

* MEDICAL CANNABIS

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* Conflict of Interest

Dr. Vincent Carlesi certifies that, to the best of his knowledge, no affiliation or relationship of a financial nature with a commercial interest organization has affected his views on the subject on which he is now presenting.



HISTORY
PHARMACOLOGY
SPECIES
DELIVERY SYSTEMS
VARIETIES
STATE OF CT.
REQUIREMENTS
CANNABIS TX FOR CRPS

- * The cannabis plant is believed to have first emerged about 36 million years ago in Central Asia, Siberia, Mongolia, and Kazakhstan
- * Usage dates back as far as 12,000 yrs since the end of the Ice Age.
- * Humans cultivated cannabis for fiber, medicine and inebriation
- * From 1500-200 BCE, cannabis used as a medicine in the Mediterranean region, Egypt, Greece, and India.
- * Eventually, Cannabis traveled to the West in the 17th century.

HISTORY

- * 1809-89 Sir William Brooke O'Shaughnessy an Irish physician working in Calcutta, India studied the medical uses of cannabis with animals to assess it's toxicity.
- * 1838 it was reintroduced to western medicine which was typically consumed orally rather than smoked.
- * By 1925 the League of Nations banned cannabis and it's derivatives for consumption and in 1928 the UK did the same except for medical and scientific use which continues today.
- * By the mid 1930's cannabis was banned in all 48 states by the federal government with the Marijuana Tax Act of 1937 and the perception devolved from being safe to being a "dangerous narcotic."

HISTORY

- * In the early 1960's, Raphael Mechoulam, an Israeli researcher, discovered the major psychoactive ingredient in cannabis, THC: delta-9-tetrahydrocannabinol and CBD: cannabidiol.
- * Eventually he went on to identify the two "best candidate" molecules which were later proven to be the body's own cannabinoids, called the endocannabinoids.

HISTORY

There are two major species of the plant:

SATIVA (Higher % of THC)

INDICA (Higher % of CBD)

- * For thousands of years it has been used to make hemp cloth, and paper.
- * Betsy Ross used hempen cloth to sew the first U.S. flag and the Declaration of Independence was written of hempen cloth.
- * In the Netherlands windmills were often built on hemp stalks.
- * Cannabis Seed (hempseed) which is a nut rather than a seed is rich in polyunsaturated fats, essential fatty acids and proteins.

THE CANNABIS PLANT

- * Cannabis is dioecious, meaning it produces male and female flowers on separate plants.
- * It evolved two sexes to encourage a wider genetic diversity.
- * The females grow seed pods, while the males develop sacs full of pollen for fertilization.
- * Cannabis is an annual plant, which means that it completes its life cycle in a single year.
- * The typical female plant will produce hundreds of tiny flowers at the top of the plant called, “COLA”

THE CANNABIS PLANT

- * Although cannabis is cited as being one of the most abused drugs, this characteristic is a bit misleading.
- * Both licit and illicit drugs can be abused or misused
- * Molecules that make up drugs are neither good nor evil.
- * To claim that cannabis is completely safe and cause no harm is as irrational as claiming that cannabis has no medical use whatsoever.
- * We should approach cannabis as a medicine cautiously since humans have a tendency to abuse almost anything in existence.

USE OR ABUSE

The cannabis plant produced about 700 chemical compounds

The two best know chemicals are **THC, tetrahydrocannabinol, and CBD, cannabidiol.**

Absorption:

- * Varies with delivery: smoked/vaporized, ingested, breath strips, transdermal application, tincture.
- * Smoking peaks blood plasma levels in 6-7 mins and lasts about 3-4 hrs.
- * Sublingual administration is not as efficient as inhalation but can be absorbed in 5-15 mins and lasts 4-5 hrs.
- * Oral absorption is slow and inconsistent and may take 2-6 hrs, but can last 6-8 hrs

How Cannabis Works Within the Body

Metabolism:

- * Once absorbed 90% of THC will be bound to proteins in the blood and distributed throughout the body.
- * Only 1% finds its way to the brain.
- * The liver metabolizes THC it converts it to 11-hydroxy-THC which is 2X as psychoactive and has a longer $\frac{1}{2}$ life as the parent drug.
- * Metabolites are excreted from the body over 36-72 hrs.
- * The non-psychoactive metabolites can hang around for 2-3 weeks depending on the individual's usage.

