

The Health Benefits of Cannabidiol

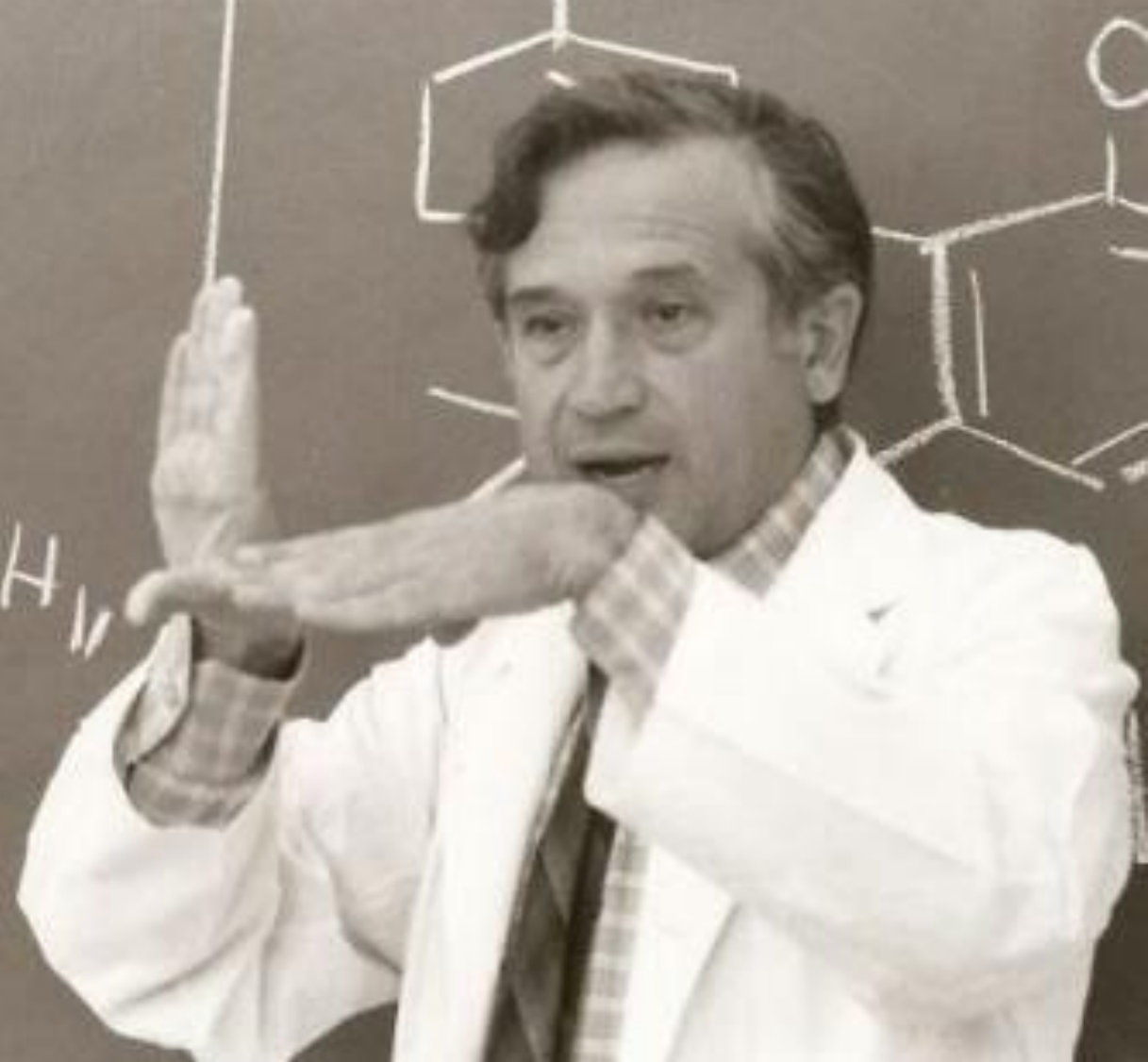
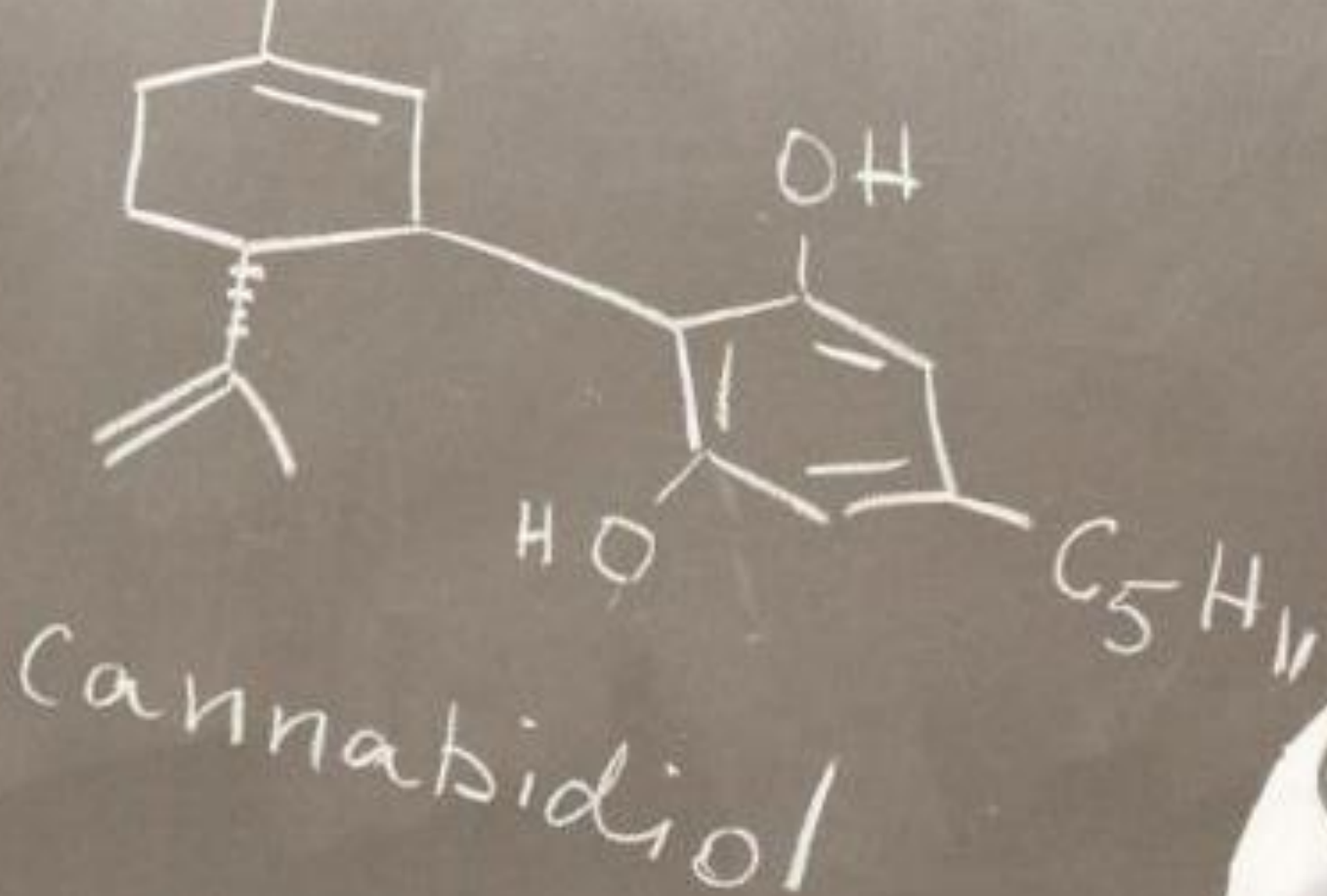
TERRENCE SHENFIELD MS, RRT-ACCS, RPFT, NPS, AE-C



