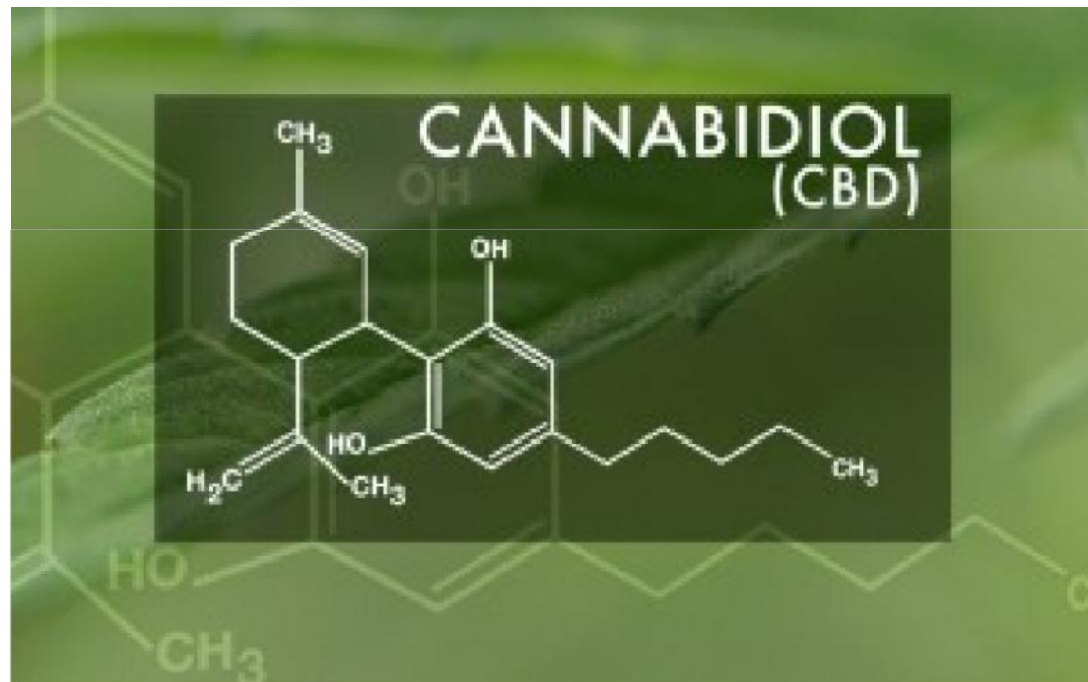
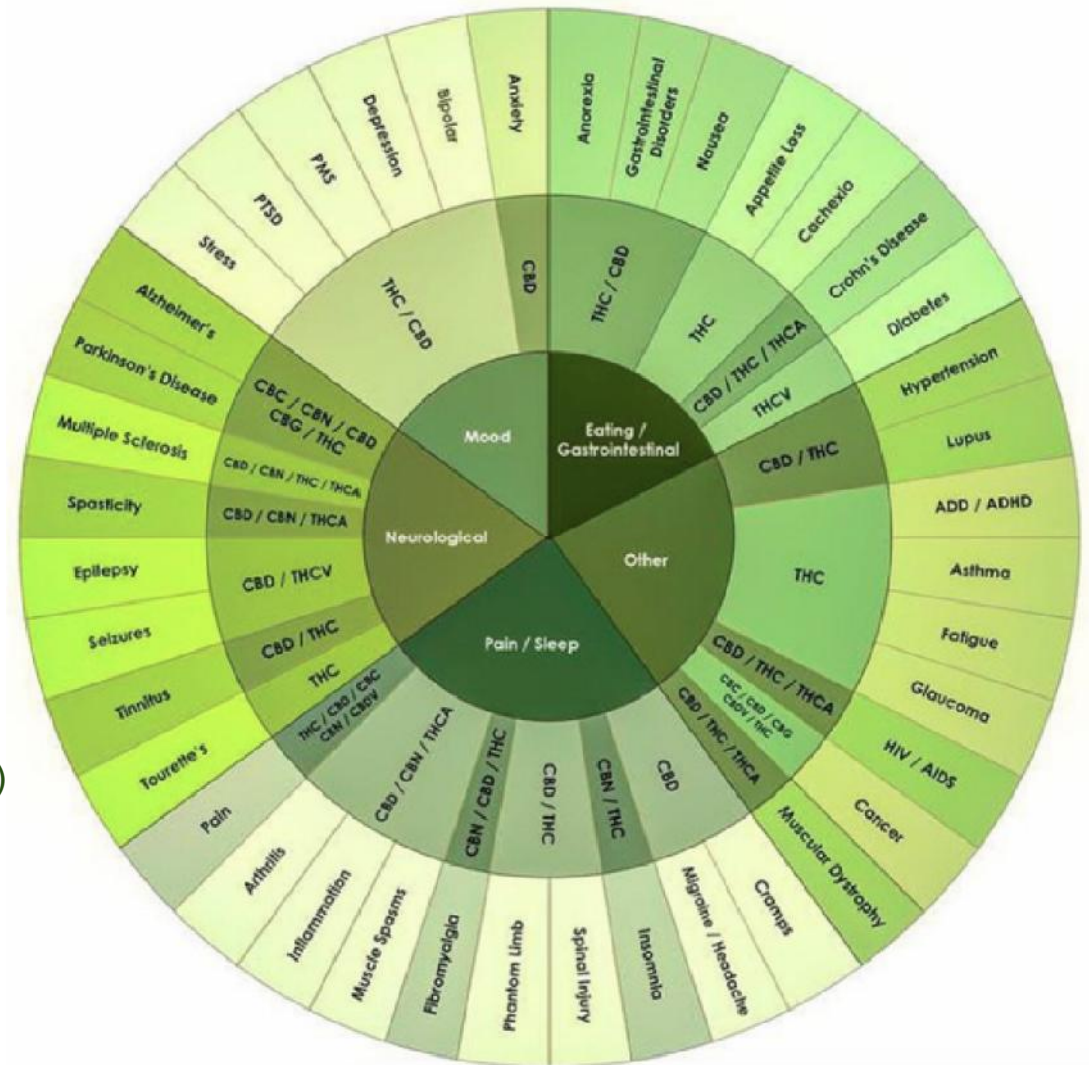