How Cannabis Works
Within Our Body

- * Numerous studies have shown variations of effects on individuals that are administered cannabis
- * This variations depends on the genetics of metabolism as any other medication.
- * GI absorption can also vary depending on the amount of CB1 and CB2 receptors.

For this reason when it comes to cannabis dosing:

- * Less leads to more effect due to the density of the cannabinoid receptors in the body.
- * The body adjusts to the exposure of cannabis by increasing or decreasing the density of it's receptors.

Variance in Cannabis Effect Among Patients

- * It is important that the physician who is prescribing cannabis understand the possible side effects of cannabis to make the experience both safer and pleasant for the patient.
- * The physician should know if there is a history of psychological disorders, heart disease, HTN, arrhythmias, COPD, immune disorders since there is conflicting information regarding these issues.

Adverse Effects of Medical Cannabis

Most common reported sided effects are:

- * Tachycardia
- * Dry mouth (i.e.: cotton mouth)
- * Dizziness or lightheadedness
- * Red irritated eyes
- * Cough if inhaled
- * Cannabis Hyperemesis Syndrome (a new condition identified in 2004
- * associated with vomiting and abdominal pain and relieved by a hot shower and termination of cannabis use)
- * Impaired cognitive functioning, confusion, anxiety, feelings of panic

Adverse Effects of Medical Cannabis

* Long-Term adverse effects include:

* **Chronic bronchitis** (in heavy smokers)

* **Cognitive deficits** which include executive functioning, short term memory loss, and attention which are usually reversible.

* **Dependence:** cannabis receptor density down regulation which is responsible for tolerance.

* **Drug interactions** which can either increase or decrease the effects of oral cannabis.

* **Cannabis Withdrawal Syndrome:** which includes symptoms of agitation, aggression, anger, weight loss, anxiety, restlessness, altered sleep patterns, vivid dreams

Adverse Effects of Medical Cannabis

Drugs that increase the effects of oral cannabis

- * Amiodarone
- * Clarithromycin
- * Diltiazem
- * Erythromycin
- * Fluconazole
- * Isoniazid
- * Itraconazole
- * Miconazole
- * Ritonavir
- * Verapamil
- * Benzodiazepines
- * Alcohol
- * Opiates

Adverse Effects of
Medical Cannabis

Drugs that decrease the effect of oral cannabis

- * Carbamazepine
- * Phenobarbital
- * Phenytoin
- * Primidone
- * Rifabutin
- * Rifampin
- * St John's Wort

Adverse Effects of
Medical Cannabis

- * The two primary subtypes of cannabinoid receptors are CB1 and CB2.
- * These receptors are distributed throughout the CNS, immune system, GI tract, endocrine, genitourinary system, circulatory system.
- * The first endocannabinoids discovered were anandamide and 2-AG and now three more have been discovered.
- * They all are derivatives of polyunsaturated fatty acids closely related to omega-3-fatty acids
- * They serve as primary messengers across synapses and modulate the flow of neurotransmitters.

* The Endocannabinoid System

- * Endocannabinoids are profoundly connected to the body's homeostasis.
- * Variable levels may be responsible for the baseline of pain throughout the body.
- * This maybe the reason why the endocannabinoid-based medicines may be useful in treating conditions such as Fibromyalgia, MS, neuropathic pain, inflammation, and cachexia.

The Endocannabinoids have effects on brain functions such as:

- * Decision making
- * Cognition
- * Emotions
- * Learning
- * Memory
- * Body movements
- * Anxiety, fear
- * Pain
- * Temperature
- * appetite

The Endocannabinoid System

Cannabinoids:

A group of 80 molecules with chemical structures called **terpenophenolics**.

