Medical Cannabis in Nutrition Therapy

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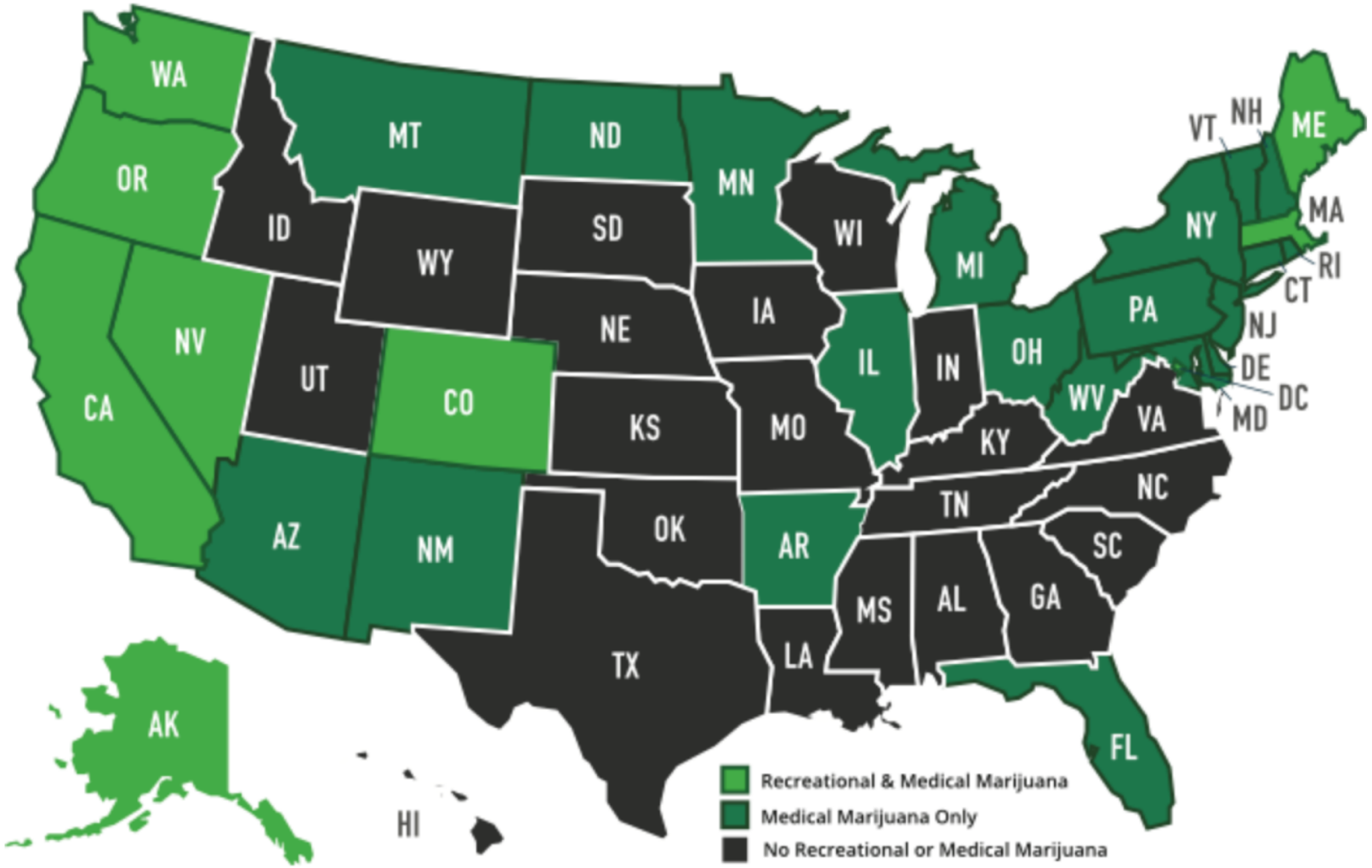
Objectives

- Explain the various qualifying medical conditions for legal medical cannabis use.
- Summarize the benefits and risks of medical cannabis in its various forms of administration.
- Describe the relationship medical cannabis plays in nutrition interventions and goals.

A Brief History

- Therapeutic Agent for 5000 years
  - Mood, cognition, memory, gout, malaria, rheumatism
- 1840's studies by French psychiatrist
  - Increased appetite, improved sleep, reduced headaches
- 1851-1942 listed as medication in US
  - "patent medications" along with opium, alcohol
    - Labor pain, nausea
  - 1840's US surgeon used for anti-inflammatory, anti-convulsant, analgesic, anti-spasmotic
- 1906: Pure Food and Drug Act
- 1937: Marijuana Tax Act
- 1996: Medical Marijuana in California
- 2019: 39 states + DC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Recreational & Medical Marijuana
Medical Marijuana Only
No Recreational or Medical Marijuana

Nomenclature

- Components (over 60 known)
  - Tetrahydrocannabinol (THC): only psychoactive
  - Cannabidiol:
    - does not significantly interact with cannabinoid receptors
    - may also inhibit endocannabinoid degradation
  - Cannabinol: THC metabolite with
    - CB2 affinity
    - weak psychoactive properties
- Synthetic cannabinoids