Objectives

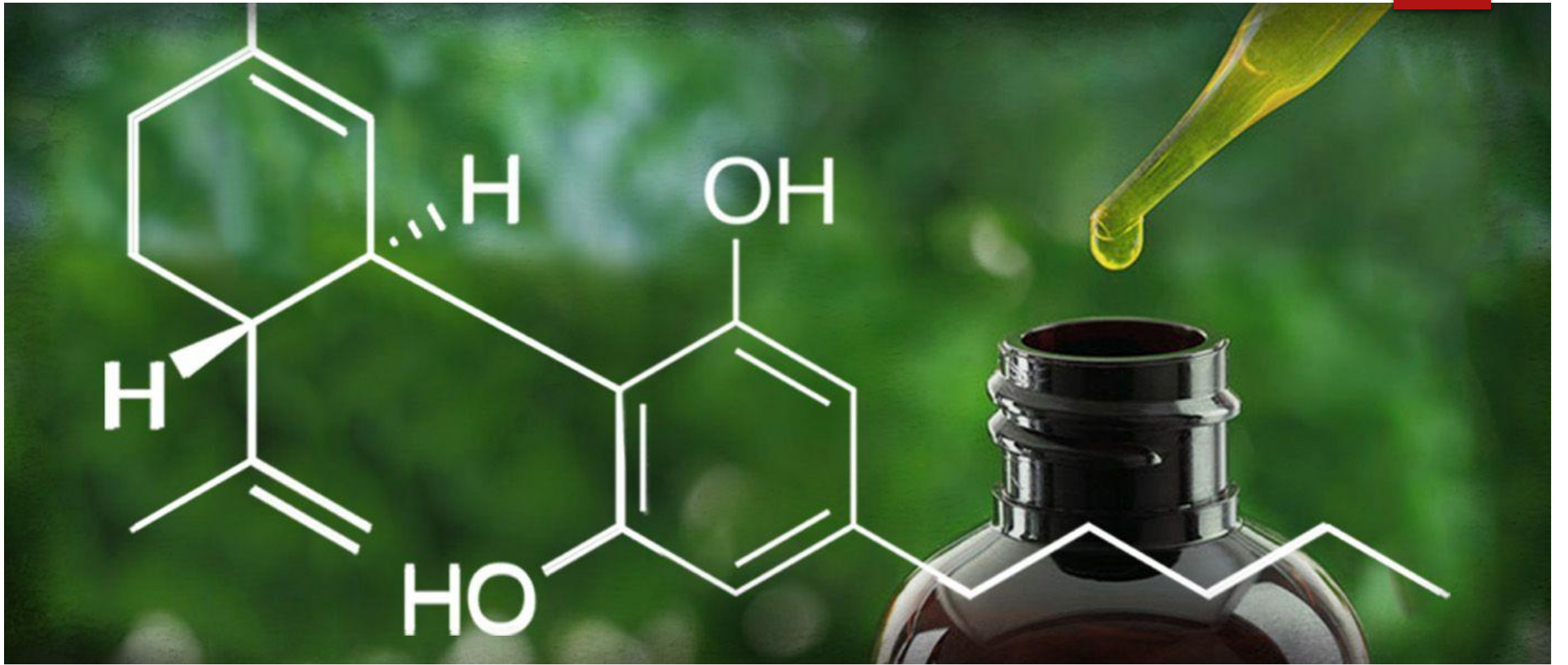
- ▶ Why does cannabis work for so many different conditions
- ▶ What is the endocannabinoid system and how does it impact your health?
- ▶ What are the different cannabinoids found in the cannabis plant
- ▶ What is CBD (cannabidiol)
- ▶ Case study for Charlotte Figi (Charlotte's Web)
- ▶ CBD and anxiety
- ▶ CBD and insomnia
- ▶ CBD and pain relief
- ▶ Dosing