- * 10 structural types, 4 are primary:
- * THC (**tetrahydrocannabinol**)
- * CBD (**cannabidiol**)
- * CBG (**cannabigerol**)
- * CBC (**cannabichromene**)
- * CBN (**cannabinol**) the 5th type is not produced by the plant but results from oxidation of THC

The Principle Active Ingredients of Cannabis

THC: Delta-9-tetrahydrocannabinolic acid or THCA

- * Is the most common phytocannabinoid
- * The primary psychoactive constituent of cannabis
- * Upon heating through cooking, vaporization, or smoking THCA is converted to THC by decarboxylation.
- * Besides having psychoactivity, THC is a potent analgesic, anti-inflammatory, has neuroprotective activity, reduced intraocular pressure, antispasmodic, and reduces muscle tension.
- * It binds to both CB1 and CB2 receptors

Cannabinoids

CBD: Cannabidiolic acid or CBDA

- * Is the most common phytocannabinoid produced by the fiber (Hemp)cannabis.
- * CBDA is converted to CBD by heating similar to THC
- * CBD is also produced from CBG but by a different mechanism.
- *
* CBD exhibits:
 - * analgesia
 - * anticonvulsant activity
 - * anti-inflammatory
 - * antitumor growth in vitro against human brain, breast, thyroid

Cannabinoids

Sativex:

- * Combines both THC and CBD to eliminate the unpleasant adverse effects of THC modulating the psychoactivity, sedation, anxiety, and rapid heart rates.
- * It demonstrates strong synergy between THC and CBD which has been studied in cancer patients in which it reduced their intractable pain.
- * THC alone did not.
- * CBD was also found to be effective in inhibiting MRSA better than Vancomycin in a number of in-vitro studies.

Cannabinoids

CBG: Cannabigerol

- * Is a non-psychoactive cannabinoid
- * It has not been studied as in depth as CBD and THC
- * A recent Italian study has shown its effectivity in treating (IBD) inflammatory bowel disease in mice.
- * It has also been found to be a potent antiseptic and antibiotic effective against potent pathogens such as MRSA.
- * Also has anti-tumor properties especially against prostate and oral cancers.

Cannabinoids

CBC: Cannabichromenic acid or CBCA

- * A rare phytocannabinoid produced very early in the flowering cycle.
- * It has been isolated in Central Asia
- * It does not seem to interact with CB1 or CB2 receptors
- * It does exhibit a range of effects such as:
 - * Antibacterial
 - * Antifungal
 - * Anti-inflammatory
 - * Analgesic
 - * Antidepressant

Cannabinoids

CBN: Cannabinol

- * It is produced by oxidation of THC and not produced by the cannabis plant.
- * If found in high concentrations, usually indicates poor storage of the cannabis products.
- * It does have activity against MRSA infections.
- * A new study showed it had activity in reducing the thermal sensitivity of the skin in burn patients.

Cannabinoids

These are the aromatic constituents of all plant oils found in all species of fruit, spices, and vegetables.

Terpenes are the most common plant chemicals in nature.

Terpenes found in cannabis are the following:

