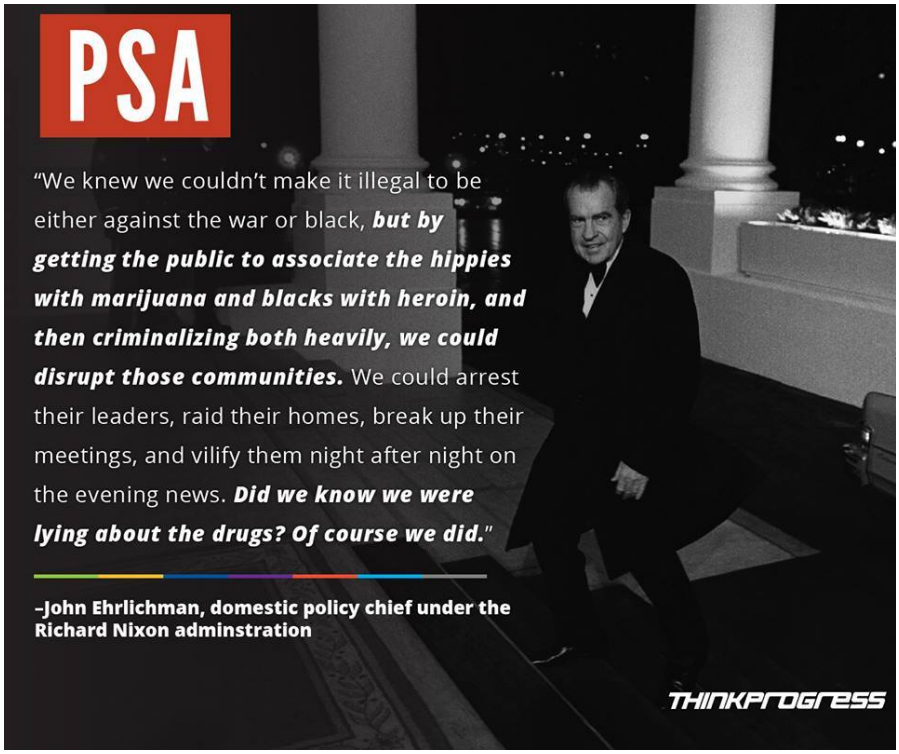
Now, despite all the strong efforts into demonizing and banning the cannabis plant, the United States Department of Agriculture actually released a short film, "Hemp For Victory" in 1942, in order to encourage farmers across America to grow the hemp plant for the wartime effort. The US Navy and the rest of the army needed hemp for cord and other reasons. The film, which is a little over 14 minutes, goes into great detail as to why the military needed farmers to grow hemp, as well as provided detailed methods on how to efficiently grow and harvest the plant. This was essentially a double standard by the US Government, and as strange as this all is, it's actually true. You can watch the whole documentary by clicking the link above!

This was also mentioned in the previous chapter but it deserves a spot here in this chapter.

Now, what happened to cannabis and hemp after World War 2 was over? Not much, it remained in prohibition and it was still illegal to grow, traffic, and smoke the plant. Law enforcement across the country had other issues to worry about at the time, however, and college kids, musicians and entertainers, and individuals associated with the "Beatnick" generation continued to experiment with and recreationally use cannabis. Soldiers in the Vietnam war would even popularize its use.

While it remained illegal, efforts by the major entities who put the plant into prohibition in the first place were nowhere near as bad in the late 40s, 50s, and 60s - some speculate that those said entities had already won and were well on the way to growing and keeping their financial and political powers. It wasn't until Nixon's War on Drugs where the image of cannabis would again be heavily demonized - more on this on the next page!

Nixon's War on Drugs



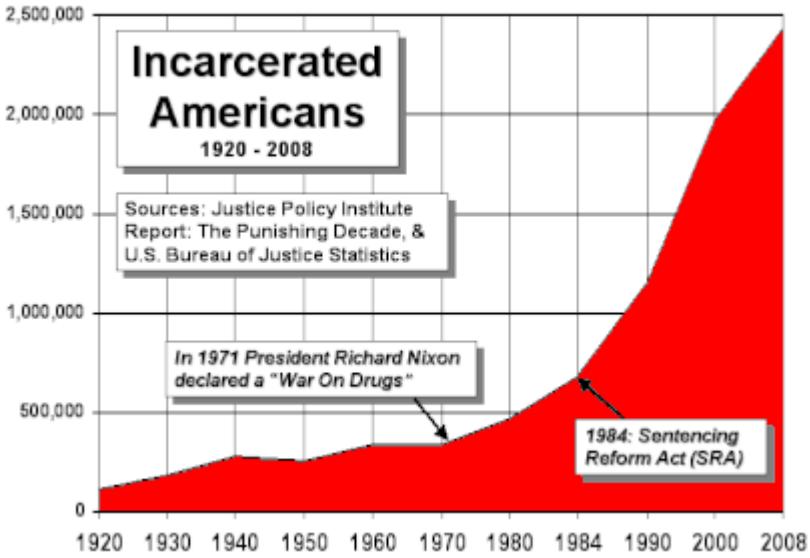
In the 1970s, the War on Drugs enacted by President Nixon was primarily due to racism against Black People and because Nixon didn't like peace loving weed smoking hippies who were against the Vietnam war (and in reality some of the soldiers in Vietnam were actually smoking the plant and finding that they were no longer willing to fight).

It's no secret that Nixon was a paranoid racist president. In fact, he is quoted saying, "You know, it's a funny thing, every one of the bastards that are out for legalizing marijuana is Jewish. What the Christ is the matter with the Jews, Bob?" he said to top aide H.R. Haldeman. "What is the matter with them? I suppose it's because most of them are psychiatrists."

With that said, he intended to do just what the above image describes. He wanted support and to go ahead with his drug war despite the recommendations of another study and commission called the National Commission on Marihuana and Drug Abuse (that he himself appointed), also known as the Shafer Report. Released in 1972, former Pennsylvania governor and head of the commission Raymond Shafer presented his report, "Marihuana, A Signal of Misunderstanding" to Congress and the general public. It actually favored ending prohibition and recommended alternative ways of discouraging the plants abuse. The report also stated, that while public sentiment tended to view marijuana users as dangerous, they actually found users to be more timid, drowsy, and passive. It concluded that cannabis did not cause widespread danger to society. It recommended using social measures other than criminalization to discourage use. It compared the situation of cannabis to that of alcohol.

Nixon, like Anslinger, was infuriated by his own commissioned report, had copies of it confiscated and destroyed, and he went full steam ahead with the War on Drugs. Since this time, prison populations began to grow and inevitably skyrocketed as marijuana offenses were easy to find and come by.

Money for the Law Enforcement and Private Prison Industries + Prohibition crimes



The US has the largest prison population in the world. You the reader might also want to check out the amazing documentary, “13th” on Netflix. It discusses the Private Prison Complex and how the prison systems have become a legal equivalent form of slavery and super cheap labor for big business. Unfortunately for the people of our country, there is a direct correlation with minority crimes related to marijuana arrests and the rise in the number of people we incarcerate.

This is harmful to our communities in several egregious ways. For simple marijuana possession and convictions, our law enforcement can separate parents from their kids, creating voids in the family homes and creating even more poverty in poor communities, which statistically correlates to increased crime (Black and Brown communities have been severely affected by this). By wrongfully demonizing this plant, we have created a negative image of marijuana drug offenders, which makes it difficult for them to find stable jobs, support their families, and to be normal functioning members of society - this forces individuals to go back into the world of crime.

This vicious cycle is furthered by the continued misinformation being perpetuated by prohibitionists, ignorant politicians who are in power (look up Jeff Sessions), and by our own communities - **people are still stuck in their old views despite the fact that those said views were the result of lies, propaganda, and brainwashing by old racist politicians.**

The solution? Amnesty and rehabilitation for individuals wrongfully disenfranchised by the drug war. There are legal states like California and Colorado where this is being put into effect - cannabis drug offenders are seeing sentences reduced or cleared altogether, and there are local efforts in the form of startups and nonprofits that aim to help these particular individuals get back into society. It’s only fair, and we’d be helping out our communities across the nation, This sensible and compassionate approach is one that should be adopted throughout the United States. Why keep people imprisoned when they were imprisoned by a lie in the first place?

Ignorance and because people don't like to admit when they're wrong (probably one of the main reasons we're still in prohibition)

News flash dear reader, no single human being is going to be right 100% of the time. This includes your parents, your past teachers, and everyone you love. Being wrong is an experience that you cannot avoid. Learn to deal with it. Besides, that sickly uneasy feeling of being wrong opens the door to truth. It's a choice, a moment that is presenting you with an epiphany - embrace it, and accept that there's always more to learn - in all things. Sounds a little too general and cheesy but it applies to this. The author really does want you to know that if you were against cannabis, were an ignorant hater, and a staunch prohibitionist, it's totally okay! Without you, I would never have written this book.

For those who might say, NO IT'S NOT OK!!! Well, what are you gonna do? Change the past? You can't. What we all can do, is work now and change the world for a better future, for you and any possible kids you might have, nieces and nephews, young loved ones - it's better to move forward now that you are better equipped with the truth. Truth can help release wrongfully imprisoned nonviolent individuals and we can stop wasting time and valuable resources in disenfranchising people who love the cannabis plant.

Ignorance, while it sucks, can be educated. No shame in being wrong, you were simply given the wrong information growing up. Now, if you don't find yourself changing your mind given the facts surrounding this plants history and controversy, and you still want to hold onto your ignorant hate, I really don't know what can be done for you.

It's ok, you were lied to, we ALL were, including your parents and teachers. Welcome to the world we live in. Let's move on and look at how we can build a better future!

The hypocrisy behind prohibition

Now that we've looked at why we're in prohibition (and likely still are by the time you read this), we're going to investigate how messed up this really is. First, let's take a look at the current scheduling of cannabis as a drug in the United States. (And then take a moment and flip back to chapters 3-5!)

Drug scheduling (Quoted from the Drug Enforcement Agency (DEA) Website)

Schedule I

Schedule I drugs, substances, or chemicals are defined as drugs with no currently accepted medical use and a high potential for abuse. Some examples of Schedule I drugs are:

heroin, lysergic acid diethylamide (LSD), marijuana (cannabis), 3,4-methylenedioxymethamphetamine (ecstasy), methaqualone, and peyote.

This effectively classifies Cannabis as worse than cocaine, meth, oxycontin, and fentanyl in the eyes of the Federal government. This translates to our police spending manpower and money on drug busts related to marijuana, instead of focusing their efforts on more serious crimes throughout the country. The current drug scheduling makes it hard for medical professionals and scientists to fully research and find the best ways to utilize the plant. Unfortunately, while we could be pushing for the many benefits of hemp (which we are importing from China and Russia), we as a country are still attached to erroneous racist driven legalization that dates back to the 1930s.

(Yes, as mentioned in chapter 1, the US government literally filed a medical patent called Cannabinoids as Anitoxidants and Neuroprotectants - Patent Filing US 66307507 B1 in 1999, all the while people were getting arrested and sent to jail for marijuana crimes. And yes, your taxes paid for this. Hypocrisy much? Gotta love 'Merica').

But Big Pharma can make synthetic cannabis medicines and CB1, CB2 Agonists and Inverse Agonists

Pharmaceutical companies, contrary to popular belief, are actually not late to the game as some of you readers may like to believe. Despite being in prohibition, scientists and doctors from around the world have been studying and researching the cannabis plant for its medicinal purposes since even before prohibition. In fact it was a british surgeon (Sir) Dr William O'Shaughnessy that brought cannabis to Western Pharmacopeia; over time cannabis tinctures and pills were brought over to the US and were actually sold across pharmacies in America. Park E Davis, Eli Lilly, and Grimault and company are just a few of the companies that legally produced and sold cannabis medicines of various kinds, smokable "marijuana" cigarettes included (see chapter 2).

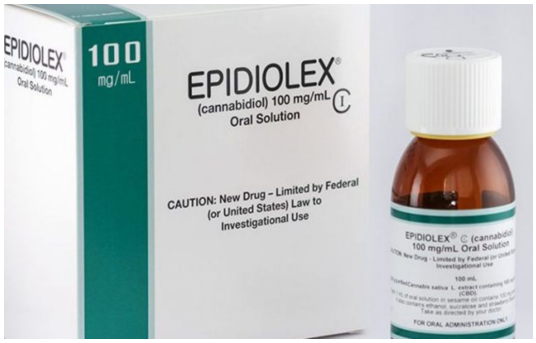
With the advent of synthetic drugs and opiates however, it became more financially viable and economical to replace herbal medicines with easily manufactured cheap pills.

Now, despite the Marihuana Tax Act in 1937 and the eventual removal of cannabis from Western Pharmacopeia, cannabis medicine was never really eradicated nor did scientific study and research into the plant halt throughout the world. Yes, it was illegally distributed and trafficked as a narcotic drug for many decades since prohibition, but eventually, in the 80s, pharmaceutical companies started to look into manufacturing synthetic cannabis drugs. Marinol, which is synthetic THC, was the first to be utilized experimentally in order to treat nausea and appetite loss from cancer patients who were undergoing chemotherapy. Note that studies by Dr. Donald Abrams out of San Francisco showed throughout the 80s and 90s that smoked, plant based cannabis was still superior to it's synthetic counterpart.