Nomenclature

- Strains
  - **Cannabis indica:** flower based on photoperiod; stimulating effects
  - Cannabis afghanica: flower based on photoperiod; sedating effects
  - **Cannabis sativa:** flower based on maturation; minimal effects
  - Hemp: no/trace THC, similar physical characteristics, require different growing conditions, does not contain trichomes

Qualifying Nutrition-Related Conditions

- Amyotrophic lateral sclerosis
- Autism
- **Cachexia/Anorexia**
- **Crohn's disease**
- **Nausea**
- Epilepsy
- Glaucoma
- HIV / AIDS
- Huntington's disease
- **Inflammatory bowel disease**
- **Cirrhosis**
- Multiple sclerosis
- Neurodegenerative diseases
- Neuropathies
- Parkinson's disease
- Post-traumatic stress disorder
- Severe chronic or intractable pain of neuropathic origin or severe chronic or intractable pain;
- Sickle cell anemia
- Terminal illness

Medical Use of Cannabis

Contraindications

- **History of psychotic illness** including schizophrenia should avoid using cannabis, unless there is a clear indication and active engagement and collaboration of a treating psychiatrist. A **family history of a first degree relative with schizophrenia** is also a prudent contraindication to medical cannabis use.
- **Active unstable ischemic heart disease.**
- A previous **hypersensitivity to cannabis or its constituents.**
- Cannabis use is also contraindicated in **women who are pregnant or breastfeeding**

Medical Marijuana Card

- To obtain a medical marijuana identification card, a patient must:
  - Submit an application to DOH; and
  - Pay the requisite application fee of $50, unless reduced or waived for financial hardship.

Medical Marijuana Card

- A patient's identification card is valid for one year or during the duration certified by the patient's practitioner.
- Patients who have a medical marijuana card may obtain medical marijuana from a dispensary in Pennsylvania that holds a valid permit issued by the DOH.
- Additionally, patients may designate up to 2 caregivers who can obtain medical marijuana on behalf of the patient.

Approved Medical Use Forms

- Pill
- Oil
- Topical forms
  - Gel, creams, or ointments
- Tincture
- Liquid

Medical marijuana cannot be dispensed in an edible form, including candy or baked products. However, a patient or caregiver is permitted to incorporate medical marijuana into an edible from to aid ingestion by a patient.

A Medical Cannabis Dispensary

Administration Methods

Method	PRO	CON
Smoking	Fast Relief Inexpensive	Long Term pulmonary damage possible
Vaporizing	Fast Relief Less harsh on lungs	Expensive Some long term pulmonary damage possible
Edibles	Long-lasting relief No pulmonary damage	Dosage inconsistencies Long onset Accidental dosage
Tinctures/Sublingual Sprays (MCT Oil, Coconut Oil, glycerin)	Consistent dosage No pulmonary damage	Delayed onset Expensive
Transdermal Patches	Mild dosage No pulmonary damage	Allergic reaction
Suppositories	Quick, long-lasting relief	Difficult to administer Must be refrigerated
Topicals	Localized pain relief – arthritis, eczema, burns	Inconsistently effective Minimal applications
Infusions (teas)	Long-lasting relief	30min-2hour onset Dosage inconsistencies
“Dabbing” (wax)	Urgent applications Cost-effective Fast relief	High concentration

Onset of Effects

Mode of Administration	Time of Onset of Effects	Time of Peak Effects	Duration of Effect
Vaporization or Smoking	90 seconds	15 – 30 minutes	2 - 3 hours
Oral Administration	90 minutes	2 – 6 hours (There is considerable variability among patients.)	4 – 12 hours
Oromucosal Spray	0.5 – 2.5 hours	1.5 – 4.25 hours	

Note: There is considerable inter-individual variability.

Cannabidiol (CBD)