# Beyond CBD



# Outline

- Cannabis Background
- Endocannabinoid system
- Cannabinoids (THC & CBD)
- Beyond CBD (CBG, CBN, CBC, THCA)
- CBD in the News



# Cannabis (Hemp vs. Marijuana)

*Cannabis sativa* is a plant of the *Cannabis* genus. This plant has been cultivated throughout recorded history as a source of industrial fiber, seed oil, food, leisure, religious and spiritual mood, and medicine. Each part of the plant is harvested differently, depending on the purpose.

Hemp- Industrial hemp is a legal definition of the *Cannabis sativa* plant. Legally, *hemp* is *Cannabis sativa* with *less than* 0.3% THC, on a dry weight basis.

Marijuana **\*\***- derived from the Mexican Spanish, thought to be originated from Chinese *ma ren hua* "hemp seed flower". William Randolph Hearst used this term in the 1920s and 30s to demonize Cannabis in effort to enact federal prohibition. This term is based in racism, fear, and lies, and has been the main label for *Cannabis sativa*'s worldwide prohibition.

**\*\***I use Medical Cannabis, as a replacement for this word.

# History of Endocannabinoid Research

2000 - 650 BCE- Cannabis (azaluu) mentioned in Assyrian pharmacopoeia at the library of Ashurbanipal

1964 - Dr. Raphael Mechoulam, organic chemist & professor of Medical Chemistry at Hebrew University of Jerusalem, identified and isolated the structure of THC, the psychoactive component of the Cannabis plant

