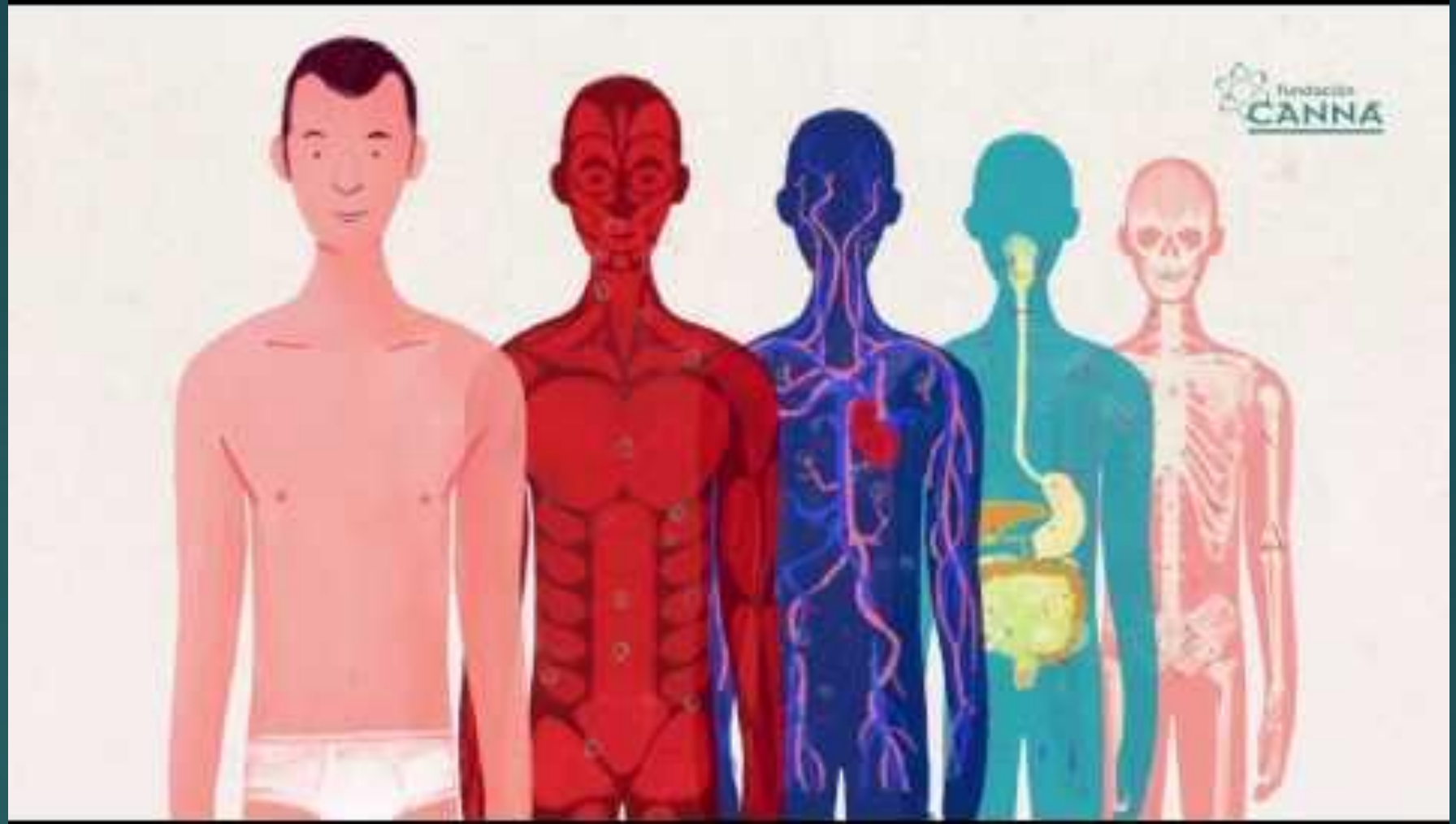
THC & CBD

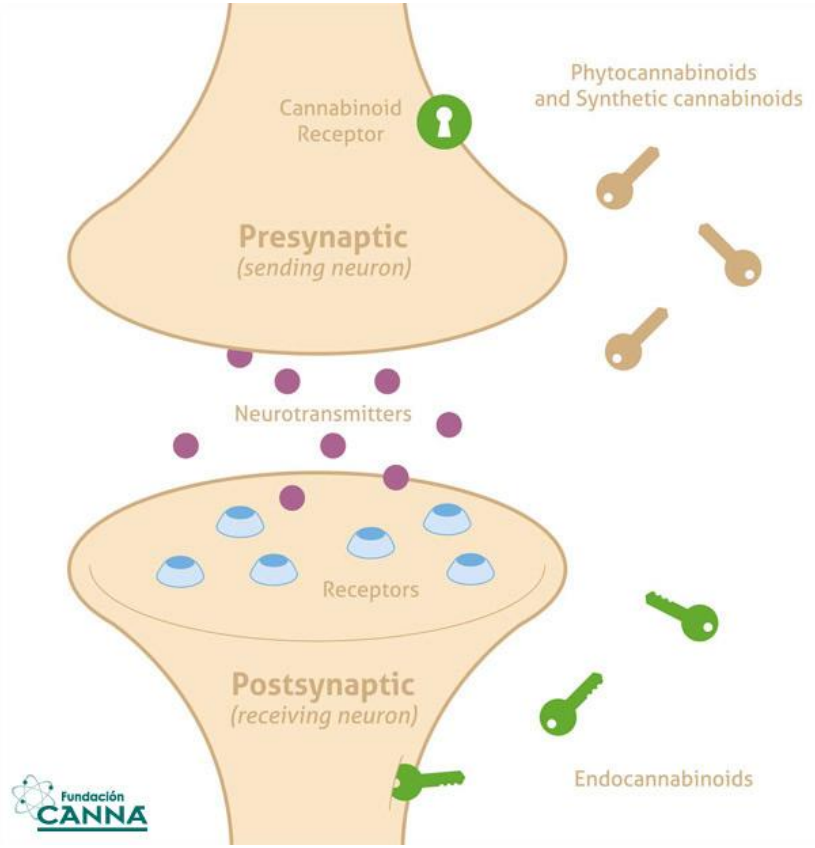
WHAT ARE THEY AND WHAT DO THEY DO?



Video link: https://www.youtube.com/watch?v=Vtc11kRinf4

Endocannabinoid System (ECS)

- System of communication between cells
- [1]Many functions of maintaining homeostasis (internal balance)
- [2]Regulation of
  - Pain
  - Mood
  - Neural protection
  - Digestion
  - Immune response
  - Inflammation
  - Sleep
- What happens if this system does not function properly?
- [3]Did you know? Paracetamol (acetaminophen) was found to involve ECS activity



1. https://www.fundacion-canna.es/en/failure-endocannabinoid-system-theory-or-reality
2. Backes, M. (2017). Cannabis Pharmacy. (J. D. McCue, Ed.) New York: Black Dog & Leventhal Publishers.
3. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2241751/

Photo: https://www.fundacion-canna.es/en/endocannabinoid-system

CB1 Receptors

- [1]Expressed most abundantly in the brain
- [1]Also present in organs, smooth muscle, gastrointestinal tract, immune system
- [2]Stress, pain, fear, motor control, cognition, mood, appetite, anxiety
- [1]Strongly activated by Anandamide
- [1]Strongly activated by THC

CB2 Receptors

- [1]Expressed mainly in immune system cells, skin and bone marrow
- [2]Recently found in hippocampus, brain stem
- [2]Inflammation and immune function
- [2]Information flow between brain networks
- [3]Neuropathic pain
- [4]Strongly activated by 2-AG
- [4]Strongly activated by β-caryophyllene

1. https://www.fundacion-canna.es/en/endocannabinoid-system
2. Backes, M. (2017). Cannabis Pharmacy. (J. D. McCue, Ed.) New York: Black Dog & Leventhal Publishers.
3. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2241751/
4. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4164977/

CB1 present:

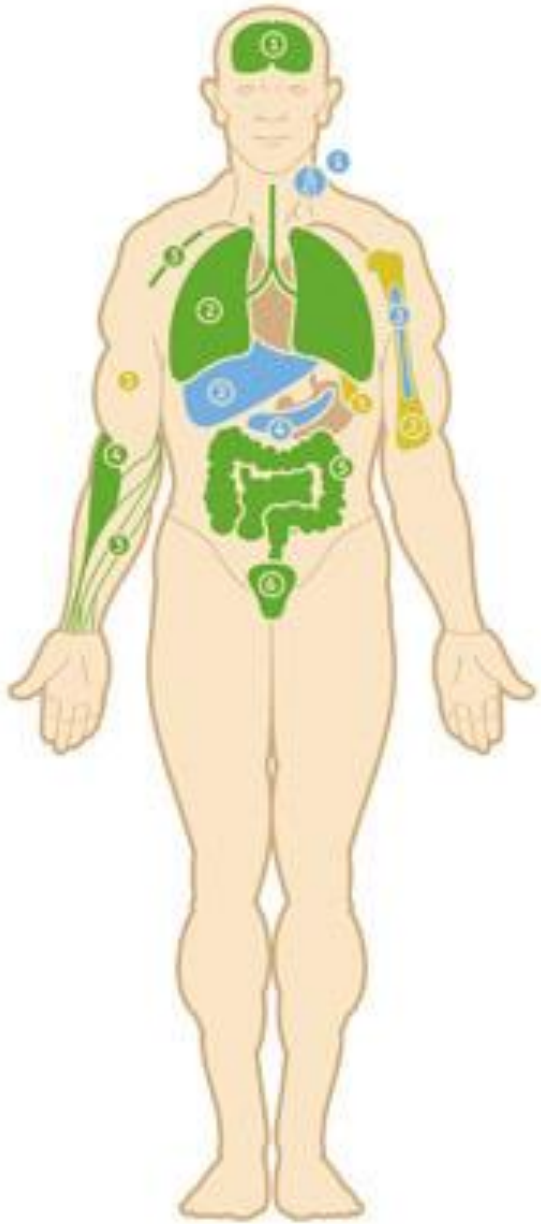
1. brain
2. lungs
3. vascular system
4. muscles
5. gastrointestinal tract
6. reproductive organs

CB2 present

1. spleen
2. bones
3. skin

CB1+CB2 present

1. immune system
2. liver
3. bone marrow
4. pancreas



CB1 present:

1. cortex
2. caudate nucleus and putamen (nucleus acumbens)
3. basal ganglia
4. hypothalamus
5. cerebelum
6. hippocampus
7. amygdala
8. spinal cord

CB2 present

glial cells

CB1+CB2 present

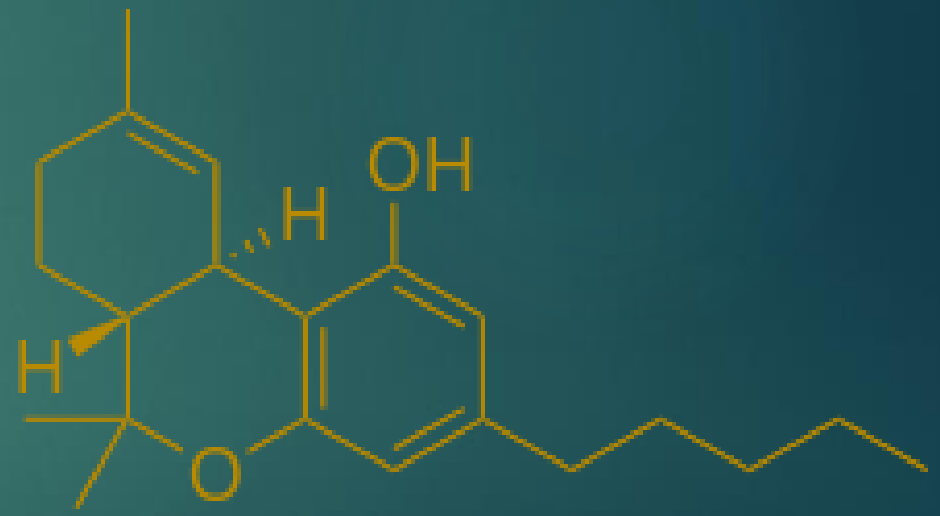
1. brainstem

Fundación CANNA

Photo: https://www.fundacion-canna.es/en/endocannabinoid-system

THC (Tetrahydrocannabinol)