Raphael Mechoulam







Blue Dream (1/S)	THC
	15.93%
	CBD
	0.00%

Purple Cindy 99 (S/D)	THC
	15.00%
	CBD
	0.00%

Purple	THC
	12.84%
	CBD
	0.00%

Island Sweet Skunk (S)	THC
	15.50%
	CBD
	0.00%

Lime	THC
	11.80%
	CBD
	0.00%

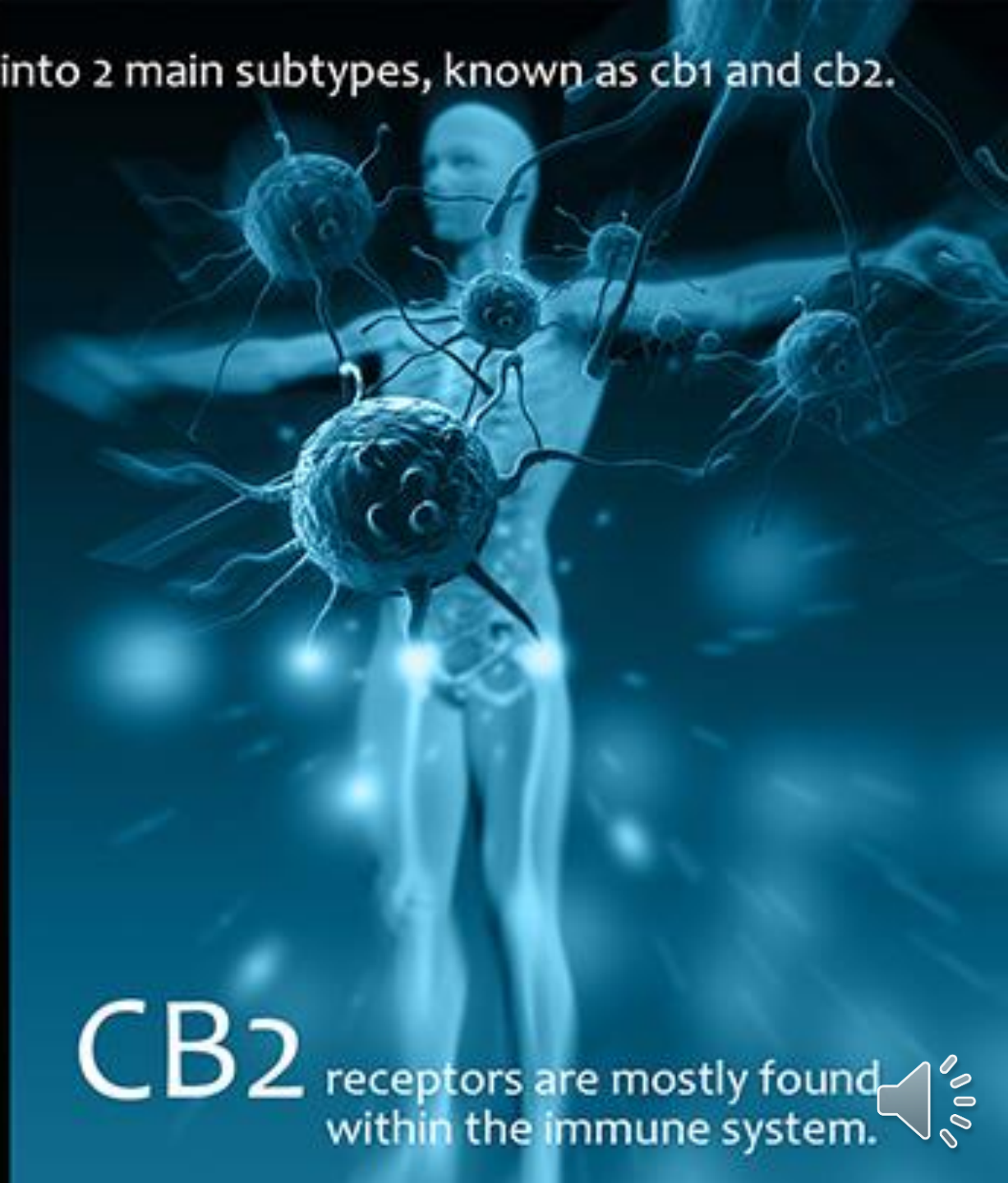
Mango Sou Jack (S/M)	THC
	12.50%
	CBD
	0.00%



The cannabinoid receptors are further divided into 2 main subtypes, known as cb1 and cb2.



CB1 is found mostly in the brain.



CB2 receptors are mostly found within the immune system.