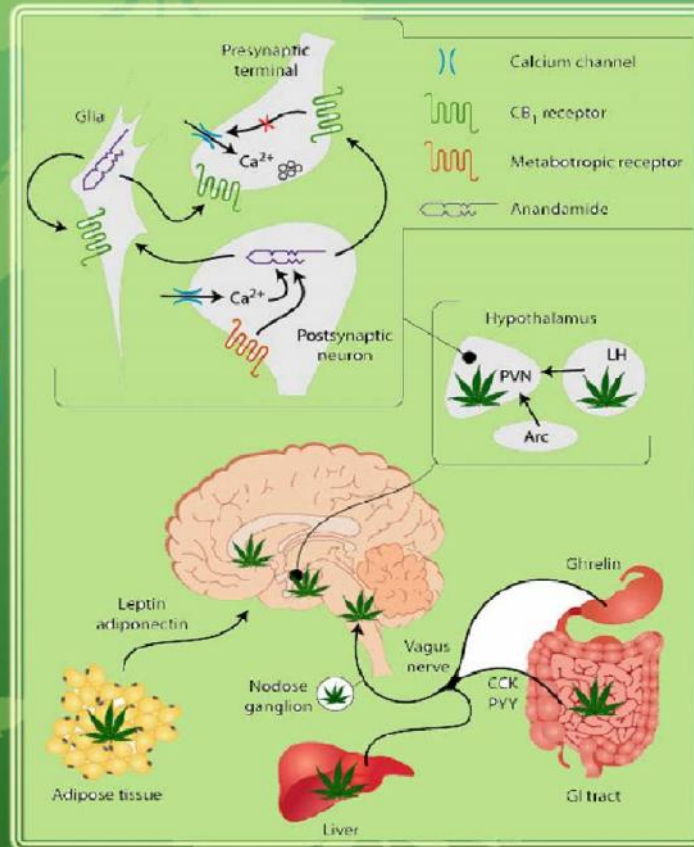
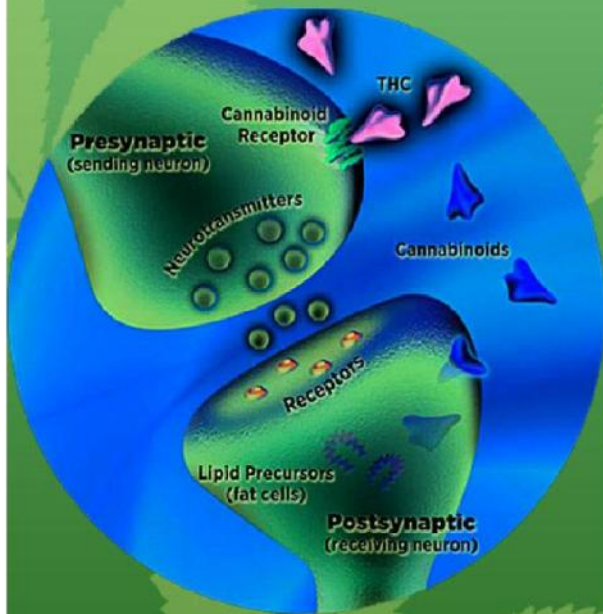
1988 - Cannabinoid-binding sites in rats brains identified