Other cannabis related medicines that were produced by pharmaceutical companies while the War on Drugs has been waged include:

- Rimonobant (Acomplia, Zimulti) - developed as an anorectic anti-obesity drug.
- Nabilone (Cesamet) - developed as an antiemetic and adjunct analgesic for neuropathic pain.
- Dexanabinol (HU-211) - developed as an anticonvulsant, neuroprotectant, and anti-cancer agent.
- Ajulemic Acid (HU-239, CT-3) - developed as an analgesic and anti-inflammatory for pain.
- Cannabinor (PRS-211,375) - developed as an autoimmune and anti-inflammatory agent.
- HU-308 (Hebrew University of Jerusalem) - developed as an analgesic and promotes proliferation of natural stem cells.
- HU-331 (Hebrew University of Jerusalem) - synthesized from and mimics CBD.

GW Pharmaceuticals



Beginning with their cannabis research in 1998, UK based GW Pharmaceuticals has become a pioneer in bringing plant based cannabis medicine into the hands of doctors, other medical professionals, and patients. Working through a challenging bureaucratic system but cooperating with the UK Home Office, they were able to successfully provide difficult to treat medical patients (starting with individuals suffering from Multiple Sclerosis) with cannabis tincture sprays formulated with 1:1 THC to CBD ratios. Known as Nabiximols (Sativex), the tincture spray is currently marketed and distributed by Bayer, Health Canada, and Otsuka Pharmaceuticals in various parts of the world for the treatment of neuropathic pain, spasticity, overactive bladder, and other symptoms of multiple sclerosis.

Also produced by GW Pharmaceuticals is the first US Food and Drug Administration (FDA) approved cannabis based medicine Epidiolex. To quote their website, “Epidiolex is GW’s lead cannabinoid product candidate and is a proprietary oral solution of pure plant-derived cannabidiol, or CBD. GW’s Epidiolex development is initially concentrating on severe, orphan, early-onset, treatment-resistant epilepsy syndromes including Dravet syndrome, Lennox-Gastaut syndrome (LGS), Tuberous Sclerosis Complex (TSC) and Infantile Spasms (IS).”

It’s recognition and approval by the FDA marks a step in the right direction in the discussion of incorporating cannabis into the modern medical arsenal. While critics of varying perspectives argue that much more could be done in the way of allowing medical patients access to cannabis, the production and distribution of this particular medicine is much needed for individuals suffering from epilepsy symptoms across the United States and the rest of the world.

Keep in mind, however, that despite the FDA’s approval of this medicine, the current drug status of the cannabis plant is still in schedule I, with no currently accepted medical use.

Bayer & Monsanto Merger, Insys, Johnson & Johnson with Avicanna

A look at Avicanna's medical cannabis product line-up. Avicanna is a subsidiary of Johnson & Johnson

Now, despite whatever perspective you might have at Big Pharma's involvement with cannabis, (pro or against, supportive or angry at the big establishments) there are a number of "industry moves" that you the reader should be aware of:

1) On September of 2016, German Pharmaceutical company Bayer and US agrochemical and agricultural biotechnology corporation Monsanto announced a $60 Billion deal merger. Monsanto has a controversial reputation with farmers across the world and they are known for developing the RoundUp glyphosate based herbicide and for becoming a major producer in genetically modified crops. On June 7, 2018, with approval from both US and EU regulatory commissions, Bayer officially acquired Monsanto for $66 billion. There is much speculation as to how this can be worrisome to the existing cannabis industry - one primary fear amongst others is that this merger would allow for these giant corporations to "control" the currently diverse strains and cultivars of cannabis; there are actually several thousand various crosses of the varieties of the cannabis plant. How this merger pans out in the coming years, however, remains to be seen.
2) Insys Therapeutics, an Arizona based pharmaceutical company donated $500,000 in the summer of 2016 to the Arizonans for Responsible Drug Policy, a group that opposed marijuana legalization in the state. A year later, they received preliminary approval from the DEA for the drug Syndros, a synthetic cannabinoid mimicking THC. It's purpose is to treat nausea, vomiting, and weight loss in cancer and AIDS patients. This news and the company has drawn numerous criticisms from various sources; though continued efforts to develop numerous cannabis based drugs move on within the pharmaceutical company.
3) "Avicanna is a biotechnology company focused on innovative advancements in the medical cannabis industry." Working under the Johnson & Johnson and JLABS umbrella, this newly established company already has major divisions of cultivation, development and research in Colombia, Canada, and Jamaica. Their mission is "responsible development and delivery of innovative cannabinoid-based solutions through a vertically-integrated, diversified and multinational approach. By collaborating with world renowned medical institutions and utilizing strategic partnerships we strive to lead the evolution of the medical cannabis industry."

Despite whatever conclusions or ideas you may now have of the "medical cannabis industry" as a whole (which very much includes big pharma), it really does remain to be seen how the world of cannabis evolves moving forward. Several legal hypocrisies remain, yet medical advancement is actually right here.

Comparing alcohol prohibition to cannabis prohibition

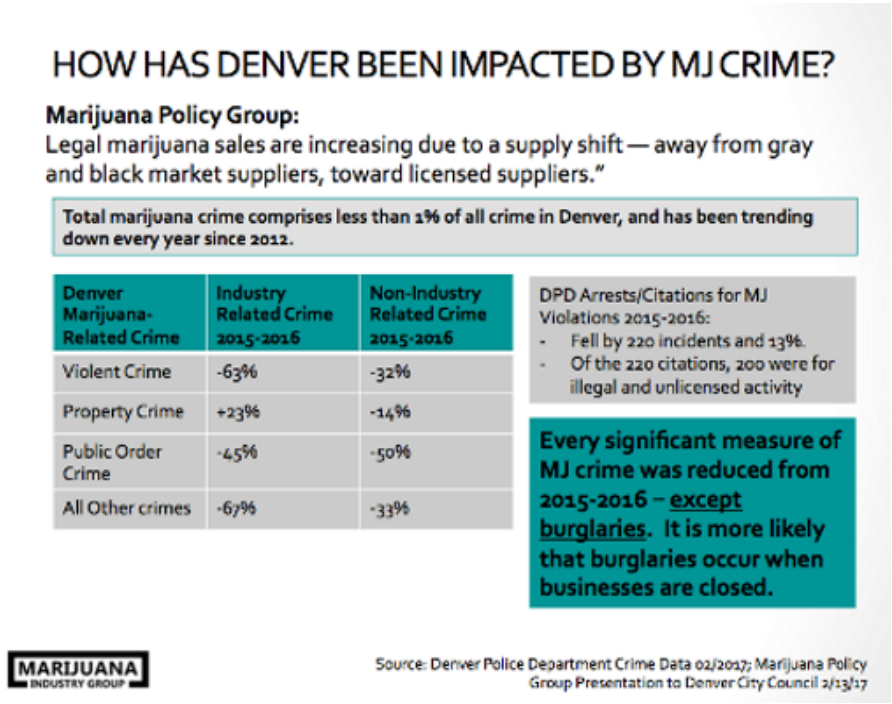
Note that the Author has stated multiple times that cannabis does not outright cure cancer. It can help cure various cancers by killing cancer cells safely and more effectively than chemotherapy, however, it is not an outright cure. Image from the internet.

Alcohol prohibition began in 1919 and ended in 1933, and not surprisingly, shares many parallels with cannabis prohibition, which started in 1937, but unfortunately still goes on to this date...

Considering the above image alongside the previous statement, it becomes increasingly mind blowing that the double standard scheduling of cannabis has carried on so long. Are there, however, lessons that could be learned from the short lived alcohol prohibition that could apply towards better legislation as the cannabis industry moves forward? While it is only a matter of time before the rest of the world wisens up to the reality and failure of cannabis prohibition, there are a few interesting points of observation:

- When Alcohol Prohibition went into effect, crime went up. Historical accounts of Al Capone and organized gangsters thriving during the liquor ban and the parallels of cartels and hood/street drug pushers profiting off of illegal marijuana sales are hard to ignore.
- Prison populations also rose during this era just as prison populations skyrocketed with Nixon's War on Drugs. Can ending prohibition significantly help to correct this?
- Proper and effective regulation is needed as Cannabis Prohibition slowly comes to an end. Alcohol Prohibition created a deregulated market, and Marijuana Prohibition created a deregulated market that has since seen its fair share of unscrupulously grown product, sprayed with harmful pesticides or cultivated with harmful chemicals. Proper regulation fixes this.
- Current heavy taxes are hindering the industry. Proper and fair taxation is needed for the cannabusinesses to actually thrive, will lawmakers do the industry right or waste an opportunity?

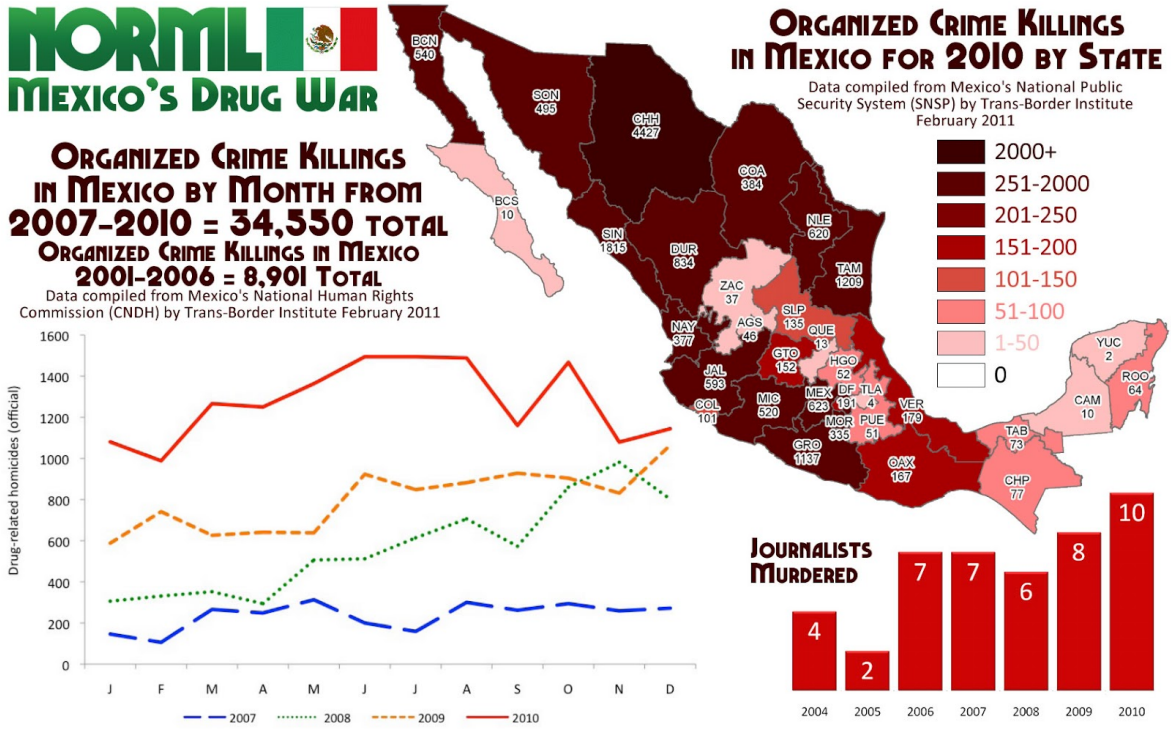
A Look at states in the US where cannabis is legal



Statistics in states where cannabis has been legalized for recreational use contain both pros and cons, but overall positive results where societal impact is concerned. While property crime has seen an increase in some of these states, overall violent crimes, public order crimes, and others have gone down. Opiate drug overdoses have dropped, cases of suicide have dropped, and underaged consumption of marijuana has also dropped. This may not sound believable but these statistics are verifiable and reflect the reality of cannabis legalization - that it is not harmful to society the way reefer madness stigma would have people imagine. More statistics on these points can be viewed at DrugPolicy.org with their report, So Far, So Good: What We Know About Marijuana Legalization in Colorado, Washington, Alaska, Oregon, and Washington D.C.

In addition to this, tax revenue has increased in these legal states, and this directly helps them by providing funding for various community infrastructures: schools, roads, public health, and even law enforcement. Oregon, in 2017 collected $85 million that went to the above said services; Nevada, in just its first 6 months generated $30 Million; and Colorado saw $247 million in taxes and fees. These revenues are slated to be dwarfed in the future, however, and economists predict that the “fastest growing industry” will only continue to generate increasingly larger sales. Forbes and Business Insider project that the legal cannabis industry could be worth $24.5 billion by 2021 - a substantial amount that infers new jobs and a positive stimulation to our economy. Society’s ignorance towards this is just another example as to how the continued prohibition is causing it to lose out.