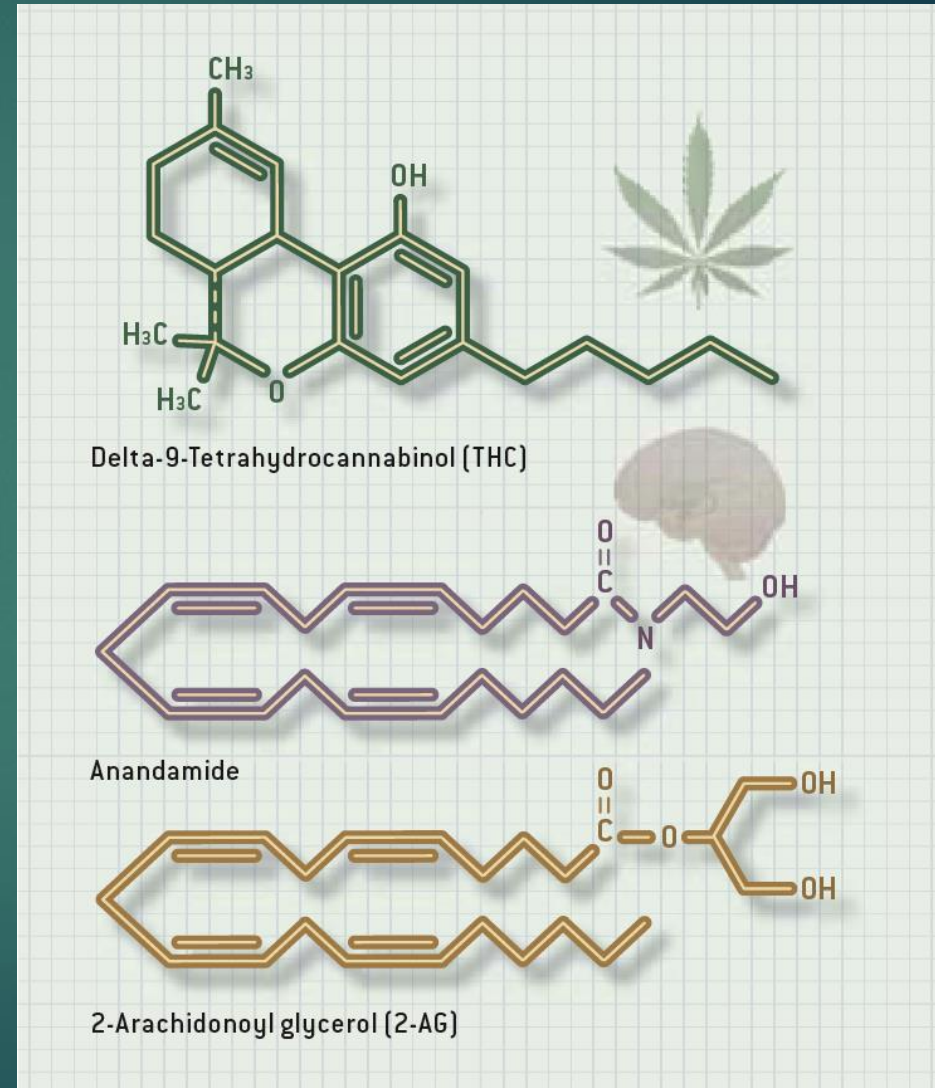
Endocannabinoids: Bind CB1 > CB2 structure, related to prostaglandins

- ▶ **Anandamide**

(arachidonyl-ethanolamid)

- ▶ **2-Arachidonoyl - glycerol (2-AG)**

more abundant, less potent



Endocannabinoid System

CB1

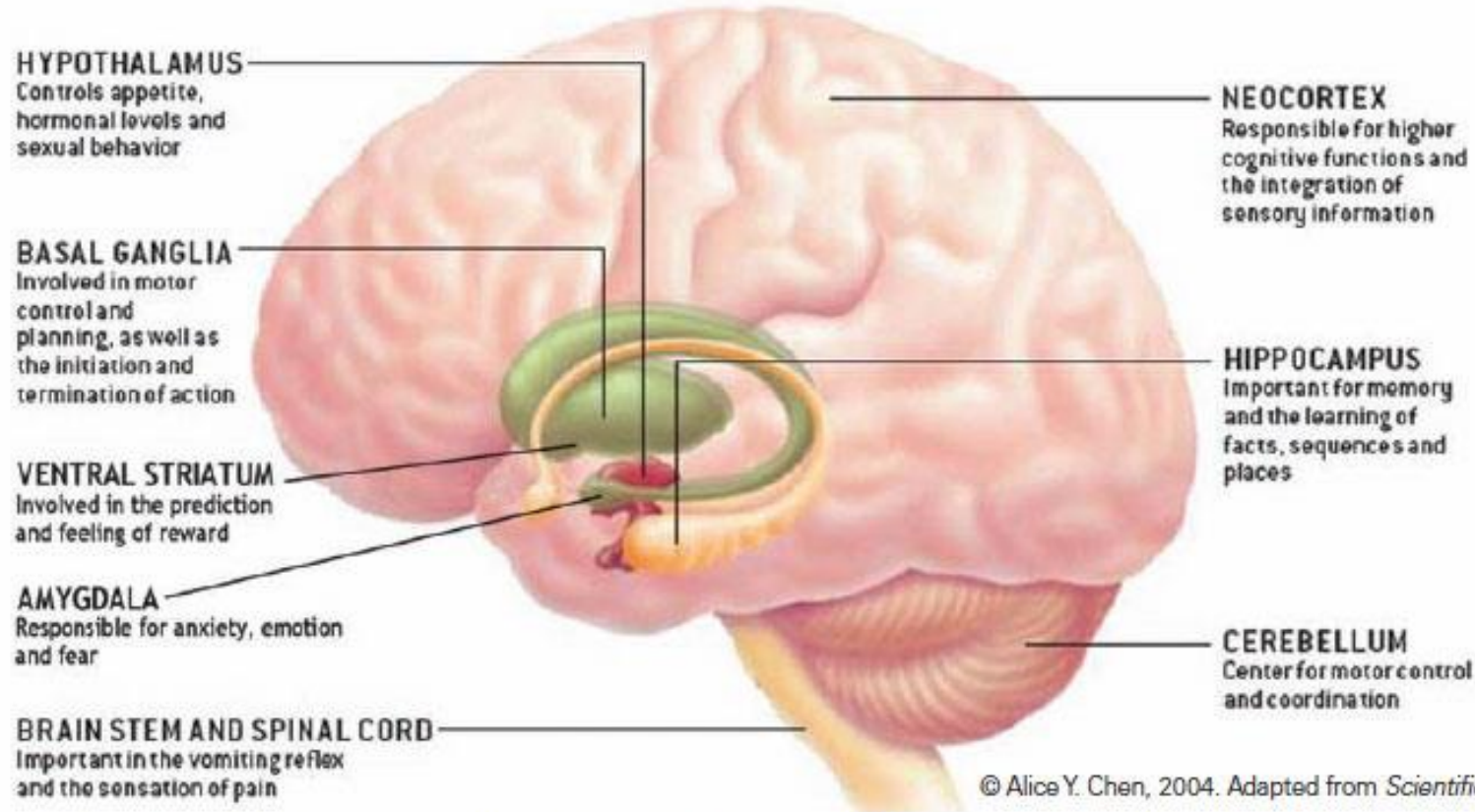
- One of the most abundant found in the peripheral and central nervous system
- Distributed throughout the brain:
 - Pleasure
 - Memory
 - Thought
 - Concentration
 - Sensory and time perceptions
 - Coordinated movement
- Sparsely found in the cardiopulmonary centers in the brainstem