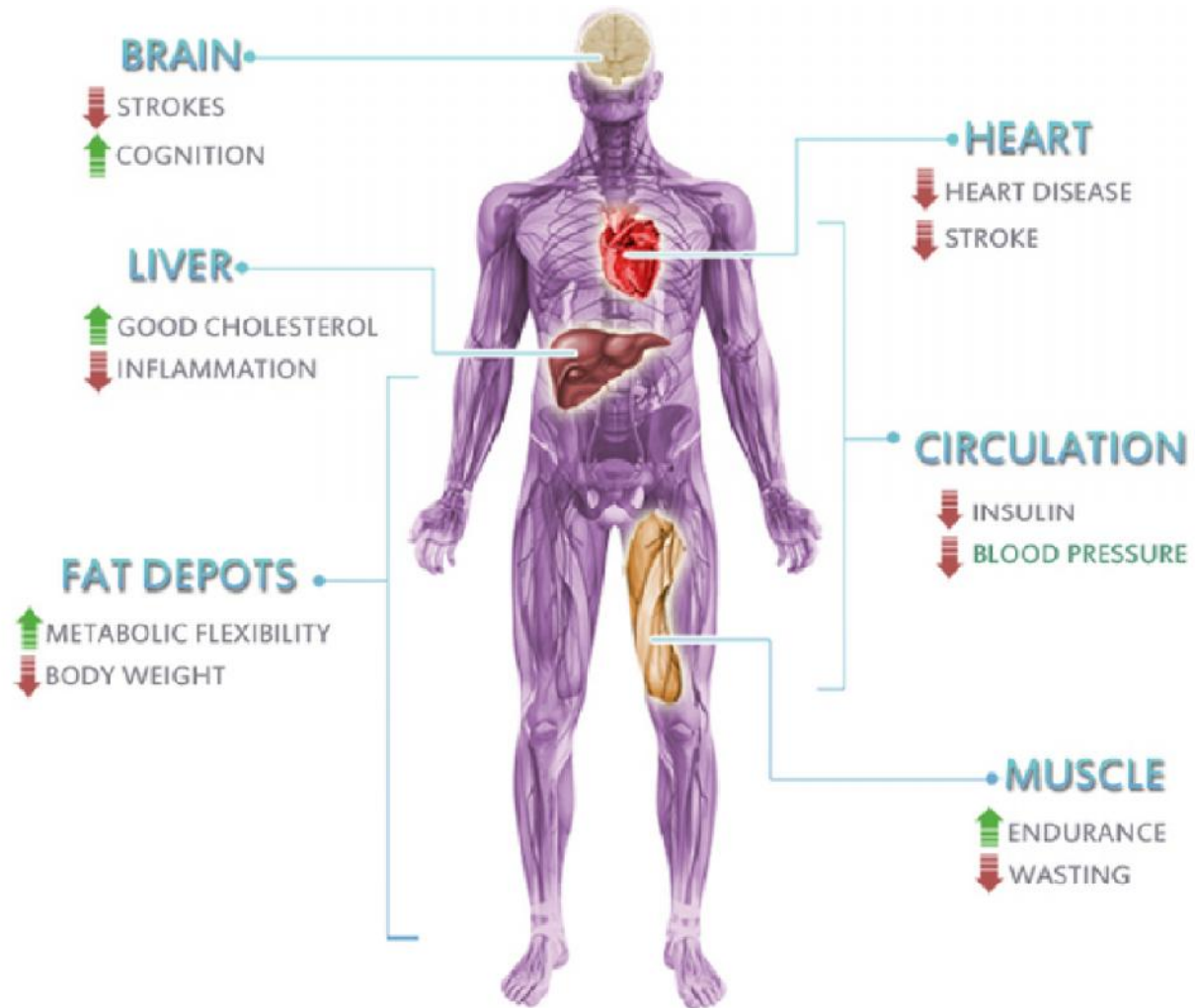
1991 - Human CB1 receptor successfully cloned (brain and peripheral nervous system)

1993 - Human CB2 receptor successfully cloned (immune system)

1995 - Identification of the Endocannabinoid system as a primary psychological system of the human body (same level as Central Nervous system, Immune system, Circulatory system, etc)