Victims of the War on Drugs - Vindication (Its just as bad if not worse in Mexico and the Philippines)

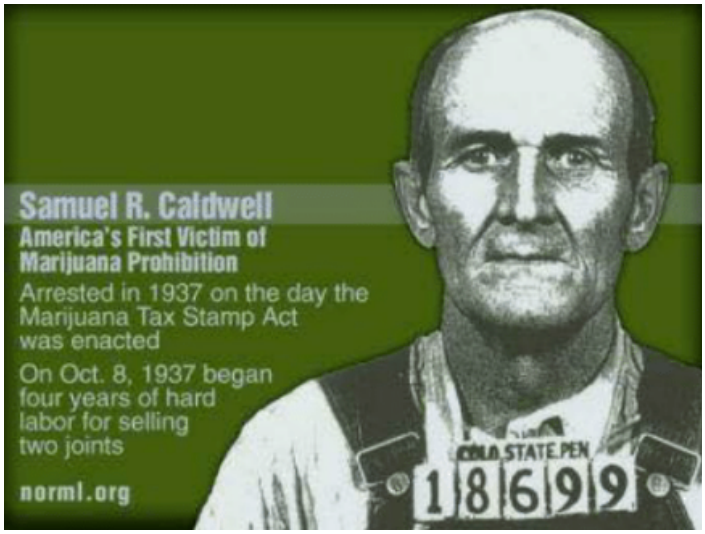


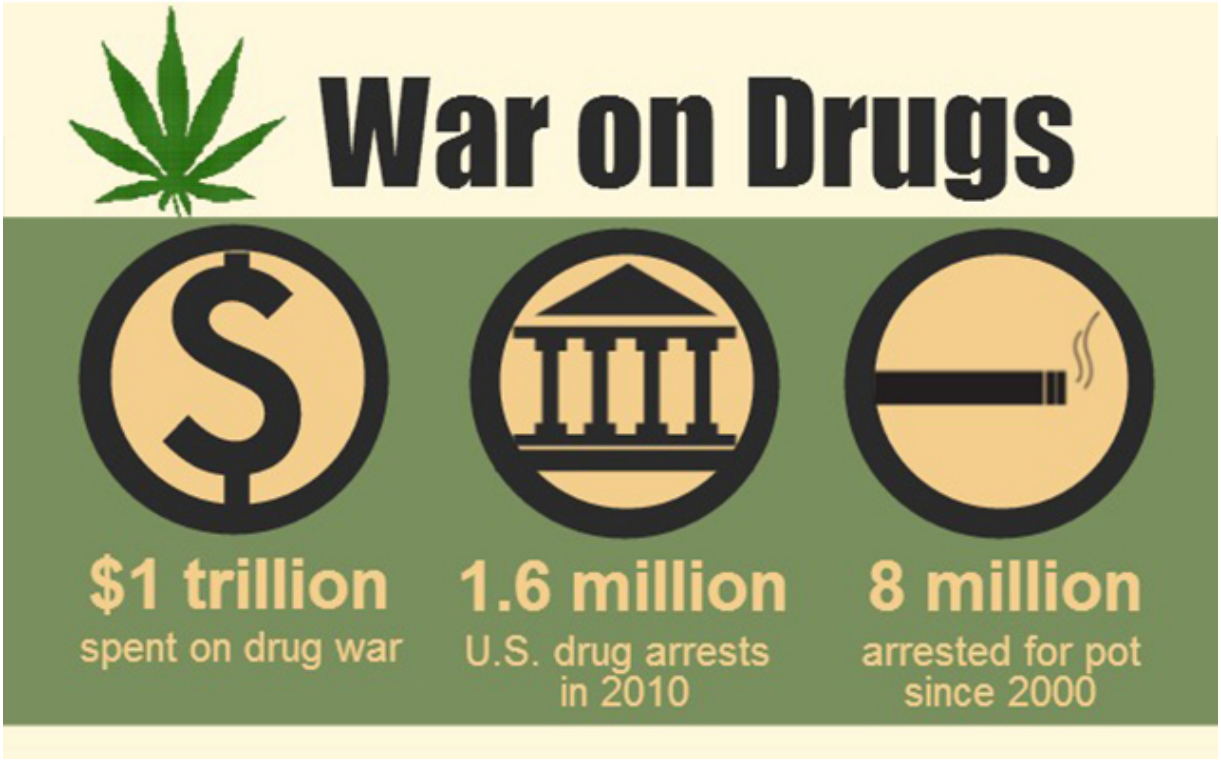
WORLD NEWS | Sun Feb 5, 2017 | 3:47am EST

Philippine Catholic Church slams 'reign of terror' behind war on drugs

Effigies of corpses are seen with placards as activists protest against the Extra Judicial Killings in the country involving the war on drugs of President Rodrigo Duterte, during a rally outside the Philippine National Police (PNP) Headquarters in Quezon City, metro Manila,...

A woman cradles her husband, next to a placard which reads "I'm a pusher," who was shot dead in Manila on July 23, 2016.





There are millions of victims of the drug war. Not just in the US, but throughout the world. Yes, the taxes that come out of your paycheck, the taxes you file and pay the government every year - your money pays for this. There are still thousands of Americans incarcerated in our prisons and expensive marijuana drug arrests are still being carried out in many of the states that have not legalized this plant. We are harming our own society plain and simple and we're doing it based off of government lies.

Knowing what you now know of the cannabis plant - all the way from chapters 1-7, we've covered the plant's medical use, its ability to help change and evolve medicine with its cancer killing, neuroprotecting, autoimmune disease effectiveness, (plus way more), as well as it's amazing textile and industrial potential, do you really think this plant should remain in prohibition and that drug users deserve to be treated and stigmatized the way they are? Is it sensible that our taxes continue going towards enforcing the War on Drugs when there are simpler, more cost effective, and humane alternatives?

A call for sensible approaches to cannabis and other drugs - A look at Portugal where all drugs are decriminalized

The question and premise, “can’t we as a society evolve and stop incarcerating and even killing drug users? We’re spending an ungodly and unnecessary amount of money on the drug war,” is a statement many more progressive idealistic perspectives hold in the fight against prohibition. While the current legal states of Colorado, Washington, California, Oregon, Alaska, Nevada, Maine, Massachusetts, Vermont, and Washington D.C. show beneficial trends in the societal impact of decriminalizing cannabis offenses in their respective communities, there is another country whose experiment with decriminalizing ALL drugs is showing shockingly positive results in terms of saving money and with providing humane treatment to their people.

In 2001, Portugal decriminalized ALL drug use, effectively treating drug addiction like a disease and epidemic instead of a crime to punish and incarcerate citizens of its own society. Drug offenders instead of getting arrested and going to jail, are sent to rehabilitation and given education on how to reduce personal drug abuse and harm; they are even given medical resources to help them wean off of their addictions. Note that rehabilitation costs a fraction of what incarceration does - it costs anywhere between $20k-$28K for arresting and incarcerating someone, sending an individual to rehab costs roughly $5k-$6k. While this notion may seem radical to many, seventeen years into this social experiment have shown the following successes: disease prevention and lowered cases of HIV (a rising issue prior to decriminalization), lowered drug use, and lowered crime. These statistics can be verified in Portugal’s Country Drug Report 2017.

Perhaps the most important takeaway from this is that education, not prohibition, is the answer. Medical usage is a right, recreational usage is a topic of debate for the locals of the state or country. There are humane ways of approaching drug use and addiction. Illegal drug trafficking and the black market are less powerful when proper regulations are in place and when more people are better informed about how to reduce drug harm**.**

Medical Cannabis Refugees

Last but not least it should be called to attention that in the current era of prohibition, there are actually “Medical Cannabis Refugees,” or individuals who need access to cannabis in order to live but reside in a state where marijuana is illegal. These include cancer patients, epilepsy patients, and much more, including children. Oftentimes, these individuals are forced to abandon their homes and uproot their lives in order to move to a state where cannabis is legal. Worse still, is that this can be expensive and isn’t always an option to some individuals, leaving them to suffer needlessly. Several newscasts including CNN’s Weed series expose by Dr Sanjay Gupta discuss this, and it should be noted that the process of raising awareness around this subject is painfully slow. There are still die hard prohibitionist out there who would call this a hoax, including the head of the DEA Jeff Sessions, and there are still organizations out there spending money on keeping this plant in prohibition.

Whether for political, economical, or plain ignorant reasons, and more than likely a combination of all three, prohibition continues to go on, cannabis remains in Schedule I, people in states where marijuana is still illegal are still being arrested and incarcerated at taxpayer expense, and individuals throughout the country suffer inhumanely due to a racist lie that some individuals wish to hold onto.

Hopefully, after reading through the previous seventeen pages, you can now imagine a comprehensive and complete picture of the ongoing prohibition of cannabis and the War on Drugs - it's atrociously racist origins, the not so far from the truth conspiracies to keep cannabis illegal, the double standard hypocrisy (and flat out lie) of marijuana being in Schedule I, how big pharma stands to make bank on an herb despite thousands of individuals being incarcerated for smoking it, how the plant is straight up not harmful to society (unlike alcohol), and how society is desperately missing out on all of the amazing benefits the cannabis plant has to offer.

And yet there are still die-hard, staunch supporters of prohibition. There are still individuals with puritanical beliefs that wish to hold onto Reefer Madness racist driven propaganda. Law enforcement continues to waste valuable time and resources on "dope" crimes. It's still okay to stigmatize stoners despite the reality that cannabis possesses amazing societal benefits. The War on Drugs and marijuana's drug scheduling remain, despite a majority of the states (30 thus far) acknowledging and legalizing it for medical use. America and the rest of the world are sadly "behind the boat" when it comes to modern cannabis (hemp included), the persisting prohibition only makes it that much harder to catch up.

One thing to note on prohibition - on anything. It doesn't work.

With that said, are we really going to waste your tax dollars on prosecuting and imprisoning non violent "drug" use when we could be going after corrupt CEOs, dirty politicians, and violent individuals. Even better, rehabilitation and education for drug abusers is a lot cheaper on your wallet than sending them to prison. I mean, we could be using all that money for universal healthcare, to help build our infrastructures and schools, we could have done a lot of things with that trillion dollars in drug war spending that continues to grow...

But thanks for supporting the private prison complex and the War on Drugs. It's okay, you and I both support it with our taxes even if we don't want to. This is why we need change in the government, and in general awareness. If you want to stop supporting the private prison complex, get up and do something about it - voice your concern, join an activism group (yes they really need you, a lot of them do), and last but not least, learn to see through government lies and people's bullshit. We live in the amazing modern digital era, start fact checking what people tell you. Vote for the right people. Fight for proper legislation in your community - this goes beyond the United States and extends to anyone in the world who lives in an area that enforces erroneous prohibition. Or better yet, why don't you initiate for change in the government by being the right type of person who gets involved in politics? Help write the future laws that can correct a past that is holding us all collectively back. After all, bitching and whining alone does nothing.

Rules and commandments weren't created to simply be followed or broken. They were meant to reveal something of character in those writing, observing, and enforcing them.

End of Chapter Addendum - References and Resources

Some Movie Resources That Discuss Cannabis Prohibition (these are all free open access)

Weed - Dr Sanjay Gupta Special Report - CNN
Weed 2 - Cannabis Madness Dr Sanjay Gupta Reports - CNN
Weed 3 - The Marijuana Revolution Dr Sanjay Gupta Reports - CNN
Weed 4 - Pot vs Pills Dr Sanjay Gupta Reports - CNN
The Union: The Business Behind Getting High
When We Grow, This Is What We Can Do
Jack Herer - Emperor of Hemp
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Run From The Cure
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CannaPsyJournal.com
DEAMuseum.org
DrugLibrary.org
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Wikipedia.org

Chapter 9 - Changing the world with cannabis.

Space Cake by Bodhi Seeds grown in no-till living organic soil. Cultivated by the author, and his amazing friends JacketGeorge and WarlockGlass. 2018 Outdoor Season.

My personal journey into the cannabis world is a trip that never ceases to amaze me. There isn't a day that goes by that I don't stop and shake my head over how all this has panned out. Growing up, I never thought I'd ever professionally be involved with cannabis, my last career was with videogames in all honesty, but over the past several years, I've had the fortunate and fateful opportunity to have many experiences with this magical movement: to grow weed in multiple projects throughout the great state of California, do medical research for a dispensary's doctor and medical director, start a medical cannabis resource website, help manage the front of house customer service department of a major collective, found and lead a medical cannabis private consultation team, train and educate budtenders, build and run a plant nursery, attend and participate in activism efforts at city hall and in various parts of the bay area, teach medical cannabis and cultivation at both a dispensary and a hydro store, work with a startup medical cannabis manufacturing company, help to build and co-found a private cannabis garden for a medical patient and Vietnam veteran, and last but not least, write this book. If you ask me how I did it and how it feels, I'd first give you the cheesy answer of hard work, passionate enthusiasm, a little bit of luck, and last but not least, genuine love. I know that short list could never encompass some of the crazy things myself and my colleagues went through over the past, but without writing an entire piece on old weed industry adventures (perhaps another time in another book or creative medium), suffice it to say, at least from my perspective, our journey through this industry has been a priceless one so far. The latter question of how it felt? It was that last bit.

I fell in love, with a movement that was fresh, raw, edgy, young but that had everything it took to shake and change the world - a misunderstood identity; a past mired in a conspiracy lie that could be proven to the world; the ability to save and change lives; the ability to give hope, compassion and acceptance to stigmatized demographics of minorities; the ability to create opportunities for people both workwise and healthwise; a wealth of medical and scientific knowledge to learn from; and last but not least, boundless fun where experimenting with the plant and friends was concerned. The industry and movement literally gave me a new life, a community to be a part of, and something to believe in and fight for. It sounds like a lot and a just a little unreal, and that's exactly what I said to myself, and yet here we are, you reading the words of a high stoner who just happened to know how to write and somehow had the desire and mind to share with the world what his favorite plant could really do.

The experiences and adventures that I was fortunate to have in the cannabis industry gave me all the fuel and reason I needed to write this book. It doesn't take a genius to see that everything contained within these pages has the potential to be a societal game changer throughout the world. I know I keep saying that, and I won't stop saying it - that the cannabis plant can change the world for the better. I'm not the only one saying it, and I'm not the only believer nor am I the only one helping to build a young industry and fighting for a movement that is bigger than any single individual. The re-emergence and renaissance of this plant and all that surrounds it constitutes a hot topic where society, the modern era, and near future are concerned. It's already arrived, it's here to stay, and its worldwide impact is just getting started.