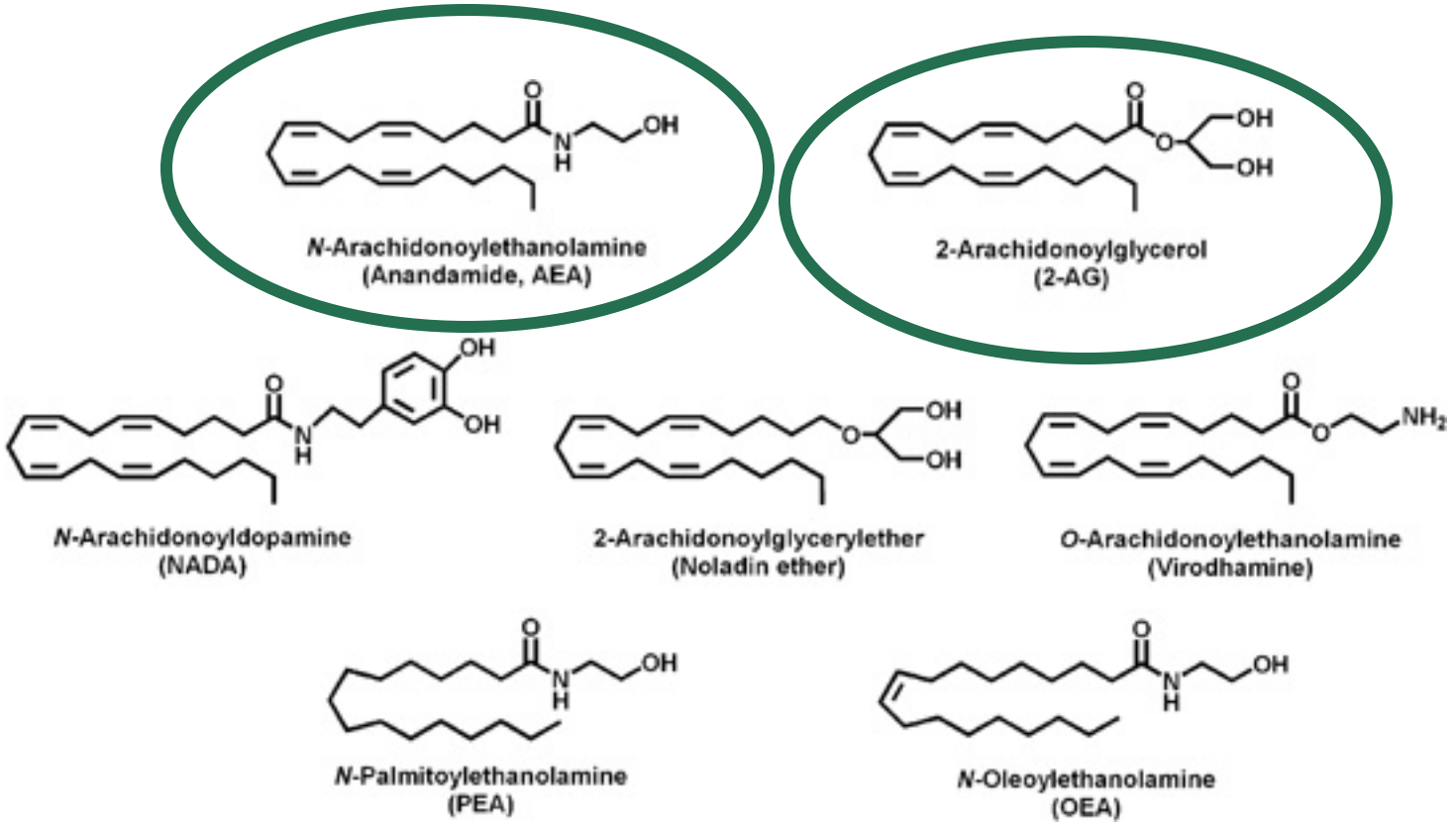
- From the Institute of Medicine (2017):
  - "there is evidence that CBD could potentially be exploited in the treatment and symptom relief of various neurological disorders such as epilepsy and seizures, psychosis, anxiety, movement disorders (e.g. Huntington's disease and amyotrophic lateral sclerosis) and multiple sclerosis."
- **CBD's influence on receptor binding**
  - inhibits FAAH (the enzyme that breaks down anandamide), and thus makes more anadamide available to bind to CB1 and CB2 receptors (the same receptors to which THC binds)
- **CBD's influence on the metabolism of THC**
  - allows THC to metabolize more quickly to 11-hydroxy-THC, which has stronger psychoactive properties than delta-9-THC
- **Cannabis with high CBD:THC ratios**
  - less associated with psychoactive symptoms compared to **low** CBD:THC ratios

The Endocannabinoid System

Challenges with Research

- Schedule 1 Substance
  - Have a high potential for abuse
  - Have no currently accepted medical use in treatment in the US
  - Have a lack of accepted safety for use under medical supervision
- Lengthy application and approval time
  - Requires “research-grade” cannabis (University of Mississippi)
  - Difficult to access **quantity, quality, and type** of cannabis product necessary to address specific research questions on the health effects of cannabis use
- Funding Concerns
- Standardization of Dosing Administration
- Placebo Effect