# ENDOCANNABINOID SYSTEM

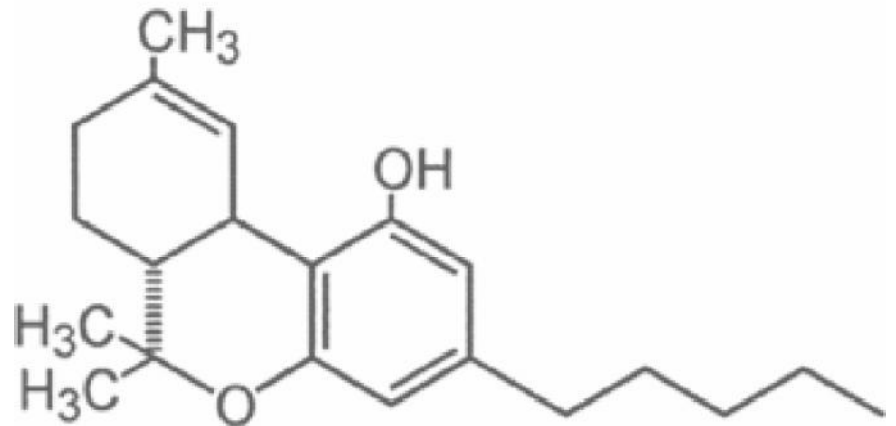






# Tetrahydrocannabinol (THC)

- Most prevalent of the cannabinoids
- Psychoactive properties
- Anti-spasmodic
- Anti-inflammatory
- Analgesic (pain reduction at CNS level)
- Anti-oxidant (up to 20x anti-inflammatory properties of aspirin & 2x hydrocortisone)





# Cannabidiol (CBD)

- Second most prevalent cannabinoid found in medical cannabis

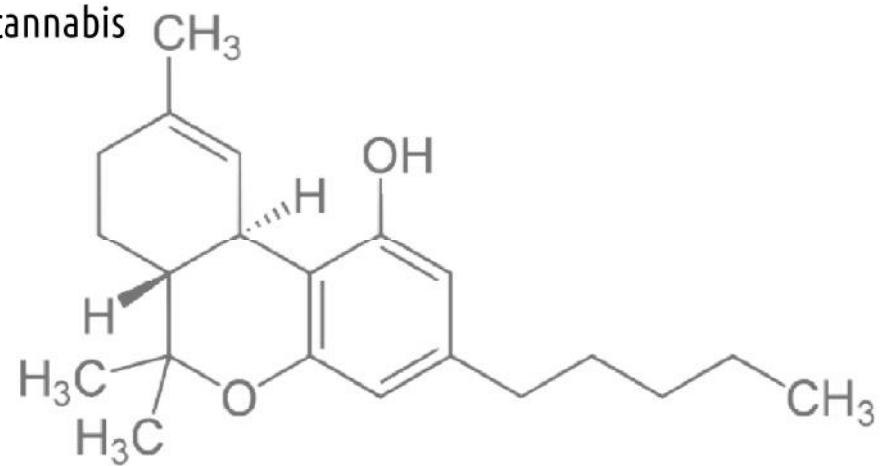
- Higher percentages of cannabinoids in hemp

- Manage conditions such as:

diabetes, rheumatoid arthritis, cancer, epilepsy, antibiotic-resistant infections, alcoholism, PTSD and neurological disorders

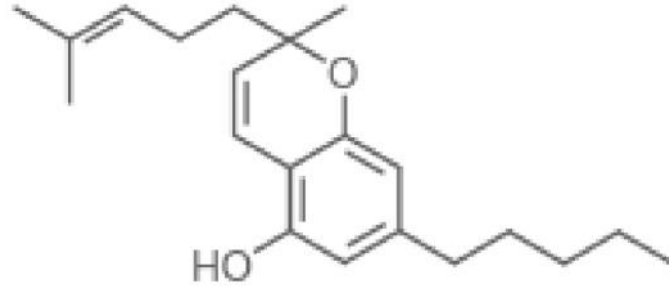
- Analgesic

- Potent anti-oxidant that is stronger than vitamins C and E



# Cannabichromene (CBC)

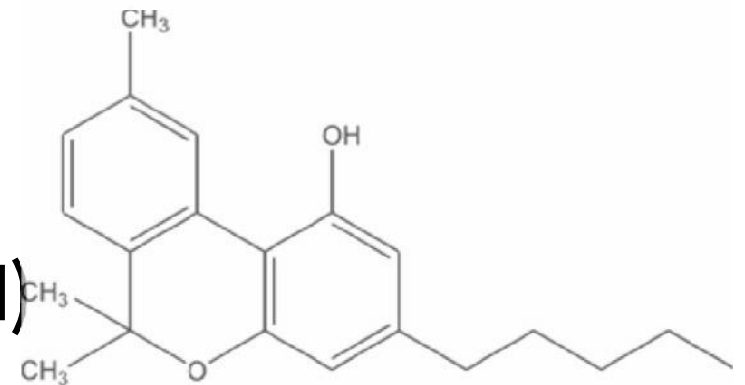
- Anti-microbial
- Anti-proliferative (inhibits cell growth)
- Bone Stimulant
- Anti-inflammatory
- Analgesic (pain reduction at CNS level)