I have written and organized this last chapter very differently. This book being titled The Cannabis Journal and all, I've decided to share a small scrapbook of some of my favorite photographs that I've taken throughout my journey into the cannabis world. Despite its many imperfections, hardships, and sorrows, it has indeed been a fascinating and fulfilling one. I hope you enjoy the pictures, the nostalgia trips me out, and the feeling of finishing this book to pictures from my career is simply indescribable.

To Grow - from tents, to greenhouses, to medium indoor hydro operations, to large warehouse plant factories, to private medical regenerative and sustainable organic gardens for cancer and other ailments, and to more…

From my first grow tent. LEDs with a strain called Voodoo Kush. Grown in Coco Coir. Great learning experience.

One of the primary reasons I started growing weed was to learn how to cultivate the awesome cannabis plant. I'd be lying if I said it wasn't to get high off my own supply, but it wasn't just for that. I ultimately knew it would be a long endeavor, a commitment to years of grinding and studying, countless classes and lessons from industry pros, and spent blood sweat and tears in both factories and farms. It sure as hell didn't turn out to be easy, it was even scary at times, but I sincerely cherish every memory good and bad laboring for this magical plant. I look forward to continuing my gardening experiments and projects, I actually hope my growing experience and adventures go on till the day I die.

I'm sharing this small gallery of grow projects I've been on if only to showcase how beautiful a taboo and stigma can be. If this inspires cannabis gardeners new and old anywhere in the world, then that's groovy. In all seriousness though, this is an amazing plant to cultivate and learn about. Cannabis taught me many facets about agriculture, biology, botany, chemistry, organics, sustainability, and all of this magically coalesced into first a hobby, then into a profession that somehow kept giving back and back. It's rewarding, and it does grow you, pun intended. I hope that others find the same joy in working with the cannabis plant like I do. The cultivation world needs more people and it is hungrily waiting.






From sleeping next to grow tents, to cutting my teeth with medium scale indoor hydro, to learning large scale high-tech greenhouse, to grinding hard in a large scale indoor factory, to co-founding a sustainable no-till organic cannabis garden. It's been a wild and fulfilling journey for sure, I really do hope others find a chance to build their own.

Reviving a textile giant that could provide building materials, cloth, fiber, food, fuel, and medicine - an homage to Jack Herer and "The Emperor Wears No Clothes."

I honestly first heard the name Jack Herer browsing the menu of an old San Jose cannabis dispensary back in 2012. I wasn't a part of the industry back then, I was simply a new cannabis patient eagerly looking to try different strains. The budtender recommended it, saying it was very "thought provoking" and one of those cerebral ones that surprisingly gave you a sense of focus and motivation. He told me it was one of his favorite cannabis genetics, and that it was named after a legendary activist.

I got home and smoked it, and it quickly became one of my favorite strains. This may sound weird, and anyone who has smoked Jack strains can relate, but it made me enjoy doing household chores, it made watching Planet Earth an amazing experience, and last but not least, it made me want to find out more about this "legendary" guy Jack, who was apparently influential enough to have a weed strain named after him. I smoked more and spent the next several hours pouring over his book that I found online. I was so blown away, I finished it the next day and watched a documentary about him on youtube (I shared it in the references of chapter 7). This drastically altered my perspective of the cannabis movement, and it made me understand that there was so much more at stake than what the world knew.

This legendary and late activist, Jack Herer, in his book "The Emperor Wears No Clothes," makes the proposition that hemp and cannabis could save the world. It was released in 1985, and since then has become a historic piece for the movement. Having read chapter 7 you should know that I have merely echoed the same message his book had all those decades ago. Really, take a moment, go back and flip through the pages of that chapter before continuing on. Yes, Jack's statement may initially sound like the utopian fantasy of someone really really high, but it cannot be denied that the material in his book is eye opening, poignantly relevant to this day, and whether you believe the world needs saving or not, the hemp plant and its re-emergence and acceptance into society can significantly evolve the status quo. I wrote this section into the last chapter to pay homage to this man and any other cannabis activist out there fighting the War on Drugs. I never met him, and he was fighting for hemp and marijuana rights long before I got into the industry, but his work and legacy indeed inspired me to write a cannabis book of my own.

Found this photo on the internet of Jack Herer and his best friend Captain Ed Adair from 1990. The two were iconic activists of their time that swore to fight marijuana prohibition every day till the day they died. Their work has been acknowledged as monumental in helping the cannabis movement grow into what it is today.

One of the next big innovations is actually a beautiful plant that has been with us for thousands of years.

This is a realization that many of us in the cannabis industry have made. In an era where the next "big innovation" is sought after year after year and where advancements in science and technology impact the progress and evolution of humanity faster than we could have ever imagined, it is an ironic notion that a several thousand year old natural herbal plant that is prohibited throughout most of the world could help cure cancer and revolutionize medicine…after reading this book, you must now know that it totally can. Irony indeed, because cannabis is so fascinatingly beautiful. There is indeed an art to it, a relationship that a grower forms with his or her plants, one that constitutes countless hours of work and learning. They have a lot of personality these flowers, and there's thousands upon thousands of breathtaking varieties.

Chernobyl. Grown with JacketGeorge

True OG. Grown with Ash and TimTim.

Allen Wrench.

Gorilla Glue #4. Grown with JustinC, BrandonM, Danimal, & GrowDan.

True OG

Sour Diesel

Gorilla Glue #4

Boss OG

Chem 4

Tahoe OG.

All flowers on this page were grown by JacketGeorge and myself.

Forbidden Fruit grown by JacketGeorge, WarlockGlass, and yours truly.

Building New Industries and Creating Jobs - a second chance for young adults with a delinquent record, individuals with marijuana convictions, and for entrepreneurs to explore new horizons.






I know what you're thinking - "hmmm, a scrapbook of 2 empty buildings." Yes, that's exactly what they are. What matters are 'what' buildings. They happen to be what it looks like to take down a dispensary and build a new one in order to move it to another location, a so called "green zone" area in San Jose where all the legal "sweet sixteen cannabis clubs" could operate and do business. The first 3 are pics are of what the old Elemental Wellness

cannabis club in San Jose looked like at Charcot Ave, and the last 3 are what it looks like to build and move a cannabis club from scratch. No easy feat, and it was a surreal experience to be a part of. Cool huh? Yes and no, and you can agree to disagree.

What these shots tell, however, is a story of evolution within the cannabis industry. Elemental, or EWC as we liked to call it, was just one of hundreds if not thousands of cannabis entities throughout the state of California growing and expanding itself in an economically volatile industry. Lots of businesses had dreams of catching the wave of the "Green Rush." But it wasn't all a walk in the park, no one ever expected it to be one. And it still isn't, for many of the currently existing cannabusinesses that are trying to lay the foundation of what could be one of the greatest industries in history - the cannabis and hemp industry as a whole. They're struggling, they're fighting, they're all trying to get this awesome industry off of the ground. It's an uphill battle, one where entrepreneurs have to adapt to a constantly changing legal environment, one that has heavier taxes than any other industry, but despite this, is being called by Forbes and other business outlets as the "Fastest Growing Industry" of our time. There's definitely a story to tell on this, from many sides, and this slice of life perspective should catch your interest. After all, how often do you hear inside tales of what it's really like to work in a California cannabis club at a pivotal time during the advent of national legalization? Perhaps another time.

Why are these pictures relevant though? From family owned business to recreational retail outlet. A glimpse of growth and economic potential. A slice of cannabis industry life - what it looks like to tear a cannabis club down and to move it to a new "cutting edge" location. You see, the cannabis industry didn't just magically appear. It built itself through a lot of political and economic turmoil, with some of its supporters even spending time behind bars throughout their careers, and to this day it fights and vies for societal acceptance and opportunity. These pictures may depict the hollow empty transition between two buildings, but what these pictures really illustrate is change - the sacrificing of one home for another, the repackaging of a brand, the change of a small cannabis club startup into a potential market franchise. Again EWC is not the only one, there are countless outfits and establishments nationwide and there could be potentially more down the road - ones that could provide jobs, economic contribution and growth, and helpful aide to build a healthier and happier society. It is an exciting time to be alive

Words could never describe the feeling of being a part of that change. It was bittersweet, but necessary for the current era. Simply put, I'm thankful to have been there to help it happen.

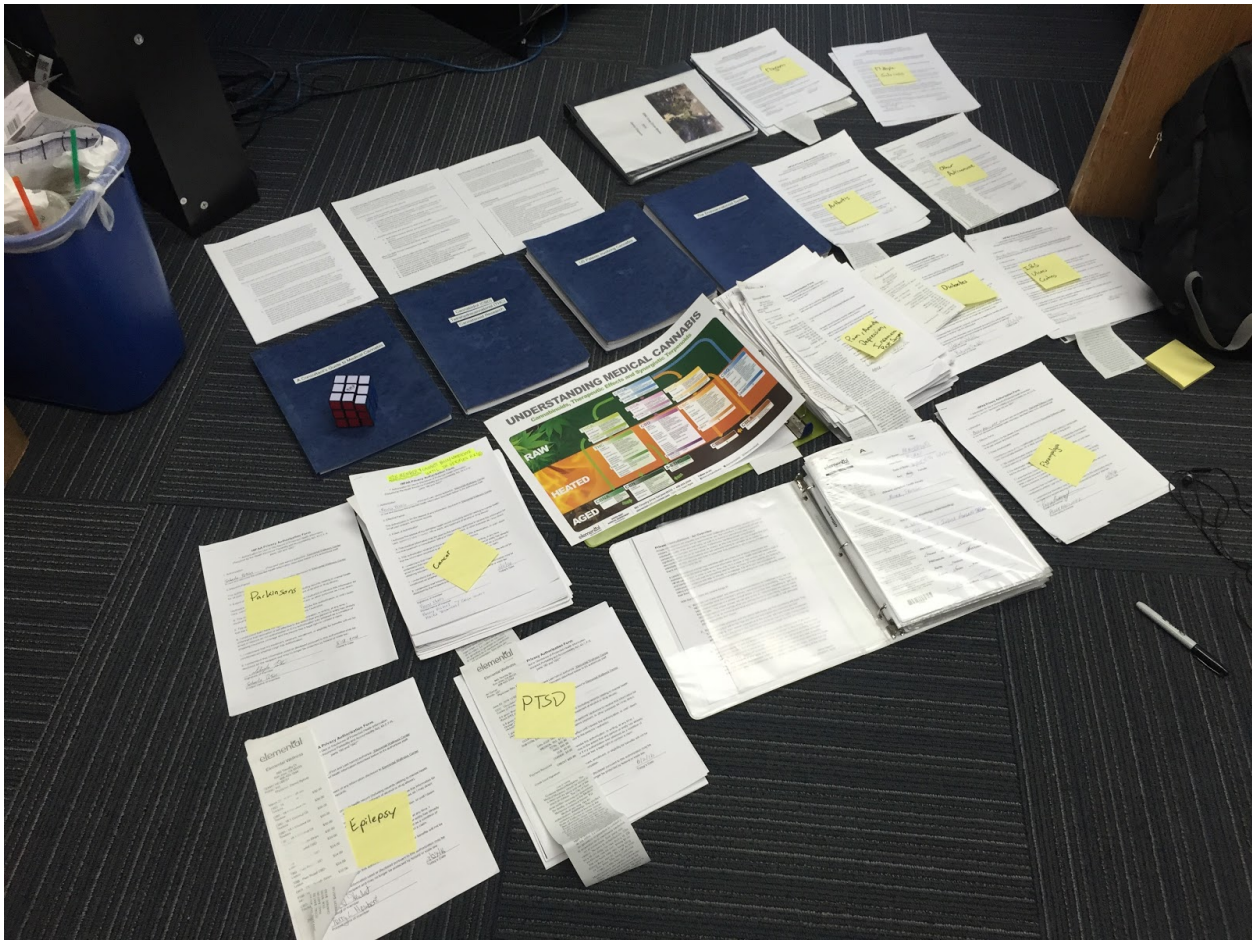
And yes, this is the longest picture comment ever.

Elemental Wellness Center cannabis club at its current location: 985 Timothy Drive, San Jose, California.

A packed day on 4/20/2018 at the Elemental Wellness cannabis club. The cannabis culture in the California bay area is great and yes there are lots of parties!

The closing crew of the Charcot Elemental Wellness Center location. Although this photograph is missing a lot of individuals whom I've had the pleasure of working with, this shot conjures some of the happiest memories throughout my journey into the cannabis world. It may look like just another group picture of coworkers, and sure that's what this is. But this team alongside so many more members of the club created a unique kind of cannabis experience and a dream that was something out of this world. We kept it lit throughout the day if you get what I mean. Some love, some hate on the club game, I'll always cherish my time in it. Without that experience, this book would have never been written.

Saving Lives, Revolutionizing Medicine, Building and Supporting a Healthier Society



Doing work with the Elemental Wellness Private Consultation team files. We saw medical patients on a daily basis, and each of them presented a unique and life-altering challenge: how could we find a way to ease their suffering with cannabis? We saw so many people across various ailments, each with their own set of challenging symptoms and obstacles to overcome. The work we did was life changing, for our patients as well as everyone on our team.