The Endocannabinoid System

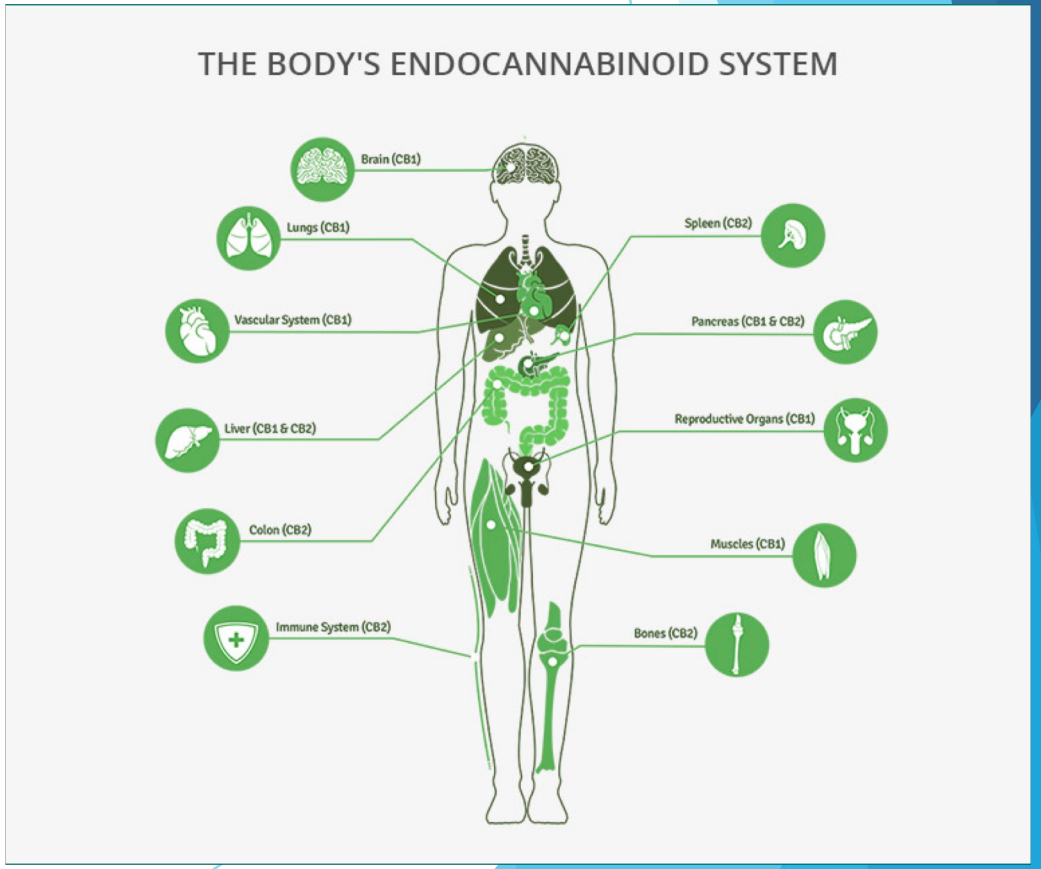


The Endocannabinoid System

- Internal homeostatic system comprised of 3 components
- **Receptors**
  - CB1 & CB2
  - Throughout central and peripheral nervous system
- **Endocannabinoids**
  - endogenous lipid based neurotransmitters that bind to cannabinoid receptors
  - AEA and 2-AG most abundant
    - higher affinity for the receptors CB1 and CB2
    - Anandamide is an amide from arachidonic acid – higher CB1 receptor affinity
    - 2-AG is an ester from arachidonic acid
- **Regulatory enzymes**
  - Catabolize or synthesizes endocannabinoids [i.e. fatty acid amidohydrolase (FAAH)]

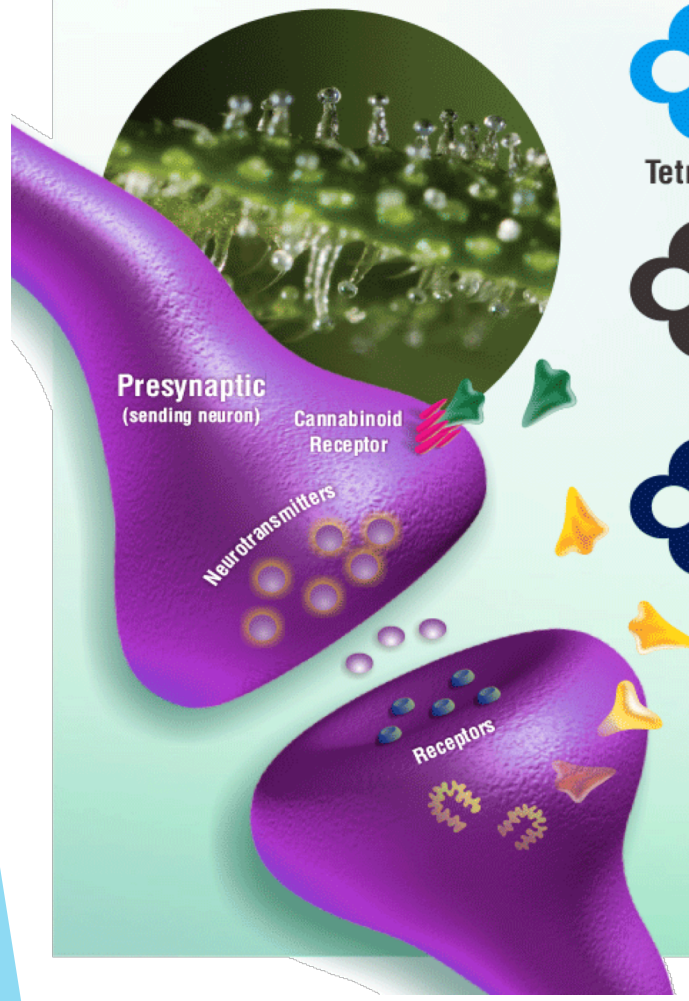
The Endocannabinoid System

- Endogenous cannabinoids are produced on-site and on-demand
- Plays critical role in nervous system
- Regulate multiple physiologic processes including:
  - Modulation of pain
  - Appetite
  - Digestion
  - Mood
  - Seizure threshold
  - Coordination
  - Cardiovascular function
  - Intra-occular pressure
  - Hypothalamic-pituitary-adrenal axis



The Human Endocannabinoid System

CBD, CBN and THC fit like a lock and key into existing human receptors. These receptors are part of the endocannabinoid system which impact physiological processes affecting pain modulation, memory, and appetite plus anti-inflammatory effects and other immune system responses. The endocannabinoid system comprises two types of receptors, CB1 and CB2, which serve distinct functions in human health and well-being.



THC

Tetrahydrocannabinol

CBD

Cannabidiol

CBN

Cannabinol

CB1 receptors are primarily found in the brain and central nervous system, and to a lesser extent in other tissues.