Usually found in aging cannabis and increases the effect of THC

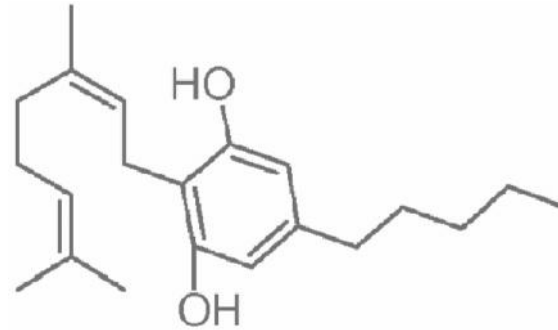
- Anti-convulsant and Anti-inflammatory
- 3x greater affinity for the CB2 receptor
- Increases testosterone production & plasma concentration of follicle-stimulating hormone.

# Cannabinol (CBN)



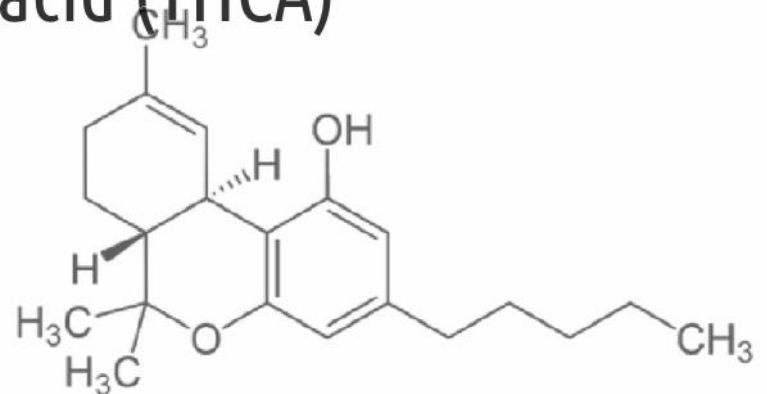
## Cannabigerol (CBG)

- Antibacterial
- Anti-Proliferative (inhibits cell growth)
- Bone Stimulant



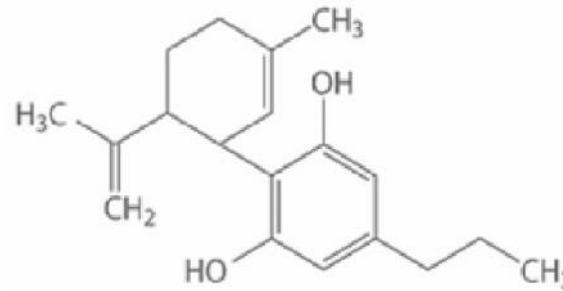
## Tetrahydrocannabinolic acid (THCA)

- Anti-spasmodic
- Anti-Proliferative (inhibits cell growth)
- Used in clinical trials to effectively treat migraine headaches



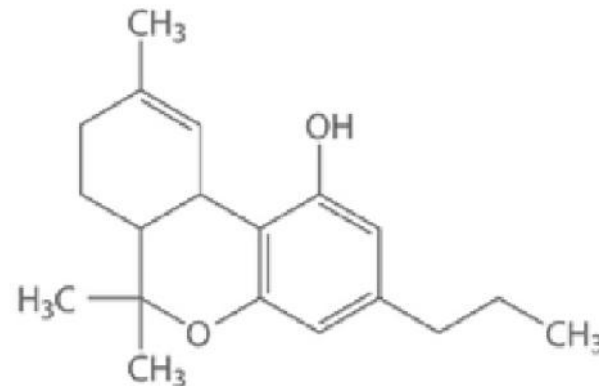
## Cannabidivarin (CBDV)