The Elemental Private Consultation Team

It is 2015 and a sixty year old woman who has never smoked marijuana in her life, not once, walks into a cannabis dispensary. (Yes I know this sounds like the start to a joke, but keep reading).

It is one of the nicer, cleaner, more professional ones in San Jose. She checks in with security and gets a good look at the club.There was a wide open floor space surrounded by warm walls with welcoming hues of violet and purple. Three carved out wooden panels inlaid with the shapes of marijuana leaves hang from the ceiling halfway partitioning the reception area from the rest of the floor adding an artistic element to the place. A glass room at the far end that looked like a yoga studio caught here eye, then a room with a sign for massages and private consultations. Last but not least a long wooden counter at least thirty to forty feet long lines the back wall, decorated with several glass cases filled with cannabis products of all sorts ranging from thirty different flower strains, at least two dozen edible options to choose from, an assortment of various concentrates including hash, wax, shatter, rosin, CO2 carts, and actually more - tins of pre-rolled joints, vape pens, topicals, patches and balms, the list could actually go on. She also notices the registers and consultants (what we called the budtenders of the club) attending to their

line of clients - a few young adults she assumed were college kids, a couple who seemed to be in their fifties, and a woman in a wheelchair and her husband who was guiding her around - they all seemed to be having a good time browsing the weed. The easygoing and welcoming vibe of the place was not what she was expecting.

She nervously walks over to the receptionist who asks her if she is a new or returning member. You see, before 2018, cannabis clubs in California required that you have a medical recommendation in order to legally purchase cannabis; you also had to sign up for membership with a dispensary in order to get in. The woman explains that this is her first visit to any cannabis club and that she had just come from a cannabis doctor who recommended that she give this particular establishment a try. She goes on to admit that she's feeling a little overwhelmed, that she doesn't even know what she's looking for, and that she'd like some advice on how to treat her stage 3 breast cancer.

The receptionist acknowledges the woman's concern and slight distress, and sincerely assures her that they would properly accommodate her needs. She asks her to fill out a membership form for the club and the woman spends a few minutes filling out her name, age, and a bunch of small questions like what allergies she had, which doctor she came from, what made her decide to use cannabis, ect. The receptionist then asks the lady if she would like to have a private consultation. Not sure what this means, the woman requests more information. The receptionist explains that there is actually a program within the club where she could receive more in depth help and attention to any questions she might have concerning her cannabis consumption and her ailment. She is told that she would be helped by a specialty consultant that was actually already working with other cancer patients and their cannabis usage. A little shocked and pleasantly surprised, she agrees. The woman is handed another piece of paper titled "Private Consultation Form" and is asked to fill it out. It has a section labeled "Reason for Using Cannabis" with a short list of checkbox items, a section labeled "Previous History with Cannabis," and on the back, "Preferred Mode of Consumption" with more checkbox items. Last but not least a section stating "Consultant Use" with the subcategories of "Notes, Current Medications Being Taken, Medicine Recommended, Follow Up Date, and Follow Up With Medical Doctor" catches her interest.

The receptionist walks her over to the private consultation room and asks her to wait a few moments to which she agrees. As time passes, she pours herself a water from the water machine and begins to browse the mini library of cannabis books and medical papers that fill the shelves lining the walls. She notices several binders filled with various ailments and compilations of their corresponding cannabis scientific articles - Alzheimer's, Anxiety, Chronic Pain, Depression, Diabetes, Epilepsy, Fibromyalgia, Insomnia, Multiple Sclerosis, Parkinson's Disease, Post Traumatic Stress Disorder, and even Cancer. There's more folders but her eyes move on. She makes a mental note of some of the books and cannabis magazines that share the same space - "Cannabis Pharmacy: The Practical Guide to Medical Marijuana" by Michael Backes, "The Cannabis Health Index" by Uwe Blesching, and A Consultant's Guide to Medical Cannabis" by Danny Gagaoin, are just a few she glosses over.

A few moments pass and a young man wearing a black lab coat and carrying a binder walks in and kindly greets the lady. He introduces himself and the two sit down face to face at a small table in the middle of the room. He opens his binder and begins taking notes in a file labeled with her name. She sees him jot down "breast cancer stage 3, not yet metastasized." He looks up at her and asks, "so what is it that you are specifically looking to use cannabis for?" and "what is your history and understanding with cannabis?"

These two opening questions allows for a healthy back and forth discussion between the two. She admits that she's only heard through hearsay that cannabis could benefit her and her cancer, but that she has virtually no history with the drug, she was "good" growing up and "just said no," and admitted that she was only familiar with what she was taught in school; the main reason she wanted to give cannabis a try was because she heard a number of cancer patients whom she knew used marijuana on a regular basis to treat their suffering and that many of them actually swore by it. However, she honestly didn't

know how to use cannabis, she didn't know what she was getting into, and she didn't have the faintest idea of what to buy and how to decide. She also admits her fear of having to get a mastectomy - breast removal surgery. She begins to get emotional, and starts crying. She opens up, and shares a laundry list of life problems - how her family is gonna perceive her doing "pot," how she's scared for her life, how she can't sleep, that the meds she's taking are making her really sick, that she can't properly think, who to make out her will to?

In the back of the man's mind, he begins to think two things: 1) holy shit, this just got very real, 2) how can I help this person?

The man walks over to the shelves with the folders and pulls out a file labeled Cancer. He flips through it and returning to the table, shows the woman a list of medical studies that specifically discuss cannabis and breast cancer. This calms the woman down somewhat. She looks at the papers in disbelief. He tells the lady she can take pictures of the studies, and encourages her to google and read them on her own time.

The man spends the next twenty minutes explaining that cannabis can indeed help her. It's not a direct cure, but rather a multifaceted symptom management tool, and that it could help her find relief in a number of ways.

He asks her to wait, leaves the room, and comes back a few short minutes later. He is carrying a small bin with a number of cannabis products. He begins to display a few key items on the table in front of her: a tube of black tarish oil with the label "Full Extract Oil," a bottle with white lotion labeled "High CBD Lotion," two bottles of cannabis pills each labeled "AM" and "PM" respectively, a black tincture bottle labeled "CBD 20:1," a box of chews labeled "CBD 4:1," and a couple of CO2 vape cartridges in boxes labeled "Calm" and "Sleep."

He spends more time explaining each item, showing her what ingredients are in them, how much THC, CBD, or any of the other cannabinoids is in each product, and he goes on to explain what these are - how they are produced in the plant and how they interact with each of our bodies on a biological level.

He also discusses using the thick tarish oil as a topical for the tumor on her breast. He recommends mixing a small amount with the high CBD lotion and applying it to the tumor site. There were no guarantees that this would work, however there were other patients and anecdotal case stories in which this had helped others as well. He recommended that she check out the website phoenixtears.ca and watch the documentary "Run From the Cure" on youtube if she could find the time. He goes on to recommend using some of the other options strategically - vaping CBD if she's having an anxiety attack, taking CBD capsules daily, utilizing AM PM THC pills properly - she may have to experiment with the dosing to find what works for her but the man explains how to start with small doses and slowly increase them over time. He also explains that all the items there are options, not hard requirements. Her medical usage of cannabis was bound to be unique to her individual case, and it was her responsibility to test out which products worked for her; she may even enjoy the process.

After about forty five minutes, the woman and the man exit the room and head over to the sales counter. She promptly purchases the Full Extract Oil, a bottle of the CBD lotion, both the Calm and Sleep vape cartridges, and both the AM, PM, bottles of capsules. Her total comes out to roughly $400 after taxes. She makes a minor joke that she wishes insurance would cover this, but happily pays her bill. She thanks the cashier, and hugs the consultant.

She comes back three weeks later and looks in better spirits. She repeats her order. She comes back once a month to repeat this order. Four months later she asks the receptionist for the consultant who had helped her. They meet and chat inside the consultation room once more. She has miraculous and dumbfounding news - her tumor had significantly shrunk, her oncologist had downgraded her cancer to stage 2, and that she was feeling better than she had in years. She admits to loving cannabis now, and thanks the original consultant for showing her this facet of cannabis, she never would have known otherwise.

Now, the author would like to stress from a purely scientific standpoint, that we cannot objectively determine that the cannabis was fully responsible for this. In fact, the woman had made a number of positive lifestyle changes that could have had a significant impact on this as well: 1) her chemotherapy and radiation therapy treatments may actually have significantly helped with reducing the tumor and her oncologist was quite good, 2) she changed her diet and started eating much healthier, 3) she began regular hikes with her grandkids providing her good exercise, 4) she had a positive support system in her family, who helped her get through a lot of her personal pain and emotional despair, and they were actually supportive of her cannabis usage. However, it can be said that cannabis significantly helped her get through those treatments and recover faster, that it proved to be a useful medicinal tool that would not kill her, and that it was making a positive difference in her life, otherwise she wouldn't have kept coming back. And then there is of course the strong possibility that her cannabis usage helped to kill her cancer cells whilst also protecting her from the harsh treatments of conventional cancer therapy.

All in all, her experience with including cannabis into her life and medical regiment provided her relief that she may not have had if she didn't live in a medical cannabis state, or if she was simply stubborn enough to hold onto an archaic and erroneous view.

* * * * *

This is the summary of a true story, and we had hundreds of similar cases each with unique and interesting interactions, and they all had varying ailments and symptoms to tackle. We were doing something unheard of - offering a listening ear, and sharing what we knew about cannabis helped us to ease suffering in these people. It motivated us to learn more, it drove us to do the research that you see in this book.

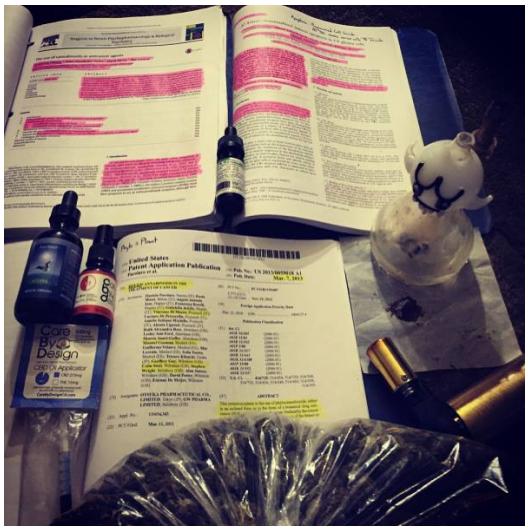
Some of those interactions were hard and haunting. Some of those individuals didn't come back, some of them did. Then there was the realization that this world should have had something like this. Why and how did it fall on us, a bunch of educated stoners working at a cannabis club, to build this? I couldn't help but think back to family members and relatives of mine who could have used this plant and service when they were sick. It made me think of how many people out there could have benefitted by this plant. Sadly much of society is in the dark. To this day, it still boggles my mind and is something that I struggle with on an existential level - laugh if you'd like, I don't mind, it's true.

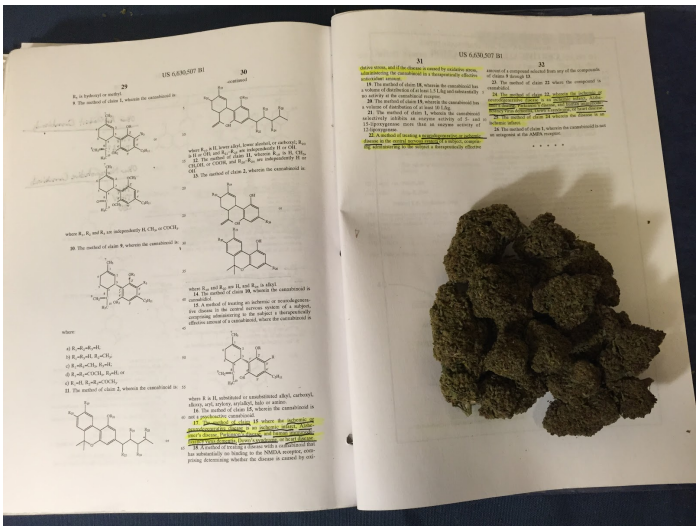
Chapter 5 represents our team's work and contribution to the medical and scientific communities, to any ailing person that wishes to learn more about cannabis, and of course to the rest of the world.