CB2

- Primarily located on immune cells and tissues
- When activated, affect inflammatory and immunosuppressive activity
- Control release of cytokines and cell migration



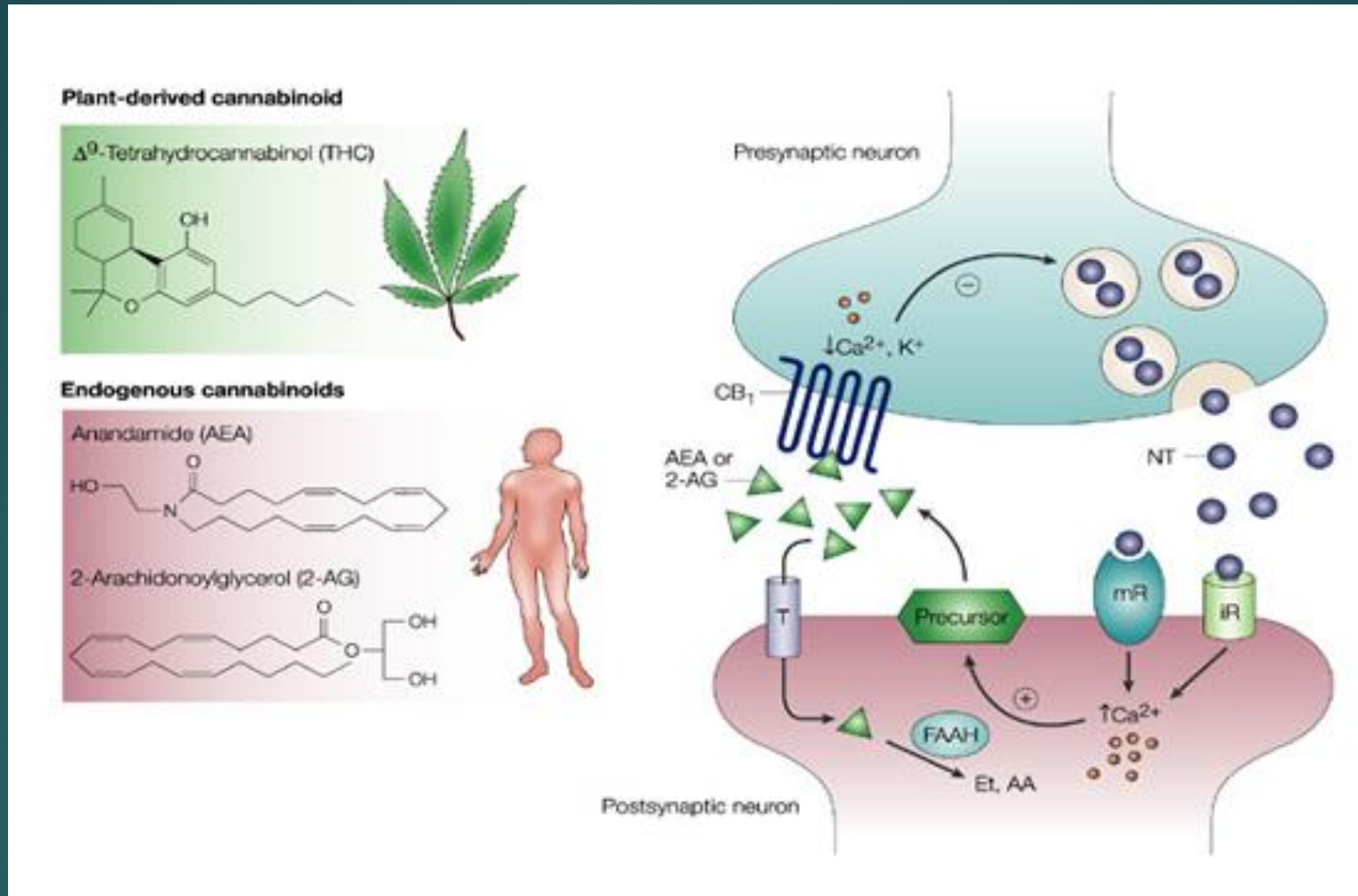
Marijuana's Effects on the Brain



When marijuana is smoked, its active ingredient, THC, travels throughout the body, including the brain, to produce its many effects. THC attaches to sites called cannabinoid receptors on nerve cells in the brain, affecting the way those cells work. Cannabinoid receptors are abundant in parts of the brain that regulate movement, coordination, learning and memory, higher cognitive functions such as judgment, and pleasure.



Endocannabinoid System



?

CB1 and CB2: presynaptic receptors
Depending on site, inhibit neurotransmitter release
(GABA, glutamate, 5HT, DA, ACh)



Sites of Action

affects nearly every major organ system

CB1:

Brain

Kidneys

Liver

Heart

GI Tract

Pancreas

Adipose

Muscle

Reproductive organs

Other?

CB2:

Immune cells (T cells, B cells,
monocytes)

Spleen

Tonsils

Brain

Heart

Liver

Lungs

Other?

As-of yet unidentified receptors?
Activity on non-cannabinoid receptors?



What's the
difference?

Cannabinoids

Psychoactive

- Cannabinol (CBN)
- Cannabinodiol (CBDL)
- delta – 9 – tetrahydrocannabinol (THC)

Not Psychoactive

- Cannabigerols (CBG)
- Cannabichromenes (CBC)
- Cannabidiols (CBD)