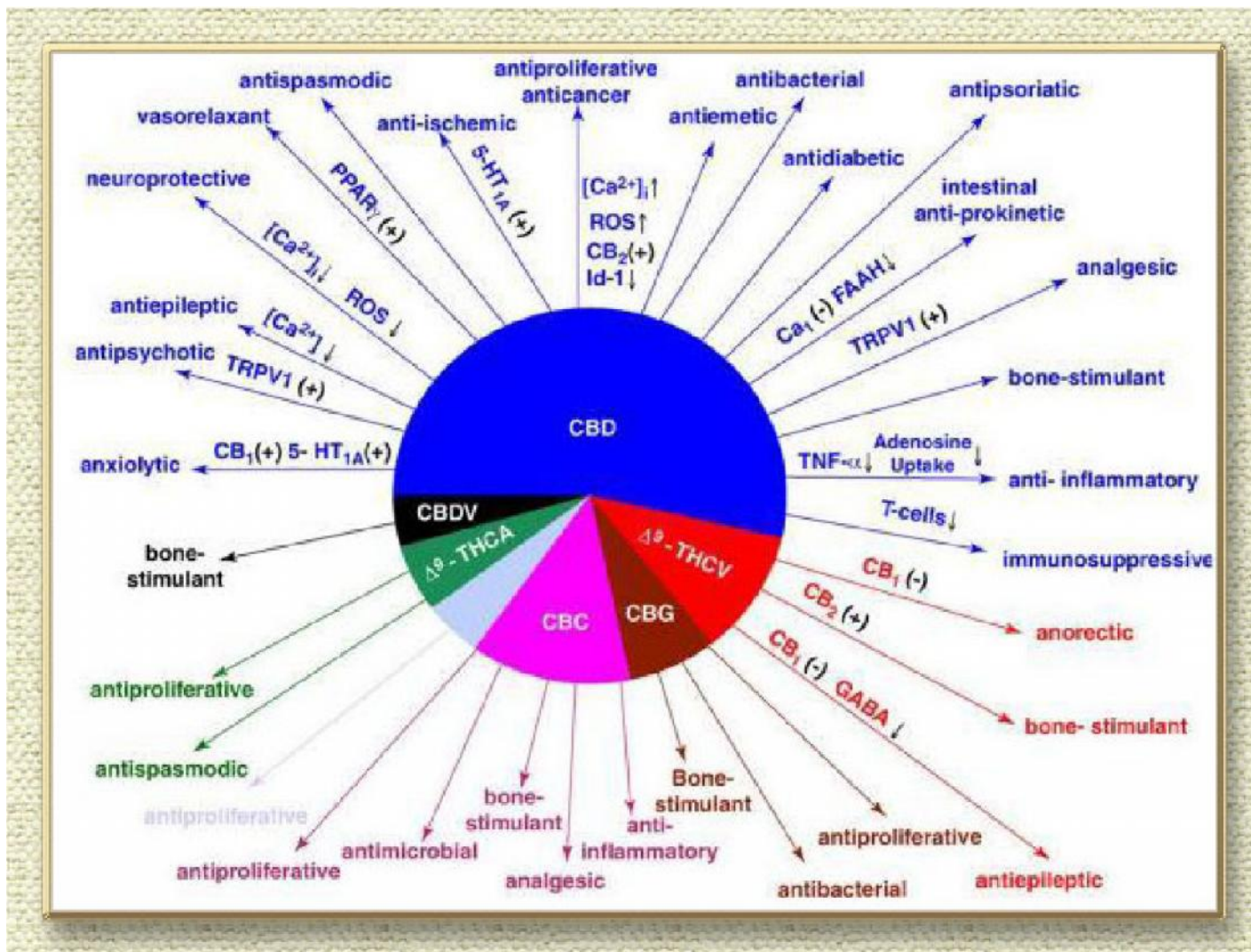
- Anti-epileptic (reduces seizures)
- Bone Stimulant
- Non-psychoactive