- Most abundant cannabinoid in ≈90% of commercially available cannabis
- Strongly activates CB1, weakly activates CB2
- [1]Demonstrated effects:
  - Anti-inflammatory
  - Analgesic
  - Neuroprotective
  - Reduce spasticity
  - Reduce muscle tension
  - Reduce intraocular pressure
- What does THC feel like?



1. Backes, M. (2017). Cannabis Pharmacy. (J. D. McCue, Ed.) New York: Black Dog & Leventhal Publishers.

Photo: https://en.wikipedia.org/wiki/Tetrahydrocannabinol

CBD (Cannabidiol)

- Second most abundant cannabinoid after THC (<10% of commercially available cannabis)
- [1]Prevents the degradation of Anandamide and THC
- [2]Demonstrated effects:
  - Anti-nausea
  - Anti-convulsant
  - Antioxidant
  - Anti-inflammatory
  - Modulate effects of THC
- What does CBD feel like?
- Have you ever used CBD products from Haggen, Co-Op, Farmer's Market, online vendor, etc.?

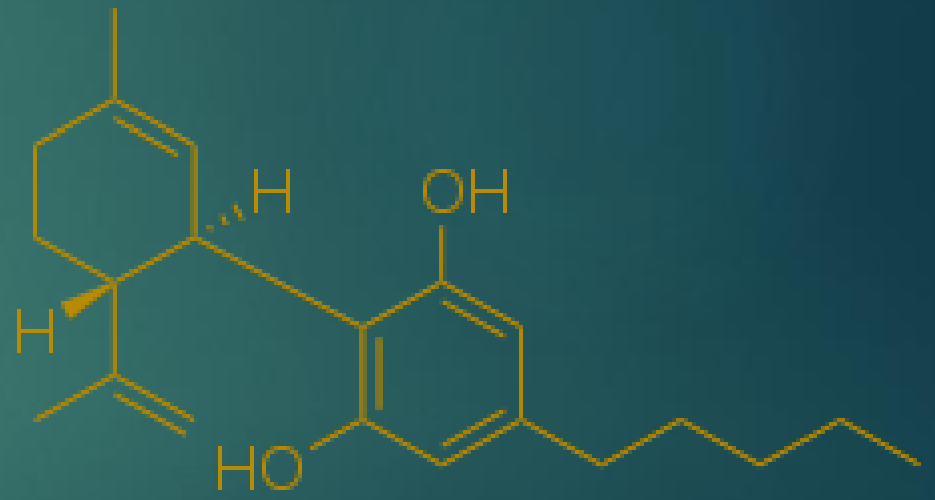


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Photo: https://en.wikipedia.org/wiki/Cannabidiol

So What?
The Entourage Effect: Emerging Research

- [1]Dr. Ethan Russo proposed this idea in 2011
- What is the evolutionary purpose of cannabis producing so many different phytochemicals?
- Why are synthetic cannabinoid isolates ([2]Dronabinol, [3]Epidiolex, [4]Rimonabant) associated with so many adverse effects?
- [5]What happens when these different phytochemicals are processed **together** in the body?
- How do the many different components of ECS work together?
- [6]Clinical Endocannabinoid Deficiency?

1. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3165946/
2. https://www.accessdata.fda.gov/drugsatfda_docs/label/2005/018651s021lbl.pdf
3. https://www.accessdata.fda.gov/drugsatfda_docs/label/2018/210365lbl.pdf
4. https://www.drugbank.ca/drugs/DB06155
5. https://www.frontiersin.org/articles/10.3389/fpls.2018.01969/full
6. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576607/