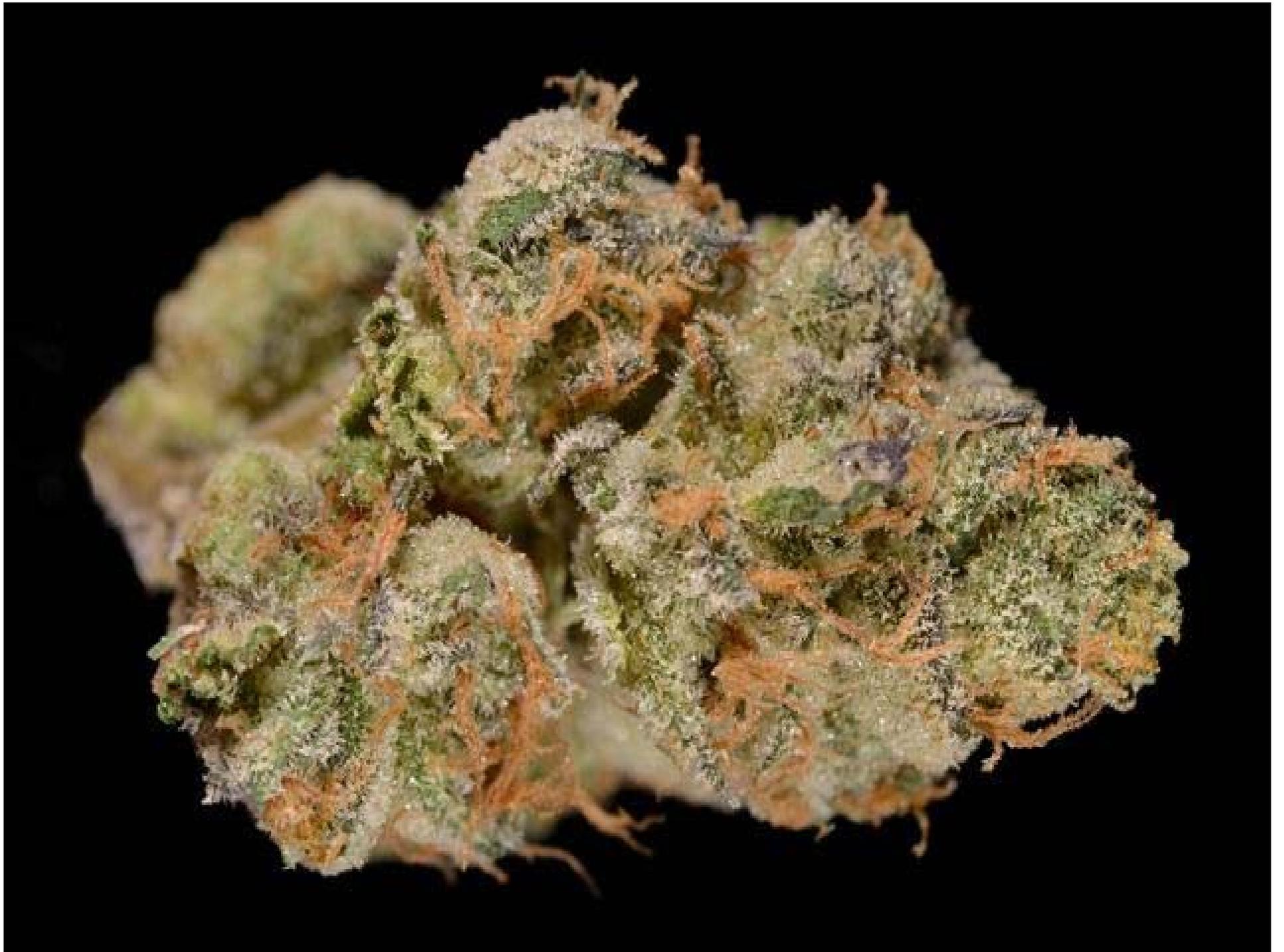
- * **Pinenes** (alpha-beta) Christmas tree smell, aids short term memory.
- * **Limonene** (citrusy) stimulating, mood elevating, antidepressant effects.
- * **Myrcene** (skunky smell) sedating, muscle relaxation
- * **Beta-Caryophyllene** (found in black pepper) anti-inflammatory.
- * **Linalool** (lavender) mildly psychoactive, sedating, calming, antianxiety, analgesic, anesthetic.