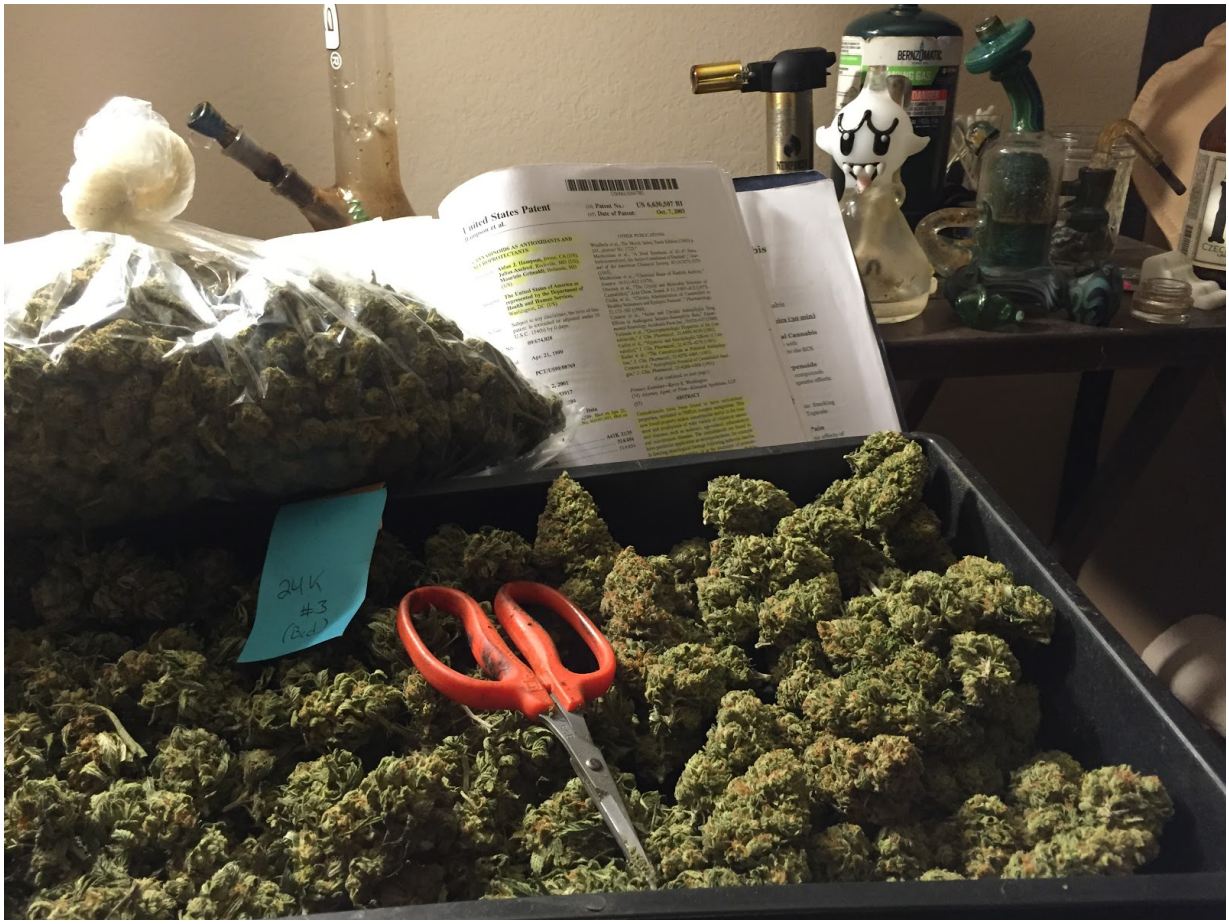
We may not have been the first of its kind, who knows, nor were we going to be the last. I'm sure there are similar programs within the industry that offer a similar service - a simple helping guide to help educate sick and ailing individuals about how cannabis could benefit them and help their quality of life. It was more than just recommending flower strains for people new to weed, we took it to a level where we were documenting patients' regiments with the medicine, what doses were being used, what was working what wasn't, and we had to find creative ways to tailor cannabis usage to each patient's unique condition and circumstance. We spent countless hours doing research, discovering what the scientific world had on medical cannabis, and it had a lot as you can tell from chapters 4 and 5. We put it to good use so that we could help the people that were coming to us for aide.

It was a surreal experience and honor to have been there to work with both the patients, and to lead that team.

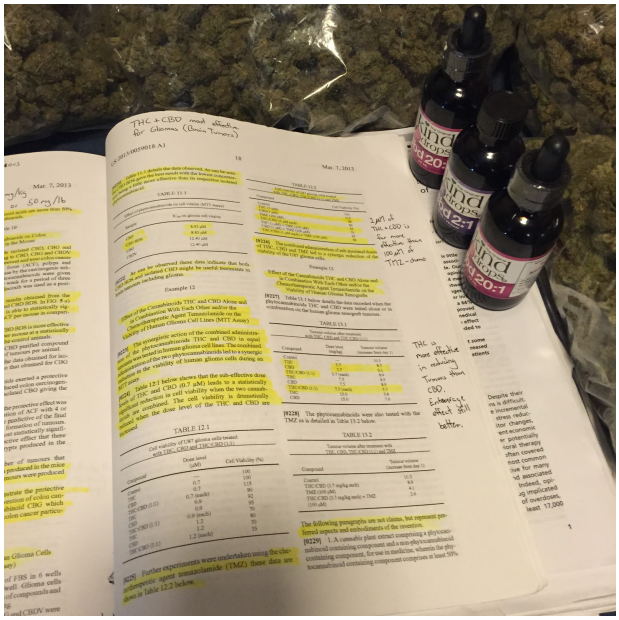
Medical Cannabis Research







Some of the work I've done as a researcher. Gardening by day, long hours of reading and research by night. I'm more than just a grower and I'm proud to have married my passion of cannabis cultivation with challenging scientific and medical research. Call me crazy, but it really was amazingly fun despite the back breaking work and late evenings.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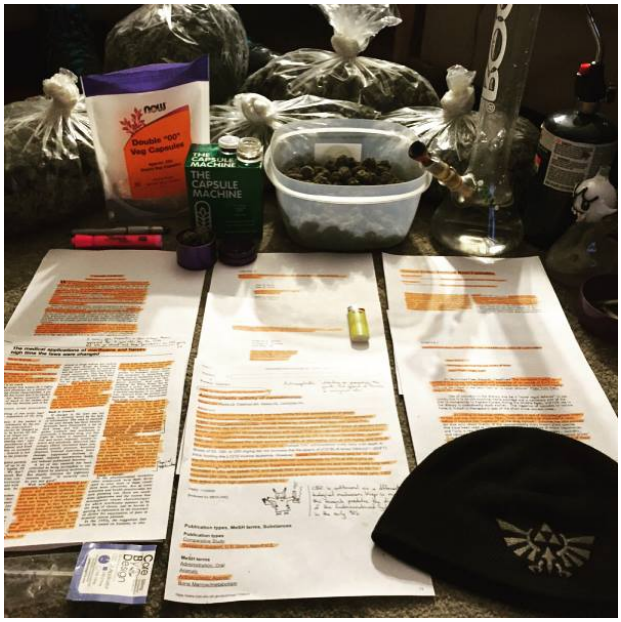
kind drops cbd 2:1
kind drops cbd 20:1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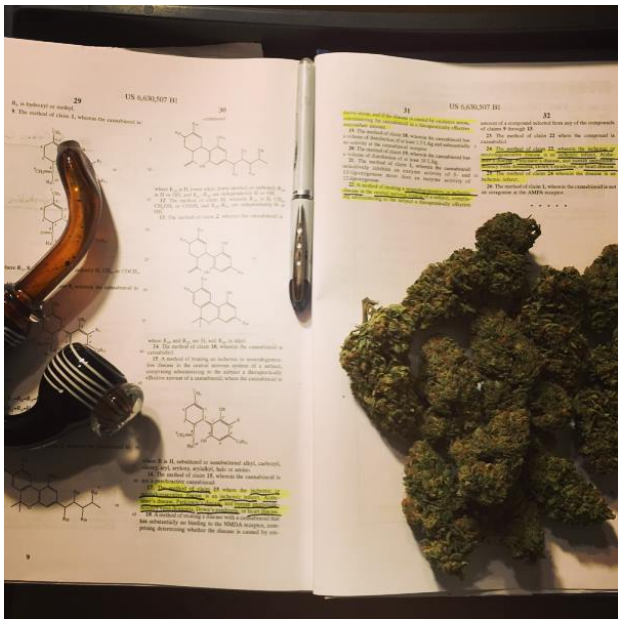
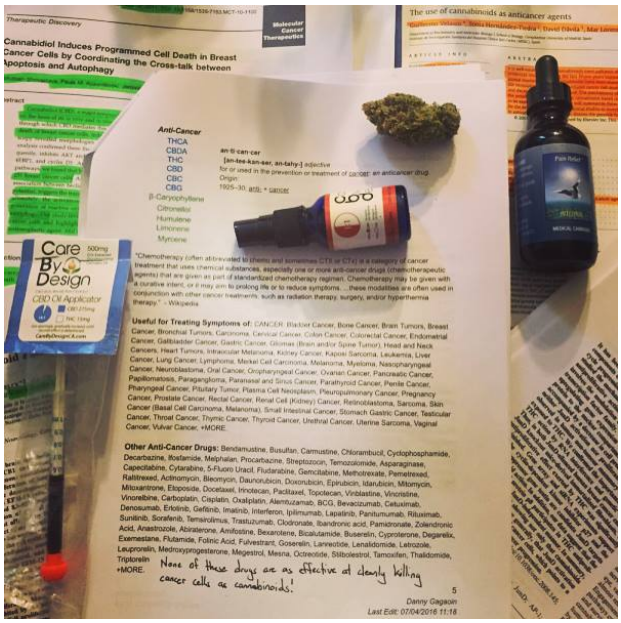
Double "00" Veg Capsules
THE CAPSULE MACHINE




Cannabidiol Induces Programmed Cell Death in Breast Cancer Cells by Coordinating the Cross-talk between Apoptosis and Autophagy
Anti-Cancer
THCA
CBDA
THC
CBD
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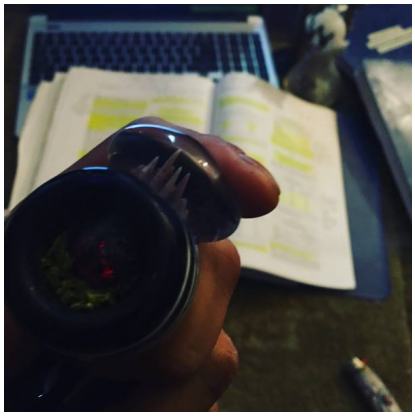
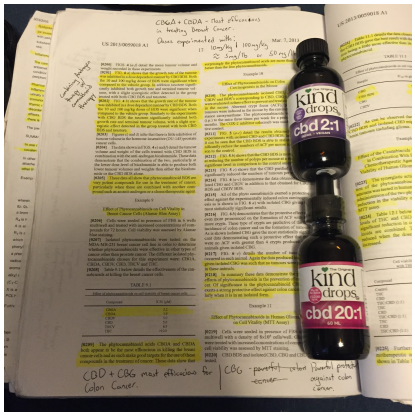
CBG
Care By Design
CBD Oil Applicator
Useful for Treating Symptoms of: CANCER: Bladder Cancer, Bone Cancer, Brain Tumors, Breast Cancer, Bronchial Tumors, Carcinoma, Cervical Cancer, Colon Cancer, Colorectal Cancer, Endometrial Cancer, Gallbladder Cancer, Gastric Cancer, Gliomas (Brain and/or Spine Tumor), Head and Neck Cancers, Heart Tumors, Intraocular Melanoma, Kidney Cancer, Kaposi Sarcoma, Leukemia, Liver Cancer, Lung Cancer, Lymphoma, Merkel Cell Carcinoma, Melanoma, Myeloma, Nasopharyngeal Cancer, Neuroblastoma, Oral Cancer, Oropharyngeal Cancer, Ovarian Cancer, Pancreatic Cancer, Papillomatosis, Paraganglioma, Paranasal and Sinus Cancer, Parathyroid Cancer, Penile Cancer, Pharyngeal Cancer, Pituitary Tumor, Plasma Cell Neoplasm, Pleuropulmonary Cancer, Pregnancy Cancer, Prostate Cancer, Rectal Cancer, Renal Cell (Kidney) Cancer, Retinoblastoma, Sarcoma, Skin Cancer (Basal Cell Carcinoma, Melanoma), Small Intestinal Cancer, Stomach Gastric Cancer, Testicular Cancer, Throat Cancer, Thymic Cancer, Thyroid Cancer, Urethral Cancer, Uterine Sarcoma, Vaginal Cancer, Vulvar Cancer, +MORE
Other Anti-Cancer Drugs: Bendamustine, Busulfan, Carmustine, Chlorambucil, Cyclophosphamide, Decarbazine, Ifosfamide, Melphalan, Procarbazine, Streptozocin, Temozolomide, Asparaginase, Capecitabine, Cytarabine, 5-Fluoro Uracil, Fludarabine, Gemcitabine, Methotrexate, Pemetrexed, Raltitrexed, Actinomycin, Bleomycin, Daunorubicin, Doxorubicin, Epirubicin, Idarubicin, Mitomycin, Mitoxantrone, Etoposide, Docetaxel, Irinotecan, Paclitaxel, Topotecan, Vinblastine, Vincristine, Vinorelbine, Carboplatin, Cisplatin, Oxaliplatin, Alemtuzumab, BCG, Bevacizumab, Cetuximab, Sunitinib, Sorafenib, Temsirolimus, Trastuzumab, Clodronate, Ibandronic acid, Pamidronate, Zoledronic Acid, Anastrozole, Abiraterone, Amifostine, Bexarotene, Bicalutamide, Buserelin, Cyproterone, Degarelix, Exemestane, Flutamide, Folinic Acid, Fulvestrant, Goserelin, Lanreotide, Lenalidomide, Letrozole, Leuprorelin, Medroxyprogesterone, Megestrol, Mesna, Octreotide, Stilbolestrol, Tamoxifen, Thalidomide, Triptorelin +MORE.
None of these drugs are as effective at deadly killing cancer cells as cannabinoids!
Danny Gagaoin
Last Edit: 07/04/2016 11:18

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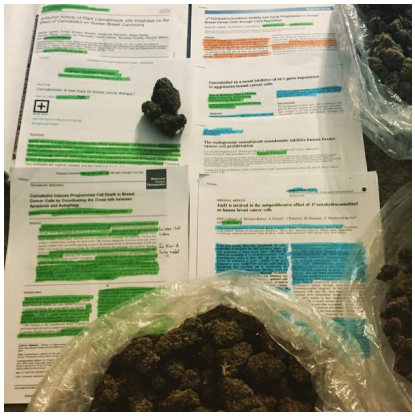