Charlotte Figi



Charlotte

- Charlotte is a little girl with Dravet syndrome
- Frequent bouts of febrile and afebrile status epilepticus
- Failed multiple medications:
 - ▶ Levetiracetam, oxcarbazepine, topiramate, zonisamide, valproate, clobazam, clonazepam, and diazepam
- At 5 years of age, had significant cognitive and motor delays, required a feeding tube, and needed full assistance with activities of daily living
- **50** generalized tonic-clonic seizures per day



History

- ▶ Matt and Paige Figi
- ▶ Charlotte and Max born in 2004
- ▶ Normal full term
- ▶ First seizures at three months
- ▶ Increased in frequencies
- ▶ MRI, EEG, Spinal Tap
- ▶ Frequent seizures
 - ▶ Diagnosed with Dravet Syndrome
 - ▶ 45-50 per day



Dravet Syndrome

- ▶ Severe form of intractable epilepsy
- ▶ First seizures with Dravet Syndrome usually start before the age of 1
- ▶ In the second year the seizures take hold:
 - ▶ Characterized by cognitive impairment, behavioral disorders, and motor deficits
 - ▶ Involuntary muscle spasms and status epilepticus
 - ▶ Last more than 30 minutes or come in clusters, one after the other



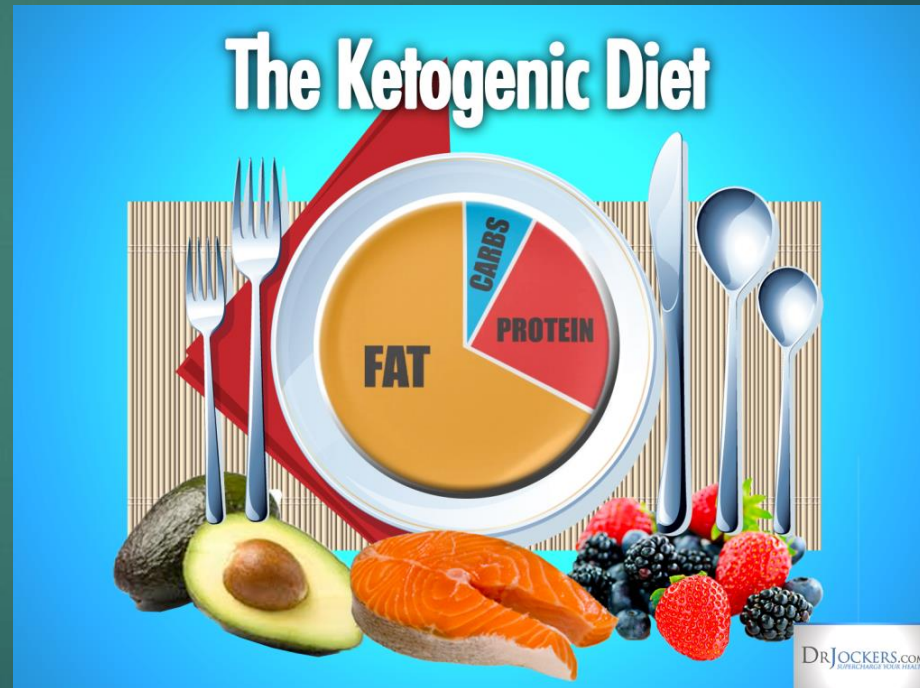
Seizures activity and drug treatments

- ▶ Hundreds of seizures each day
- ▶ Drugs therapies that failed
 - ▶ Barbiturates and benzodiazepines
 - ▶ Valproate and clobazam
 - ▶ Stiripentol and topiramate