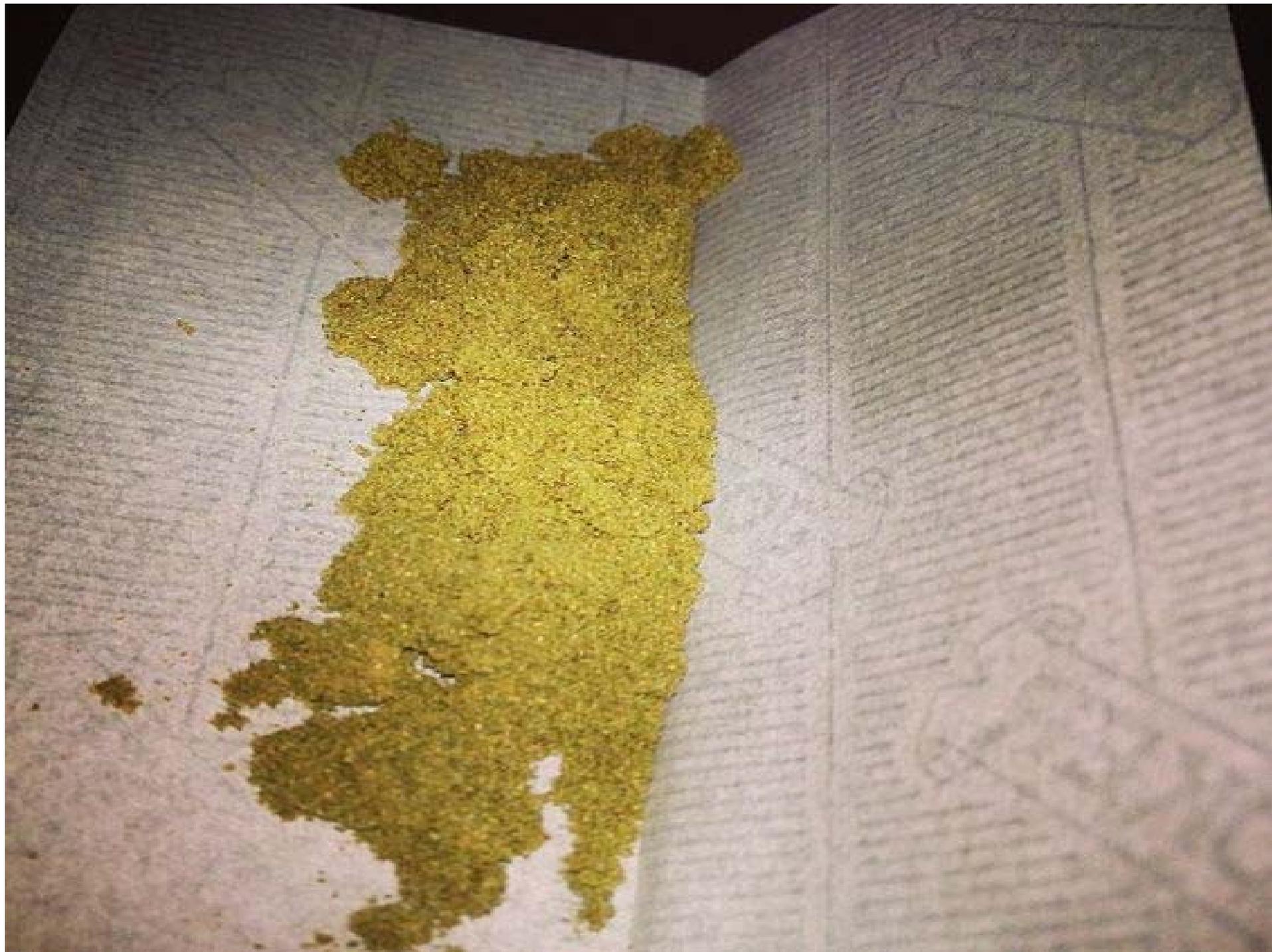
Terpenoids

Smoking:

- * Most common method of delivery
- * Causes a rapid elevation of THC or CBD
- * Peak blood levels are achieved within 5-10 mins.
- * Patients learn quickly how to titrate their doses easily.
- * Cannabis can be smoked in formulations of:
 - * Flower, oils, Kif, wax, concentrates, hashish
- * Smoking can be performed by the following methods:
 - * Vaping, e-cigarette, joints, spliffs, bong, pipes

Delivery of Cannabis









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Tincture:

- * An alcohol based extract of cannabis which are sprayed sublingually.
- * Uses solvents such as ethanol to dissolve active ingredients into the solution.