AntiCancerous Fruits and Vegetables to Juice with Cannabis

Blueberries

Fresh Mangoes

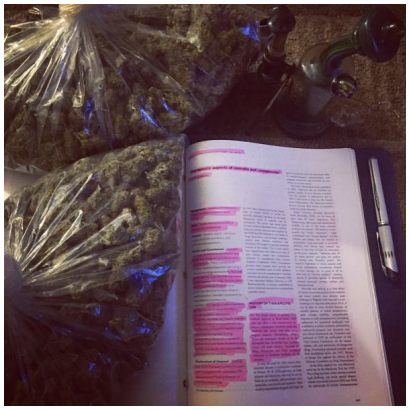
Cruciferous Vegetables - Broccoli, Cabbage, Collards, Kale

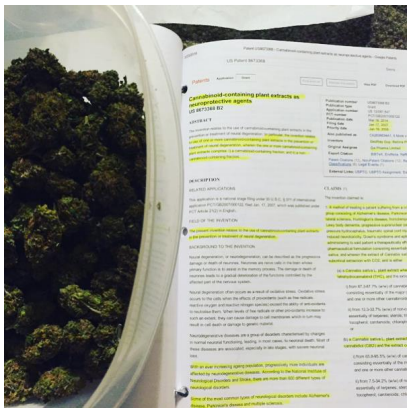
Combatting Cancer w/ Cannabis

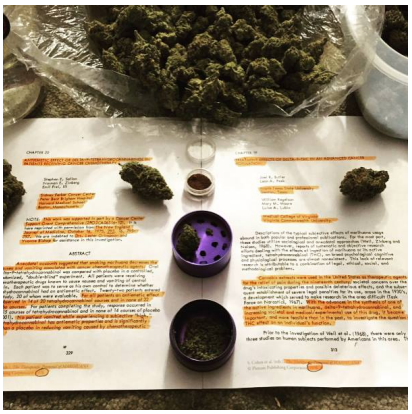
Dosing a Tolerance

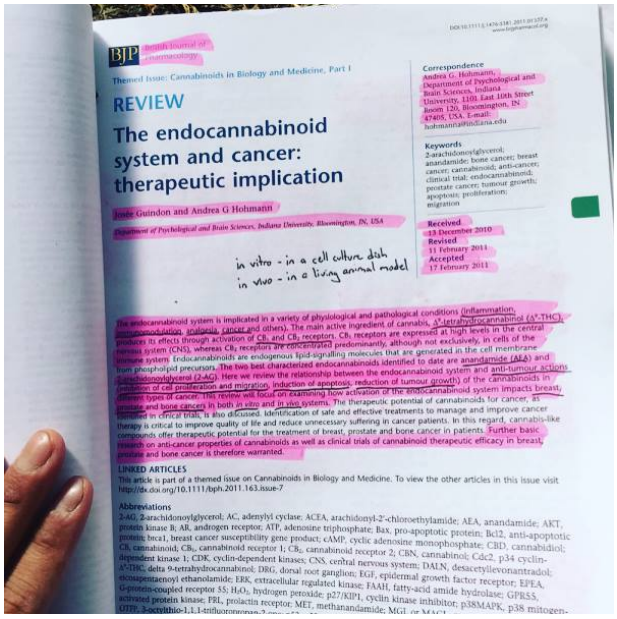
Example Daily Regiment

Cannabis and Cancer








BJP
British Journal of Pharmacology
Themed Issue: Cannabinoids in Biology and Medicine, Part I
REVIEW
The endocannabinoid system and cancer: therapeutic implication
Emidio Guindon and Andrea G Hohmann
Department of Psychological and Brain Sciences, Indiana University, Bloomington, IN, USA
in vitro - in a cell culture dish
in vivo - in a living animal model
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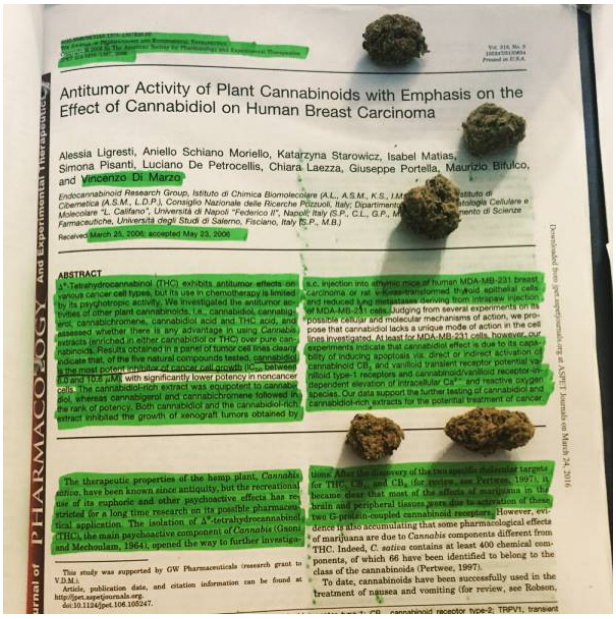
Keywords
2-arachidonoylglycerol; anandamide; bone cancer; breast cancer; cannabinoid; anti-cancer; clinical trial; endocannabinoid; prostate cancer; tumour growth; apoptosis; proliferation; migration
Received
13 December 2010
Revised
11 February 2011
Accepted
17 February 2011
LINKED ARTICLES
This article is part of a themed issue on Cannabinoids in Biology and Medicine. To view the other articles in this issue visit
http://dx.doi.org/10.1111/bph.2011.163.issue-7
Abbreviations


Antitumor Activity of Plant Cannabinoids with Emphasis on the Effect of Cannabidiol on Human Breast Carcinoma
Alessia Ligresti, Aniello Schiano Moriello, Katarzyna Starowicz, Isabel Matias, Simona Pisanti, Luciano De Petrocellis, Chiara Laezza, Giuseppe Portella, Maurizio Bifulco, and Vincenzo Di Marzo
Endocannabinoid Research Group, Istituto di Chimica Biomolecolare (A.L., A.S.M., K.S., I.M.
Cibernetica (A.S.M., L.D.P.), Consiglio Nazionale delle Ricerche Pozzuoli, Italy; Dipartimento
Molecolare "L. Califano", Università di Napoli "Federico II", Napoli, Italy (S.P., C.L., G.P., M.
Farmaceutiche, Università degli Studi di Salerno, Fisciano, Italy (S.P., M.B.)
Received March 25, 2006; accepted May 23, 2006
ABSTRACT
Journal of PHARMACOLOGY And Experimental Therapeutics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OG
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Researcher

Evolving the Societal and World Perception of This Amazing Plant






The progress of hard work and what it looks like to build a sustainable and organic no-till regenerative cannabis garden. We're hardworking growers who love nature - a far cry from the image of burnout hoodlum drug dealers. And yet much of society wrongfully labels us as criminals. So here we stand, with our plants, "a danger to society" defiant in the face of prohibition and the War on Drugs.

From Left to Right: DannyG, WarlockGlass, JacketGeorge

The property that you see belongs to a Vietnam veteran who at the time of this writing is currently battling prostate cancer for the fourth time. I once did a medical consultation for him several years back and my old cultivation mentor GrowDan recommended that he approach me regarding his outdoor garden. I hopped on the opportunity, and built a working relationship and agreement with the older man and his wife, that when the season next came, I would help him with his grow.

I spoke to my good friend and roommate George who honestly has a better cultivation resume than mine - we had both worked at the high tech greenhouse whose pictures you saw earlier in the chapter, but he was put in charge of it and actually helped to build it from the ground up, and while we both had extensive experience working in multiple gardens since we first met, his career was more focused on the cultivation side while mine was more on the medical. With that said, our growing paths had kind of aligned over the years and we decided to team up on any future projects - this was to be one of our big ones. We discussed how to approach this golden opportunity of starting our own cannabis garden and he started going over organics, sustainability, and this cool method of cultivation: no-till regenerative farming or living soil.

It's a cool practice, it really is. Imagine, creating a living ecosystem of healthy nutritious soil and compost, one that is populated with life of all kinds: earthworms, beneficial bacteria and fungi, beneficial good bugs, nematodes (microscopic organisms that feed off bad bugs), cool microbes, all in order to build a living food chain that feeds your plants and builds itself over time. It's like playing god, and creating life, in order to give life to your plants. It's also allowing mother nature to grow the way she intended.

We had to build the soil ourselves as you can tell, and while it was a labor heavy endeavor, we knew we would be rewarding ourselves in the long run. We wanted to learn this awesome organic cultivation system which could help regenerate soil and be used to grow nearly any crop, cannabis and hemp included. It was a renewable method of gardening and farming, which improved the health of the soil and earth over time which made it better with age. It was clean and it didn't utilize any chemical fertilizers or harmful pesticides, it was all natural. This was a method that could be used to fix and correct deadzone farmlands across the planet, and it was one that could affect agriculture around the world, not just with cannabis, but with food production as well. There were already other growers and farmers raving about this system in both the cannabis and normal gardening worlds, it was fascinating to us, and having spent much of our time working with synthetic nutrients in large warehouses, the change of scenery and switch to organics was a blessing.

Why is this relevant? Like many of the stories in this chapter, it represents progress and change. While the cannabis cultivation community and it's world are esoteric and many still operate in secrecy, it is one that never stops evolving itself. The cannabis cultivation world is not what the lay person thinks. It's not a walk in the park, and books could be written about what goes down at a cannabis garden, both good stories and bad, but this side of the industry, the grow side, we're the source, and we pride ourselves in that. A grow nerd like myself just wanted to share how cool our projects can be.

As a practice, this one is actually openly shared and open source, meaning you can learn all about it yourselves (google "no till living soil" and check out buildasoil.com for resources if you wanna go down the rabbit hole). One of the things I appreciate about the cannabis cultivation and even agriculture community is that there are so many people willing to help, who freely offer information, and who sincerely want others to succeed. It is a misjudged community indeed, we have a bad rap from society, but it's all good, we're the ones living high on life.

This is what I currently do and I don't know if I'm ever gonna stop. I love growing these plants if you can't tell. There's something magical about cultivating cannabis, there really is. Whether you're doing this in your backyard, or growing in a tent in your home, or working for someone's factory, you can't help but be mesmerized by your own handiwork and you can't help but feel a sense of growth in yourself. Each crop shows you the cycle of birth, growth, change, maturity, and death - the cycle of life. Going through that makes a person think and reflect. It's therapeutic, it's invigorating, it's revealing.

What's at stake - When you first saw these, you might have scratched your head, now it makes sense

- **In 2018 more than 1.6 million new cancer cases will be reported throughout the world. More than 600,000 cancer sufferers will die**.
    - Every month there will be 140,000+ new cases, and more than 50,000 deaths.
    - Every day there will be 4,000+ new cases, and more than 1600+ deaths.
    - Every minute there will be 3+ new cases, and at least 1 death.
    - This does indeed account for modern medical treatments and the current economic state of the world.

- "**Every day, more than 90 Americans die after overdosing on opioids. The misuse of and addiction to opioids - including prescription pain relievers, heroin, and synthetic opioids such as fentanyl - is a serious national crisis that affects public health as well as social and economic welfare**. The Centers for Disease Control and Prevention estimates that the total 'economic burden' of prescription opioid misuse alone in the United States is $78.5 billion a year, including the costs of healthcare, lost productivity, addiction treatment, and criminal justice involvement"

- **More than 5 million Americans are living with Alzheimer's. By 2050 this number could be as high as 16 million.**
    - Every 66 Seconds someone in the United States develops the disease.
    - **1 in 3 seniors dies with Alzheimer's or another dementia. It is the 6th leading cause of death in the United States. It kills more than breast and prostate cancer combined**.

- "The National Institutes of Health (NIH) estimates up to 23.5 million Americans suffer from autoimmune disease and that the prevalence is rising. **We at AARDA say that 50 million Americans suffer from autoimmune disease**. Why the difference? The NIH numbers only include 24 diseases for which good epidemiology studies were available."

- **Anxiety disorders are the most common mental illness in the U.S., affecting 40 million adults in the United States age 18 and older, or 18.1% of the population every year**.
    - Anxiety disorders are highly treatable, yet only 36.9% of those suffering receive treatment.
    - People with an anxiety disorder are three to five times more likely to go to the doctor and six times more likely to be hospitalized for psychiatric disorders than those who do not suffer from anxiety disorders.

- **The most commonly diagnosed form of depression is Major Depressive Disorder. Depression is the leading cause of disability in the United States among people ages 15-44.**

    - There are approximately 25 million Americans who suffer from depression every year.
    - Over 50 percent of all people who die by suicide suffer from major depression.
    - More Americans suffer from depression than coronary heart disease, cancer, and HIV/AIDS.

- **50-70 million US adults have a sleep disorder. Insomnia is the most common specific sleep disorder, with short term issues reported by about 30% of adults and chronic insomnia by 10%.**

    - 37% of 20-39 year-olds report short sleep duration.
    - 40% of 40-59 year-olds report short sleep duration.
    - Drowsy driving is responsible for 1,550 fatalities and 40,000 nonfatal injuries annually in the United States.
    - 100,000 deaths occur each year in US hospitals due to medical errors and sleep deprivation has been shown to make a significant contribution.

Statistics on Post Traumatic Stress Disorder:

- 70% of adults in the U.S. have experienced some type of traumatic event at least once in their lives. This equates to approximately 223.4 million people. Up to 20% of these people go on to develop PTSD. **As of today, that equates to approximately 44.7 million people who were or are struggling with PTSD**.