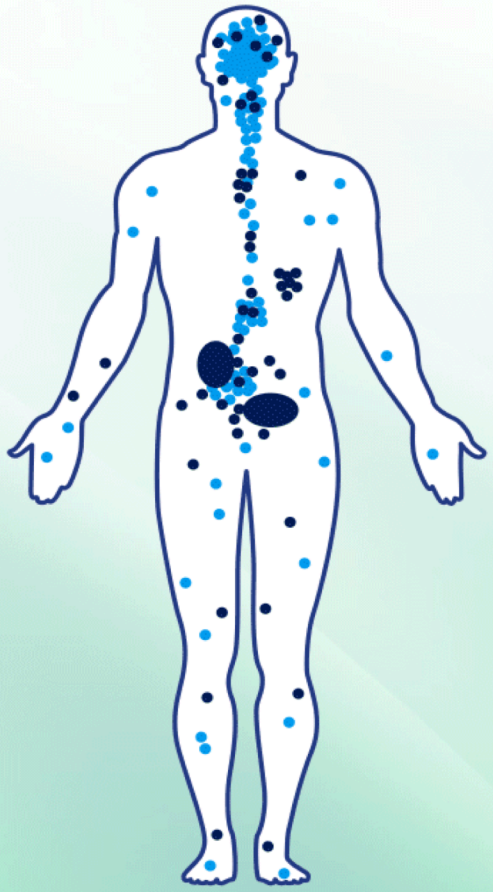
CB1

CBD does not directly "fit" CB1 or CB2 receptors but has powerful indirect effects still being studied.

CB2

CB2 receptors are mostly in the perepheral organs especially cells associated with the immune system.