Ex: **Everclear Neutral Grain Spirits**

- * Cannabis is soaked for 1 month, called **menstruum**, then it is pressed and the resulting tincture is collected.
- * Well made tinctures can reach nearly **80mg/cc** of cannabinoids which makes them extremely potent.

Terpenoids can be delivered at higher concentrations with this method vs vaporizing since heating reduces their effectiveness.

Delivery of Cannabis





Topical and Sublingual Strip Applications:

- * Cannabinoids can be absorbed through the skin or mucosa to provide anti-inflammatory activity.
- * Via the oral mucosa they can provide a more efficient way of delivery at higher concentrations
- * Can be used to treat eczema, arthritis, psoriasis, and acne.
- * Very low risk of any psychoactivity through the skin.
- * CBD can reduce the production of sebum and are antibacterial while binding to the CB receptors.

Delivery of Cannabis





Edibles :

- * Oral cannabis use dates back 2500 yrs. to ancient China, called “Ma-Fen.”
- * Was the cornerstone in traditional Indian medicine in which is called, “Bhang” taken as a general tonic.
- * It was used to treat malaria, rheumatism, and menstrual cramping.
- * **Advantages** over smoking or vaporizing is primarily increasing the duration of effects, lasts longer, fades slower over 5-8 hrs.
- * **Disadvantages** are variable absorption (30-90 mins), risk of over medication which can cause extreme psychoactivity and anxiety.

Delivery of Cannabis



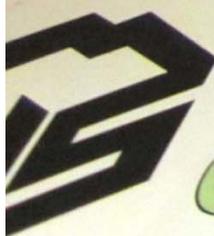


SEA SALT &
PEPPERCORN
KETTLE CHIPS



Grassy T's Gourmet™
Net wt. 25 grams half bush
Made in a Denver Commercial Kitchen



 **MOUNTAIN HIGH SUCKERS**
CBD ENRICHED INFUSED EDIBLES

Suppositories:

- * Can be formulated to be extended release.
- * Patent held by the U.S. government-contracted cannabis cultivation project at the University of Miss.
- * Not available on the open market yet.

Patchtek Transdermal Patch:

- * Delivers cannabis transdermally undergoing preclinical trials which may gain acceptance quickly in the pharmaceutical community.

Namisol:

- * A THC-pill which has a high lipid solubility absorption rate which contains “cyclodextran” increases the solubility dramatically

Delivery of Cannabis



GIZMODO REVIEWS



- * Different varieties makes for different effects due to variation of chemical make up of each plant.
- * Some produce high concentrations of THC and others produce high levels of CBD.
- * Terpene content also can vary.
- * Cannabis varieties can be chemically and genetically fingerprinted

OG Kush contains 24% THCA, 0.8% CDB, 1.6% myrcene, 0.9% alpha-pinene, 0.7% limonene, 0.8% beta-caryophyllene.

CANNABIS VARIETIES

SATIVA VARIETIES:

- * Haze
- * Trainwreck
- * Neville's Haze
- * Malawi Gold

INDICA VARIETIES:

- * Afgan
- * Bubba Kush
- * Grand Daddy Purple
- * Purple Urkle

HYBRIDS:

- * OG Kush
- * Blue Dream
- * Pincher Creek
- * Harlequin

CANNABIS VARIETIES

Cannabinoids relieve neuropathic pain by a variety of mechanisms:

- * analgesic
- * anti-inflammatory
- * neurotransmitter release
- * release of natural endorphins
- * reduces the wind-up phenomena

CANNABIS VS CRPS

A clinic trial from the University of California 2009 indicates that a mild dose vaporized cannabis (3.53% THC) was found successful in 61% and low dose vaporized cannabis (1.29% THC) was 57% successful.