    - An estimated 8% of Americans - 24.4 million people - have PTSD at any given time. That is equal to the total population of Texas.
    - An estimated one out of every nine women develops PTSD, making them twice as likely as men.
    - PTSD is recognized as a psychobiological mental disorder that can affect survivors not only of combat experience, but also terrorist attacks, natural disasters, serious accident, assault or abuse, or even sudden and major emotional losses.
    - **Roughly 20 veterans a day commit suicide nationwide, according to new data from the Department of Veteran Affairs**.
    - In 2014, the latest year available, more than 7,400 veterans took their lives, accounting for 18 percent of all suicides in America.

The cannabis plant can bring about a revolution in medicine, a renaissance in sustainable agriculture, and an end to a senseless war.

The science has been presented, approaches and methods to utilizing cannabis as a medicine for specific ailments and symptoms have been provided, and it is requested by the author that you, regardless of whether you support cannabis or are against it, to challenge, criticize, and debate the proposal that cannabis can change and impact the world for a better future. The continued discussion on cannabis needs to grow, and it needs to gain worldwide attention.

How to Change the World

With all this new information, you might say to yourself, okay great, we have all this new knowledge...what do we do with it and how do we change the world?

The first step in changing the world is changing yourself - your personal education, perspectives, experiences, you have to be willing to constantly grow, evolve, and mature them. The second step is recognizing that the world is always changing whether we like it or not. The key is to take responsibility for some of that change, to guide and help shape it, to contribute and leave something behind for others. How and why you of all people would do that, is up to you. No one ever said this was going to be easy but this how the world evolves. New views, old views, renaissances of them, and the industrialization of these views, the way we apply and integrate them into our modern lives - these all go through a process where we as a society can either join and be a part of that dance, or we can idly watch as others build the future for us, but the fact remains, society never stops growing, it never stops evolving.

This piece of literature used to be my cannabis journal, I simply rewrote and recompiled everything I had been working on over the past 5 years so that the rest of the world could read and understand it.

As a shareable book it can serve as a multipurpose educational tool. It is highly recommended that you show and discuss it with your parents, teachers, doctors, priest, rabbi, minister, friendly neighborhood cop, and even local politician, senator, congressman, governor, or even president! Sparking a debate to air out conflicts of belief can actually be healthy for everyone. Civil arguments can and should be had when discussing the subject of cannabis - there is seriously a lot more to it than we all were taught to believe.

* * * * *

You may have noticed by now that I have written this last and final chapter in a very personal manner. It was intended that way. I honestly had a hard time figuring out what to write for the ending to this book. After a lot of dabs and a bottle of wine on a very late evening, I found that the best way for me to finish this was to look back into memory lane, and to share with the world a glimpse of the magic the cannabis industry has shown me. While it may not have followed the traditional format for how a book is supposed to wrap up, I hope that you the reader enjoyed it. I really didn't write this for critics, I wrote this to give something to the world.

Who am I and why did I write and share all this for free? I'm a medical cannabis scientific researcher, activist, professional grower, writer, and I've been heavily involved with the cannabis movement and industry since 2013. I was the medical research scientist for the renowned Elemental Wellness Cannabis Collective in San Jose for several years and I founded and helped to lead their medical private consultation team in helping real world medical patients to incorporate cannabis into their regiments. I have literally seen cannabis change, improve, and save numerous lives, and I know it continues to do so to this day. This book and journal is a current culmination of scientific research that I have been working on for the past several years. Whether you believe it or not, you will hear me state multiple times throughout these chapters that cannabis can change and impact the world for the better in so many ways. It can ease suffering and save lives across many ailments, be a major player in the sustainability movement, and help to revolutionize medicine and industrial goods throughout the world for the next several hundred years if not longer; humanity has in fact been utilizing the plant since agriculture was invented.

The question of why. Why? Because humanity deserves better, the world deserves better. I love cannabis, and I love humanity. Because I want to help change the world.

Forbidden Fruit in no-till living soil. Grown by JacketGeorge, WarlockGlass and DannyG. 2018 Outdoor season.

End of chapter addendum - Epistles (a few letters to important and relevant people):

To the Haters & Prohibitionists - It's okay, no scolding or flaming, just a friendly and humble request.

Dear you,

You are entitled to your views and opinions. And given the history of the cannabis plant as a narcotic, alongside what education was given to you regarding it growing up, it is understandable that you would have such a negative view of this plant. You may have even "seen it ruin people's lives" and that may have been what it looked like. You may have perceived that it was a gateway drug that led to other harder drugs because of its association with "all drugs." You may have even believed the Ronald Reagan, the President of the United States, when he told everyone marijuana was the most dangerous drug, and it may be hard for you to believe that he was misinformed - his scientists lied to him. You may love your mom and dad, and they may have steered you right by telling you to "just say no." These are stacked sensible reasons as to why you might be afraid of cannabis and it's renaissance.

But that's what it is, fear. We all were kept in the dark about the cannabis plant, we all were taught to see it in a stigmatized light. But realize, that you can only be afraid of what you think you know. And we knew so little about what this plant could really do. What you thought you knew is largely based off of a lie. This book spends a lot of time proving that.

This world, is a fascinating and ever evolving experience for you and I, for all of us. It is rapidly unfolding, faster than we could have ever imagined. There's a lot going today, both good and bad, and it's hard to keep up - world politics, the advancement of artificial intelligence, rapid technological advancement, unending distractions and conveniences, sustainability movements, continued wars, global warming, kids growing up, new talent rising in the arts and in sports, near instant access to news and information that wasn't possible before the digital era, racism in America, new phones, new consumer products to buy, it never ends...the creation of new things and stuff for people to wrap their heads around. There's just so much out there.

The weed industry isn't better or more impactful than others. They all go together. And it's arrived. I know, you may have had a negative opinion and view of marijuana, but the cannabis industry is here to stay, and people from all walks of life and for various reasons need this plant. It's going to help humanity evolve, it already is one of the next big things.

Don't worry, it's not as scary as you were taught. You'll be pleasantly surprised, and you may even need this plant down the road. Give it time, you'll understand.

Sincerely,
A cannabis scientist and farmer.

To the Parents - What to say to your young kids.

Dear parents,

I know this may be a difficult conversation to have with your kids. But try having this talk with them if you trust yourself and them as well.

> There's this plant you may have heard of, and it goes by many names. It is called cannabis, marijuana, weed, and you may hear others call it by other names but it's important that you know what it really is. It is a medicinal plant that is used for treating sickness and disease for lots of people, some even your age. Much of the time this is for something serious and they may need that medicine.
>
> Now, you might hear adults talk about it a lot, and this is ok, there's nothing wrong with talking about it. Some people like to smoke the plant as well for either fun or medical reasons, and so long as they are an adult or are using it as a medicine, then that's okay too.
>
> Remember though, that smoking this plant is for adults only, just like alcohol, and if you mess around with this stuff at your age, you can actually slow the growth of your brain which will be bad for you later on in life. This includes vaping if you know what that is. You are young, and you'll get a chance to try these things later on in life. So, even if your friends or other people try to get you to give smoking a try, you should wait and say that you're not ready for that.
>
> Good luck kid, make good decisions in life.

I'm sure you as a parent can come up with something along those lines, and if you're not exactly feeling creative, go ahead and use that. It's pretty similar to what parents in the cannabis industry tell their kids. They don't want to lie about what they do, they're honest and provide a good education and understanding of what cannabis is. Being honest like this works wonders. Good luck with your kids, they'll understand.

Sincerely,
- A cannabis scientist who cares about the kids.

To the teenagers - In case no one has this talk with you.

Dear young person,

Look, there's a few things you should know about weed, marijuana, tree, grass, whatever you want to call it - 1) your brain hasn't fully developed yet, and you should avoid smoking weed or vaping it as well. It has been discussed in scientific studies that marijuana abuse during adolescence has been correlated with various mood disorders such as depression and underdeveloped brains later on in life. Why take the risk? 2) If you do try marijuana, just remember not to abuse it. You've got a lot of potential in front of you that you don't want to waste it living up to the stigma of stoner burnouts, a lot of us honestly hate that image. Seriously, be better than that. These years of your lives, you should be learning shit and growing up.

Yes there are people your age who do need this herb, but these are for real cases of disease and illness and using cannabis for these reasons is very different than smoking to get high. Let's be clear on that distinction.

To be real, chances are, you may end up in a social setting where you may have the opportunity to take your first toke. That's really up to you, it'll be likely that no one would stop you. However, use your better judgement, and remember there's a time and place for everything. Ask yourself if that is that time. It's true, lots of people, myself included, first tried weed when we were in high school and you might probably do the same...with that said, avoid abusing this, or any drug - alcohol, adderall, glue, paint chips...whatever it is that you enjoy getting high off of...there's better things to do with your time and your brain.

You'll be 21 before you know it, and then your adult life belongs to you (hopefully). Build and cultivate yourself until then, and when you're older, you'll have a better time with marijuana and experimenting with other things then. Trust me on this. Take the time read this book once you come of age, so that you'll be better informed as to how to include cannabis into your life if you want to.

Just some honest advice, best wishes to you.

-An adult you should listen to.

To Medical Professionals and Scientists - I seriously want to work with you.

Greetings to any medical professional or scientist, I hope you enjoyed this book.

It took a lot of time and effort putting this together, and I wanted nothing more than to contribute this to your fields. Please review this book and let me know what I could add or refine, and if you'd like to work with me on a project, discuss medical cannabis with me to pick my brain, or even if you'd simply like to meet and chat, I'd love to exchange ideas and share my knowledge. The cannabis world really is an exciting one, it would be an honor for more of you really smart individuals to give this community some newfound attention and to get involved.

Reach out to me via email at dannygthc@gmail.com , dm me on instagram at @thchigherlearning or reach out to me on facebook.

Humbly and sincerely eager to work with you people,
-Danny Gagaoin

To the Stoners - I love you people, keep those seshes lit.

To the stoners of this industry,

You guys fucking rock. Keep things lit. Let's burn some time.

Can't wait to sesh,
-DannyG

To the Cannabis Industry - I love working with you. We'll see each other around.

To the Cannabis Community and Industry,

What can I say? This book was for you, and I hope many of you put it to good use. You gave me a new life, and you gave me experiences that money could never buy. To the friends I've made, and the ones I'll make down the road, we'll keep on keeping on. The legalization fight continues, and there's still a lot of work to be done worldwide. Keep growing, keep building, keep expanding, innovate, and take ownership of your new industry. Its movement has fought long and hard to get to where it is today, and you deserve the "green rush" you created. Be proud of yourselves, you all changed the world.

Truly,
-DannyG

To the Psychedelic Community - I love your community and research, I humbly request an opportunity to expand my research and work into this field.

Dear Psychedelic community,

I love you people and would really like to collaborate and work on something with your community. I have always been fascinated by psychedelics and entheogens - psilocybin, lsd, dmt, mdma, ayahuasca, ibogaine, cannabis. I hope that you find this book a welcome contribution to this growing field, and know that I would like to expand my studies here. Given time and experience, I would like to write another book discussing these substances and would like nothing more than to spend time with some of you community legends: Rick Doblin, Paul Stamets, Dennis McKenna, and all of you other doctors and scientists furthering the renaissance of psychedelics. This is a humble request, and I hope to meet with any of you soon!

Sincerely with best regards,

- Danny Gagaoin

A special thanks to all the cannabis doctors, researchers, and scientists who made this possible (in no particular order): Dr Raphael Mechoulam and his team in Israel; Dr Manuel Guzman and Dr Christina Sanchez; Dr Lester Grinspoon; Dr Donald Tashkin; Dr Donald Abrams; Dr Tod Mikuriya; Dr Vincenzo Di Marzo; Dr William Courtney, and many more.

A special thanks to all the legendary activists who stood against prohibition (in no particular order): Jack Herer, Rick Simpson, Eddie Lepp, Marc and Jodie Emery, Richard Lee, Dennis Peron, Bob Melamede, Alexis Bortell, and much much more.

A special thanks to my industry colleagues, mentors, and friends: George K and Charlie Prince for being amazing partners in growing; GrowDan for teaching me how to grow and getting me hired at EWC; to Jen and Bruce for being the coolest and treating me like family; to Bob for supporting us and funding our grow and for understanding; to Jerry and Yuri, for giving us the surreal opportunity to grow with you; to Lauren and the EWC consulting team for putting up with my shit and being such awesome people; to the nursery team: Sammy, Justin, Rae, and EJ, we stood for each other and still do, I miss you guys; to Derik and Neil for giving me the opportunity to flourish at your company; to Dr Benson for trusting me and letting me build the private consultation team; to the Private Consultation team, what we did was nothing short of magical and legendary; to the staff of Elemental, I will always cherish the memory of working with you; to any and all of the patients I've worked with, thank you for trusting me and letting me show you what cannabis could do.

A special thanks to the countless medical cannabis patients in the industry and throughout history.

A special thanks to my family: my brother and sister who helped raise me, my mother and father, without whom I would not be here today. I love you all, I can't wait till we see each other next!

"Science is not about an individual's glory in discovery or creative accomplishment, but rather the joy of contributing to the growing and evolving body of work that helps to observe and understand the world around us. It is a diverse school of study and precise perspective that teaches us and gives us tools to help advance and evolve our very existence. It is bigger than any individual, for its aim and intent helps to elevate all of humanity."