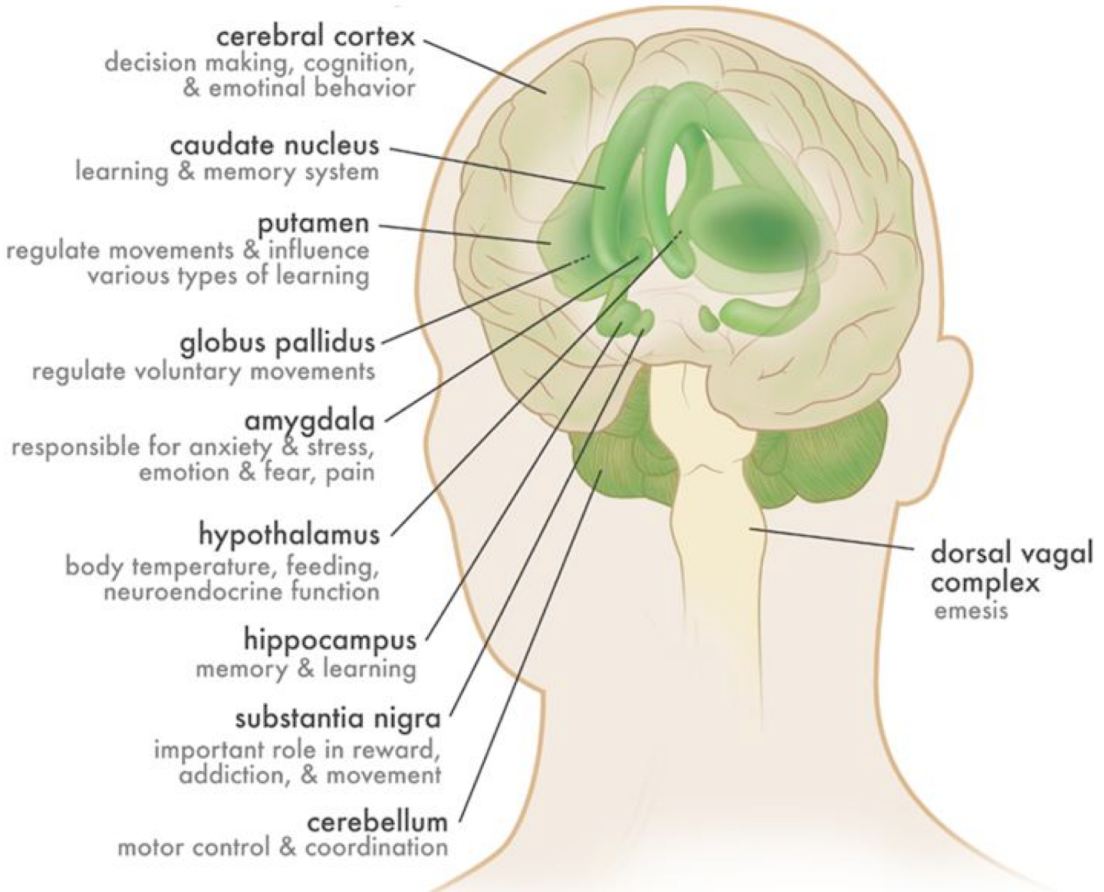
Receptors are found on cell surfaces



source: www.the-human-solution.org

A Closer Look…

Distribution of CB1 Receptors



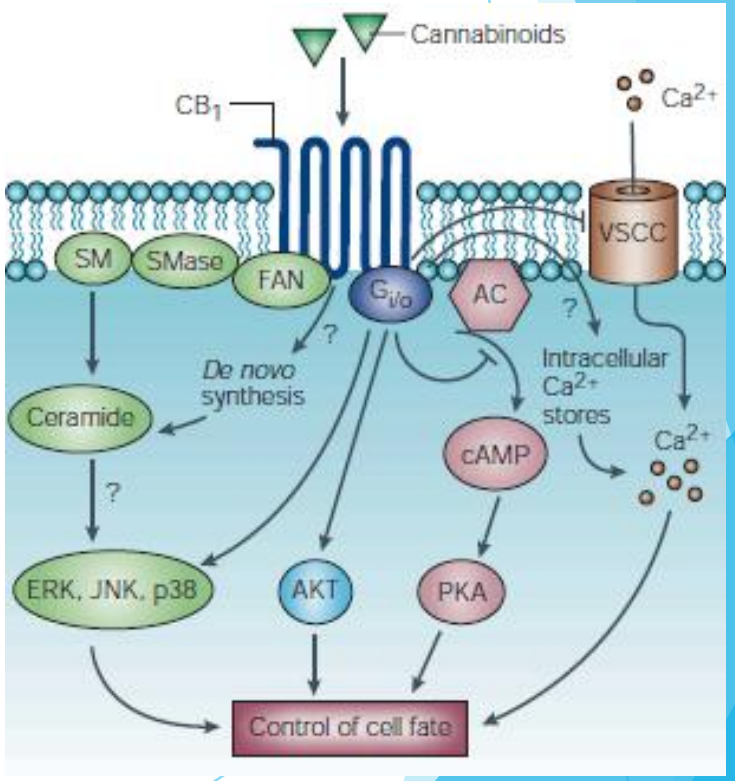
Cannabinoid Receptors

CB1 Receptor

- G-protein coupled receptors
- Found on neurons of central nervous system, immune system, testis, vascular endothelium, small intestine, peripheral nerve presynapses
- Associated with postulated benefits

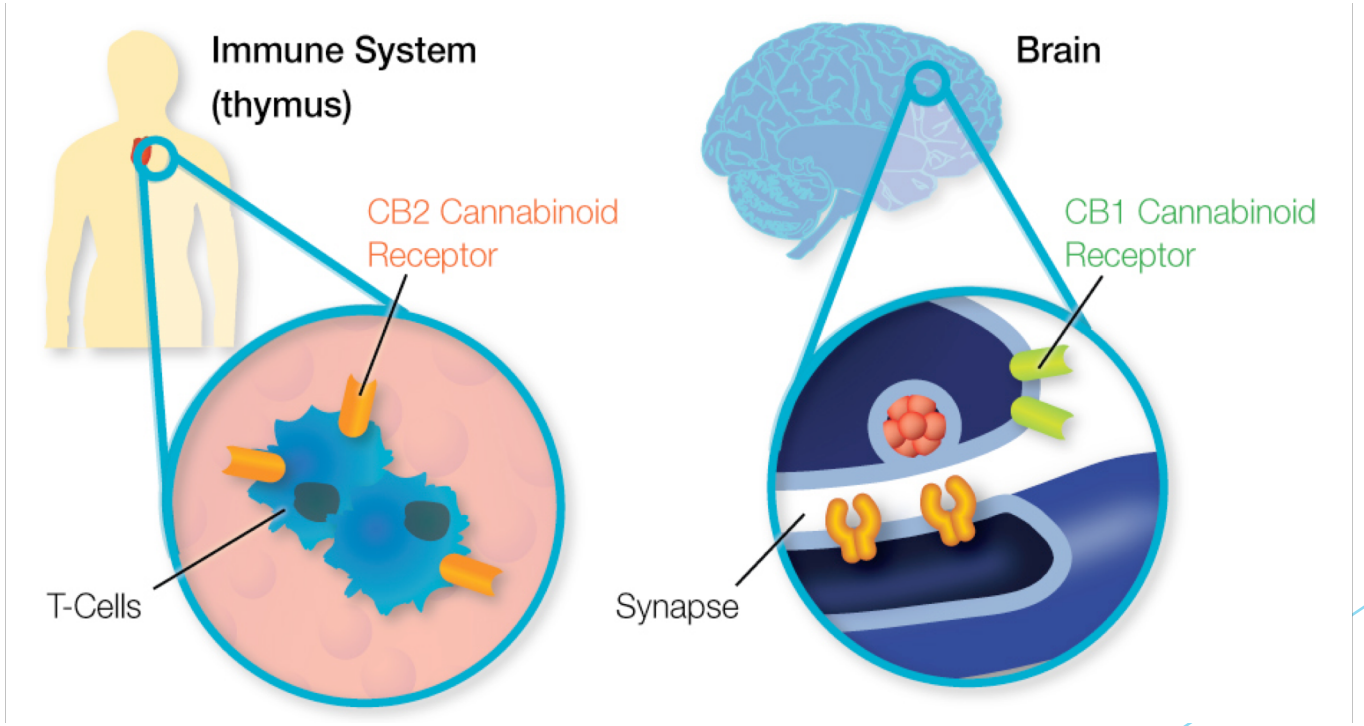
CB2 Receptor

- G-protein coupled receptors
- Found on peripheral tissues including lymph, retina, nerve, and spleen



THC and CB Receptors

- Cannabis is a plant that releases endocannabinoid “mimics”
  - Bind to the same cannabinoid receptors, eliciting similar responses – vary on location