Ketogenic diet

- ▶ Ketogenic diet frequently used to treat epilepsy that's high in fat and low in carbohydrates.
- ▶ Diet forces the body to make extra ketones, natural chemicals that suppress seizures
- ▶ Mainly recommended for epileptic patients who don't respond to treatment
- ▶ The diet helped control Charlotte's seizures but had a lot of side effects
 - ▶ Suffered from bone loss
 - ▶ Immune system plummeted
 - ▶ New behavioral problems started popping up



Denver dispensary

- ▶ Denver dispensary that had a small amount of a type of marijuana called R4, said to be low in THC and high in CBD.
- ▶ She paid about \$800 for 2 ounces and had a friend extract the oil.
- ▶ She had the oil tested at a lab and started Charlotte out on a small dose.
- ▶ *"We were pioneering the whole thing; we were guinea pigging Charlotte," Paige said. "This is a federally illegal substance. I was terrified to be honest with you."*



Treatment options

- ▶ Stanley brother's from Colorado
- ▶ Growing hybrids with low THC and HIGH CBD
- ▶ Cannabis oil twice a day with food
- ▶ 4 mg/lb dosing



Charlotte's Web

- ▶ A high concentration CBD/THC strain of cannabis produced by a medical marijuana group in Colorado
- ▶ Charlotte's Web, supplied by Realm of Caring, is based out of Colorado and parents and families are moving there to attempt treatment



Parents began giving Charlotte low doses of plant extract and slowly increased the dose over time

Month 3: >90% reduction in generalized tonic-clonic seizures and weaned from other AEDs

Month 20: 2-3 nocturnal generalized tonic-clonic seizures per month, feeds and drinks by mouth by herself and autistic behaviors have improvement, walking and talking



Happy child!



Epidiolex (cannabidiol) oral solution

- ▶ The U.S. Food and Drug Administration today approved Epidiolex (cannabidiol) [CBD] oral solution for the treatment of seizures associated with two rare and severe forms of epilepsy, Lennox- Gastaut syndrome and Dravet syndrome, in patients two years of age and older.



Cannabidiol (CBD)

Isolated in 1963

Most abundant cannabinoid, contributing up to 40% of cannabis resin.

Does not appear to bind to either CB1 or CB2

Cannabidiol acts as a non-competitive antagonist at CB1 receptors and an inverse agonist at CB2 receptors

Inhibits cyclooxygenase and lipoxygenase – anti-inflammatory and analgesic effects

May be an inverse agonist because several studies have shown that it decreases the psychotropic activity of THC

Cannabidiol inhibits the reuptake and enzymatic degradation of the endogenous cannabinoid anandamide and 2AG

Anti-anxiety effect



Benefits of CBD- What Clinical Studies reveal!

Reducing anxiety

Improved sleep

Mood enhancer

Pain modulation



Anxiety and the use of CBD

- ▶ Group of mental illnesses that cause abnormal feelings of fear and dread
 - ▶ Post traumatic stress disorder
- ▶ Impacts about 40 million Americans
- ▶ Treatment
 - ▶ Coping skills, mindfulness, and medications
- ▶ THC can cause anxiety



Anxiety and the use of CBD

- ▶ CBD exerts anxiolytic effects in human studies
- ▶ 400 mg CBD reduces anxiety and demonstrated reduction in limbic/paralimbic activity related to stress disorders
- ▶ Anandamide reuptake inhibition
- ▶ 32 mg of inhaled CBD in the treatment trauma related conditions





CBD and
improved
sleep
patterns



CBD and sleep

- ▶ Lack of sleep can lead to many different disorders such as:
 - ▶ Diabetes, weight gain, and cognitive impairment
- ▶ Pain is a very common reason for sleep disturbances
- ▶ CBD at 160 mg/day significantly increased the quality of sleep
- ▶ CBD has been shown to reduce insomnia in people who suffer from chronic pain