## Tetrahydrocannabivarin (THCV)

- Anti-epileptic (reduces seizures)
- Anorectic (reduces appetite)
- Bone Stimulant





Sunday, April 17, 2016



Business Technology Investing Economy Special Reports

# Why GW Pharma Could More Than Double From Cannabinoid Drugs

By Jon C. Ogg March 21, 2016 9:50 am EDT

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It is not normal to see the larger bulge bracket brokerage firms issue analyst price targets on stocks that imply upside of 100% or more. So, what are investors supposed to make of a Bank of America Merrill Lynch call that shows GW Pharmaceuticals PLC (NASDAQ: GWPH) being worth over 100% more than the current value?

GW Pharma was reiterated as Buy by Merrill Lynch's Tazeen Ahmad. The firm's prior \$150.00 price objective was already north of 100% upside, given the \$72.72 close from Friday. But now the price objective was raised to \$172.00, at the top of all analyst call targets, for implied upside of some 136% if Merrill Lynch's price objective comes to fruition.

Ahmad believes that the positive Dravet's trial validates GW Pharma's cannabis-based platform. Epidiolex achieved its primary endpoint of median reduction in seizure frequency in patients with Dravet Syndrome, and the higher rating is based on a higher chance of approval for Epidiolex in Dravet Syndrome.

While \$172 is at the highest rung of analyst price targets, the Merrill Lynch report suggests that upside to its price objective may be drawn from positive data in another form of epilepsy, which may be seen in the second quarter of 2016. Merrill Lynch's report said:

*The study demonstrated a significant reduction in median seizure frequency (39% vs placebo (13%, p=0.01). This trial was the first to study Epidiolex vs. PBO and we believe these results validate GW's cannabisbased platform. ... We increase our likelihood of approval in Dravet Syndrome to 60% (from 40%) and raise our price objective to \$172.*

Weather Alert  
Winter Storm Warning

## Edith Cook: Hemp oil is taking off

By Edith Cook Apr 8, 2016 Comments

I recently visited a Colorado company that has been on my radar for some time.

CBDRx manufactures capsules of cannabidiol, or CBD, in health-enhancing combinations of coconut oil and cannabinoids extracted from hemp. CBD has shown remarkable results in children with epilepsy – so much so that the Colorado law authorizing its use was named after a girl who died just weeks prior to the state's CBD legalization. Likewise, Utah's Charlie's Law was named after a girl who died just weeks prior to the state's CBD legalization. Wyoming's Leg Without, however, legalizing hemp agriculture as did its two neighbors.

I visited CBDRx's research and development quarters on its five-acre farm in Longmont, Colorado. There, genetics research, cloning, and cultivation are carried out. Its corporate headquarters are in Boulder, Colorado.

Managing director Tim Gordon showed me around a residential home and outbuildings hastily converted to fit company needs. Its farm and cloning facility in Pueblo produces large-scale outdoor hemp cultivation and cloning. There, the soil, supplemented with mountain springs, makes hemp plants thrive "in the most nutrient-rich environment possible." It enabled the company to gain momentum. "The industry is moving fast," Mr. Gordon said. "Our company developed in 18 months of growth spurts – and growing pains."

Regrettably, educating the public lags behind, he said. For example, many physicians are unaware that no prescription is necessary for CBD.

CEO Marc Brannigan has been in the cannabis industry for many years.

"I have seen (its) benefits and how it increases the quality of life," he said via email. "When I learned of the advantages of growing hemp, I wanted to go."

"Hemp CBD allows people to benefit from cannabis without the concern of getting high. We have noticed a broader range of product uses for CBD vs. marijuana and THC."

"CBDRx was created to bring CBD hemp to the nation and possibly the world. The need for CBD continues to grow."

In November 2014, Mr. Brannigan started out in Pueblo with one single cultivar. By the time planting season arrived in May 2015, he had expanded to 10 cultivars.

That year, The National Hemp Association says, CBDRx produced 50,000 pounds of hemp. Colorado's agriculture department reports that, statewide, 100 companies planted 3,546 acres.



**QUESTIONS?**