Potential Effects of Cannabis

- Normal body systems may be activated and disrupted
  - Cannabinoids in marijuana compete/mimic
  - Therapeutic doses may be too high; can cause positive + negative responses
- **Potential Positive Effects**: Appetite increase, reduced pain perception, reduction in nausea, vomiting
- **Negative effects**: impaired judgement, alertness, cognition, coordination, addiction (9%), tachycardia, dry mouth
- Overdose: smoked cannabinoids 680kg in 15 minutes
  - Rare
  - Serum Half-Life 28-56 hours; Adipose Half-Life 7 days

Relationship to Medical Nutrition Therapy

Appetite Stimulation

- Low VS high dosing
  - Related to THC binding to CB1
  - CB1 deficient mice consumed less food overall compared to controls
- AEA and 2-AG both stimulated CB1
  - suggests an increase in both homeostatic and hedonic control of eating
- Up-regulation of limbic system CB1 receptors -> controls hedonic eating
- Endocannabinoids may affect control of leptin

Weight Gain

- Distinguishable from the appetite modification
- Weight gain continued beyond marijuana restriction
  - CB1 receptors on adipocytes
  - increase of lipoprotein lipase activity, increased lipogenesis, and decrease in beta-oxidation
- More prominent results in male VS female animals
  - do sex hormones play a role in metabolism?

- Note: lack of evidence suggesting immunosuppression effects in those who experienced weight gain with AIDS on antiviral treatment

Nausea/Emesis

- Relationship to activation of 5-HT3 receptors and NK1 receptors
  - CB1 has interaction with 5-HT3 receptors that inhibit activation
    - Although cannabinoids may inhibit 5-HT3 **without** CB1
  - Ondansetron (Zofran) is 5-HT3 receptor antagonist
    - Zofran and Cannabinoids may be beneficial combination therapy
- Desensitization of CB1 receptors associated with cyclical hyperemesis, found in chronic THC use
- Limited to chemotherapy-related emesis due to mood enhancing effects
  - Systematic review of 30 randomized controlled trials with 1138 patients found that cannabinoids were more effective than placebo or conventional anti-emetics in reducing chemotherapy-induced N/V

Pain

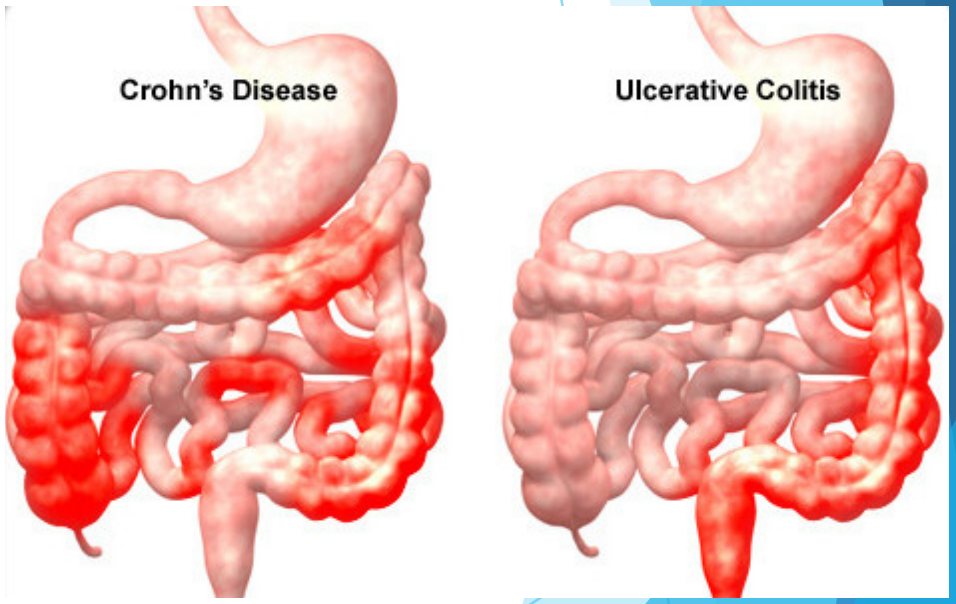
- Natural endocannabinoids involved in the action of Propofol and Acetaminophen
- CB1 and CB2 receptor binding may also release endogenous opioids
- THC, CBD, and specific synthetic cannabinoids effective
  - especially when paired with non-steroidal anti-inflammatory medications
  - CB1 receptors on areas related to pain in the brain
  - Dronabinol is less effective, if at all

Inflammation

- Ajulemic Acid: non-psychoactive metabolite of THC
  - Reacts with CB1 and CB2 receptors with anti-inflammatory properties
- Anandamide activates PPARγ and TRPV1 receptors
  - Inhibit activation of inflammatory gene expression
- 2-AG modulates eicosanoid pathways
  - Down-regulating production of TNF and other pro-inflammatory cytokines, notably at a chronic level of use
  - Potentially reducing pro-inflammatory mediators