CBD

== & ==

Mood Disorders

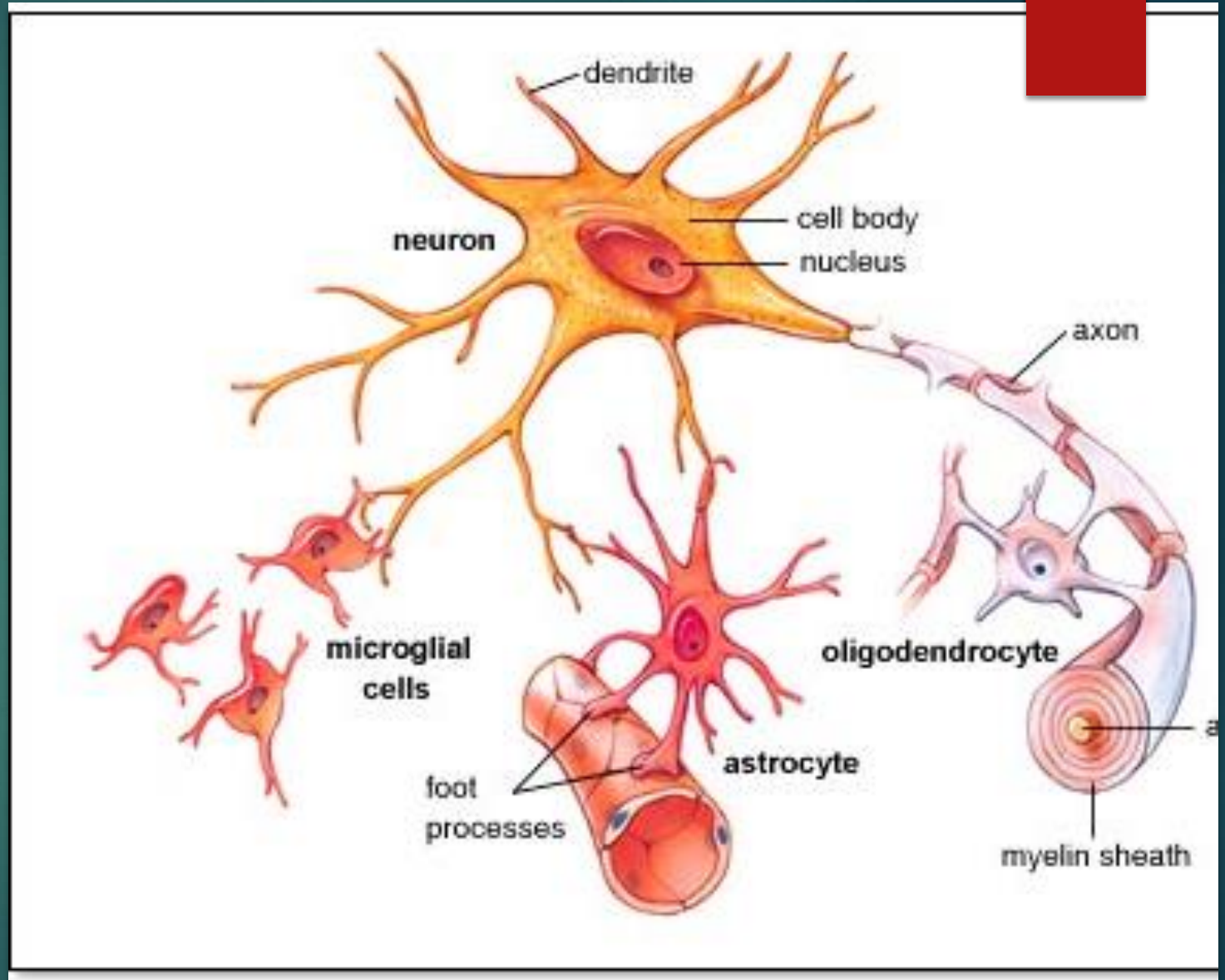
Mood disorders

- ▶ Depression and Bipolar disorders are the most common mood disorders
- ▶ THC has adverse effect of cognitive function and mood disorders
- ▶ High CBD strains demonstrates neuro-protective function
 - ▶ Antioxidant effects



CBD and mood disorders

- ▶ CBD agonistic activity on the α -HT receptor enhanced 5-HT/glutamate neuro transmission resulting in anti depressant activity
- ▶ CBD improves microglial stability similar to patients who take Lithium





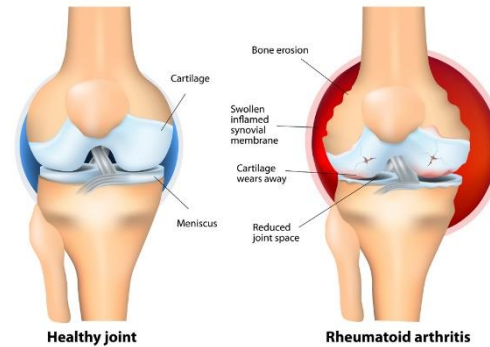
CBD and pain management



CBD and pain relief

- ▶ Current treatment for pain is non-steroidal anti-inflammatories and opioids
- ▶ Severe side effects
- ▶ THC:CBD 1 to 1 ratio is being marketed around the world as Sativex
- ▶ CBD and acute pain has limited data
- ▶ CBD and chronic pain much more supporting data

RHEUMATOID ARTHRITIS



CBD and pain

- ▶ CBD and arthritis
 - ▶ Gel applied at 62.3 mg per day demonstrated reduced pain and inflammation
- ▶ CBD and cancer
 - ▶ CBD oil with opioids shown better control of pain with less opioid use
- ▶ CBD oil and neuropathic and chronic inflammatory pain
 - ▶ Great anti-inflammatory



Dosing of CBD

CBD-rich cannabis oil products can be taken sublingually, orally (as edibles, lozenges, beverages, tinctures, and gel caps), or applied topically.

Concentrated cannabis oil extracts can also be heated and inhaled with a vape pen.

Inhalation is good for treating acute symptoms that require immediate attention

Orally administered CBD-rich cannabis oil can last for four hours or more, but the onset of effects is much slower (30-90 minutes) than inhalation.



Dosing continued

- ▶ CBD is most commonly taken orally as drops/tincture format under the tongue
- ▶ Start small!
- ▶ General Health: 2.5-15mg CBD by mouth daily
- ▶ To treat chronic pain: 2.5-20 mg CBD by mouth daily
- ▶ To treat sleep disorders: 40-160 mg CBD by mouth daily



References

- ▶ Batalla, A., Janssen, H., Gangadin, S. S., & Bossong, M. G. (2019). The potential of cannabidiol as a treatment for psychosis and addiction: who benefits most? A systematic review. *Journal of clinical medicine, 8(7)*, 1058.
- ▶ Hande, K. (2019). Cannabidiol: The need for more information about its potential benefits and side effects. *Clinical journal of oncology nursing, 23(2)*.
- ▶ Liu, T. (2019). What is CBD Oil? Learn the Facts: Uses, Benefits and Side Effects.
- ▶ Newton, M., & Newton, D. W. (2020). Cannabidiol or CBD Oil: Help, Hope, and Hype for Psychiatric and Neurologic Conditions. *Journal of the American Psychiatric Nurses Association, 26(5)*, 447-457.