This indicates that small doses of cannabis play a potentially significant role in pain reduction and quality of life in patients suffering with neuropathic pain.

CANNABIS VS CRPS

There are no FDA approved medications for CRPS

Pain, sleep, and mood improve with cannabis

Cannabis has been shown to virtually inhibit pain in every experimental study: supraspinal, spinal, peripheral.

CB1 and CB2 receptors are found on immune cells indicating that inhibition would benefit CRPS if you believe that CRPS has an immunological/inflammatory basis.

CANNABIS VS CRPS



Connecticut DEPARTMENT OF CONSUMER PROTECTION

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To Reach Us:

Within Hartford Area and Outside Connecticut
 860-713-6100
[Hours, Location & Directions](#)

Medical Marijuana Program



Qualifying Patients

Requirements and instructions for obtaining a Connecticut medical marijuana certificate.



Primary Caregivers

How to become a primary caregiver for a qualifying patient.



Minors

Information for parents on how to register their children for a Connecticut medical marijuana certificate.



Physicians

How to certify a qualifying patient for a Connecticut medical marijuana certificate.



Board of Physicians

Get information on how to add new debilitating conditions, public hearings and meetings.



Dispensary Facilities

Important information on the licensing and operational requirements for a dispensary facility.



Producers

Important information on the licensing and operational requirements for a production facility.



Forms

Access change of dispensary form, lost of stolen certificate form and other important forms.



FAQs

Find answers to some of the most frequently asked questions.

For more information please call (860) 713-6066 or e-mail us at dcp.mmp@ct.gov.

New information on the Medical Marijuana Program will be made available on this website as it becomes available. Please continue to visit our website at www.ct.gov/dco/mmp or subscribe to

- Medical Marijuana Program
- Online Application
- Qualifying Patients
- Primary Caregivers
- Physicians
- Laws & Regulations
- Board of Physicians
- Adding Debilitating Medical Conditions
- MMP Statistics
- Publications
- Forms
- Frequently Asked Questions



A patient may only register for a medical marijuana certificate if he or she is a Connecticut resident being treated for a debilitating medical condition by a Connecticut-licensed physician.

Debilitating Medical Conditions include:

- Cancer
- Glaucoma
- Positive Status for Human Immunodeficiency Virus or Acquired Immune Deficiency Syndrome
- Parkinson's Disease
- Multiple Sclerosis
- Damage to the Nervous Tissue of the Spinal Cord with Objective Neurological Indication of Intractable Spasticity
- Epilepsy
- Cachexia
- Wasting Syndrome
- Crohn's Disease
- Post-Traumatic Stress Disorder
- Sickle Cell Disease
- Post Laminectomy Syndrome with Chronic Radiculopathy
- Severe Psoriasis and Psoriatic Arthritis
- Amyotrophic Lateral Sclerosis
- Ulcerative Colitis
- Complex Regional Pain Syndrome



To Reach Us:

Within Hartford Area
and Outside Connecticut
860-713-6100

Toll-Free in Connecticut
800-842-2649

[Hours, Location &
Directions](#)

New Debilitating Medical Conditions - Effective October 1, 2016:

Patients 18 years of age or older:

- Cerebral Palsy
- Cystic Fibrosis
- Irreversible Spinal Cord Injury with Objective Neurological Indication of Intractable Spasticity
- Terminal Illness Requiring End-Of-Life Care
- Uncontrolled Intractable Seizure Disorder

Patients less than 18 years of age:

- Cerebral Palsy
- Cystic Fibrosis
- Irreversible Spinal Cord Injury with Objective Neurological Indication of Intractable Spasticity
- Severe Epilepsy
- Terminal Illness Requiring End-Of-Life Care
- Uncontrolled Intractable Seizure Disorder

Qualifications for a Registration Certificate:

- Qualifying patient must be a Connecticut resident.
- Qualifying patient must be at least eighteen (18) years of age or older.
- Qualifying patient cannot be an inmate confined in a correctional institution or facility under the supervision of the Connecticut Department of Corrections.