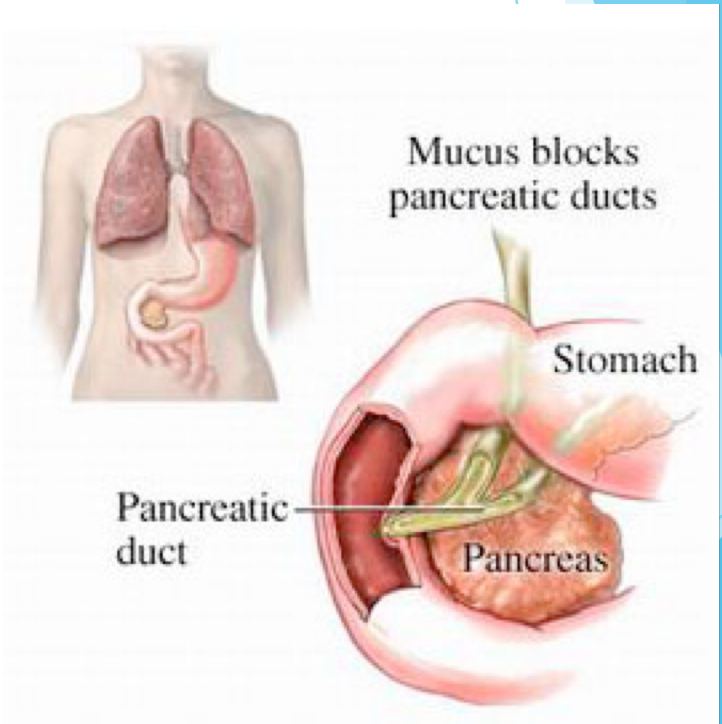
Irritable Bowel Disease (IBD)

- May affect CB1 receptors on peripheral nerve terminals on GI tract
  - Known to inhibit intestinal hypermotility by inhibiting FAAH
- 50% clinical remission in clinical trial N=11
  - Improvement was symptomatic, not objective
  - Symptoms included pain, appetite, general life satisfaction – relapsed after 2 weeks after cannabis treatment concluded
- May act as anti-inflammatory
- More research is needed



Cystic Fibrosis

- Morbidity and mortality associated with progressive lung disease
  - Further complicated and also ameliorated by nutrition/lack thereof
  - Cannabinoids may promote appetite and combat malnutrition
- Mutated CFTR: responsible for lipid imbalance?
- Endocannabinoid biosynthesis negatively impacted?
  - Appetite, nausea, diarrhea, pain, inflammation symptoms of low endocannabinoid levels and CF
  - Postulated that supplementation of cannabinoids may help correct symptoms of deficiency



Depression/Anxiety

- CB1 association has mixed results at this time
  - May be related to release of endogenous opiods
  - May promote hippocampal neurogenesis similar to antidepressants
- Cannabidiol may possess properties independent from CB1 and CB2 receptors
  - May related to serotonin reuptake
- Acute THC may cause positive effects in certain conditions, especially with chronic pain associated with cancer or MS
  - Under different conditions/higher doses: paranoia, anxiety, psychosis

The Role of the RD: Discussing Cannabis Therapy

JUDGEMENT FREE ZONE

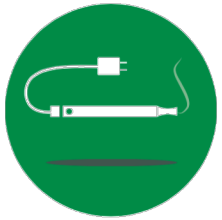
- ASK:
  - Do you currently use street cannabis?
  - What do you know about cannabis as treatment?
  - What do you think of cannabis as a treatment option for you?
  - What questions do YOU have about cannabis?
- Offer objective information and education to patient
- Consult with MD and medical team
  - Collaboration is necessary

Determining Administration Method

Consider: *Who is the patient?*

- Elderly patients may be less likely to inhale
- Pulmonary patients should use edibles
- Dosing can vary except in edibles and some vaping methods
- Important when educating patient
- Patient Needs: does the product contain more THC or CBD?
- **What does the patient prefer?**





Practice Applications

- Goal of homeostasis in endocannabinoid system has potential to be obtained with exogenous cannabis.
- Many formulations of cannabis available that create different effects in the body.
- Data support effectiveness for cannabis or cannabinoids in a variety of nutrition-related conditions
- Adverse effects occur so benefits and risks should be weighed carefully.

Improving Cannabis Research

- Basic Science Studies
  - Examine the health effects of broader social and behavioral changes associated with the legalization of recreational and/or medical cannabis
  - Plausible mechanisms by which cannabis affects specific health endpoints
  - Research findings must be of practical use to health systems
- Clinical and Observational Research
  - Use of at-risk populations
  - Dose-Response relationships
  - Research understudies areas (edibles, topicals, PTSD, pediatric epilepsy, overdosing)
- Development of research standards/benchmarks
- Expanded access to research-grade cannabis

Summary

- More research is needed to understand mechanism of action, additional short and long term benefits and risks
- May be used as part of medical nutrition therapy to help promote oral intake, reduce wasting, malnutrition, possibly ameliorate inflammation
- Dietitians should understand the roles of cannabis when instituting a Nutrition Care Plan
- Special populations are at additional risk so patient specific education is needed.

Available Resources

COLORADO
Department of Public Health & Environment

Services & information | Boards & commissions | Divisions | Concerns & emergencies | Data | News | LPHAs

Retail marijuana public health information

Back to marijuana

Education and youth prevention resources for community agencies
Fact sheets, campaign information, effective prevention strategies, technical assistance requests, education program reports, trainings

Health care provider resources
Clinical guidance, patient fact sheets and resources

Scientific literature review of marijuana-related health effects
Summary and key findings, health topics, literature review process, future review of topics

Monitoring marijuana-related health effects
Summary and key findings, health effects data

Monitoring trends in marijuana use
Summary and key findings, monitoring changes in use patterns

Contact

Get more information and resources on retail marijuana.

Learn more about the laws regarding marijuana use.

Thank You!

Questions?

Contact:
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