

The Basic Science of Cannabis

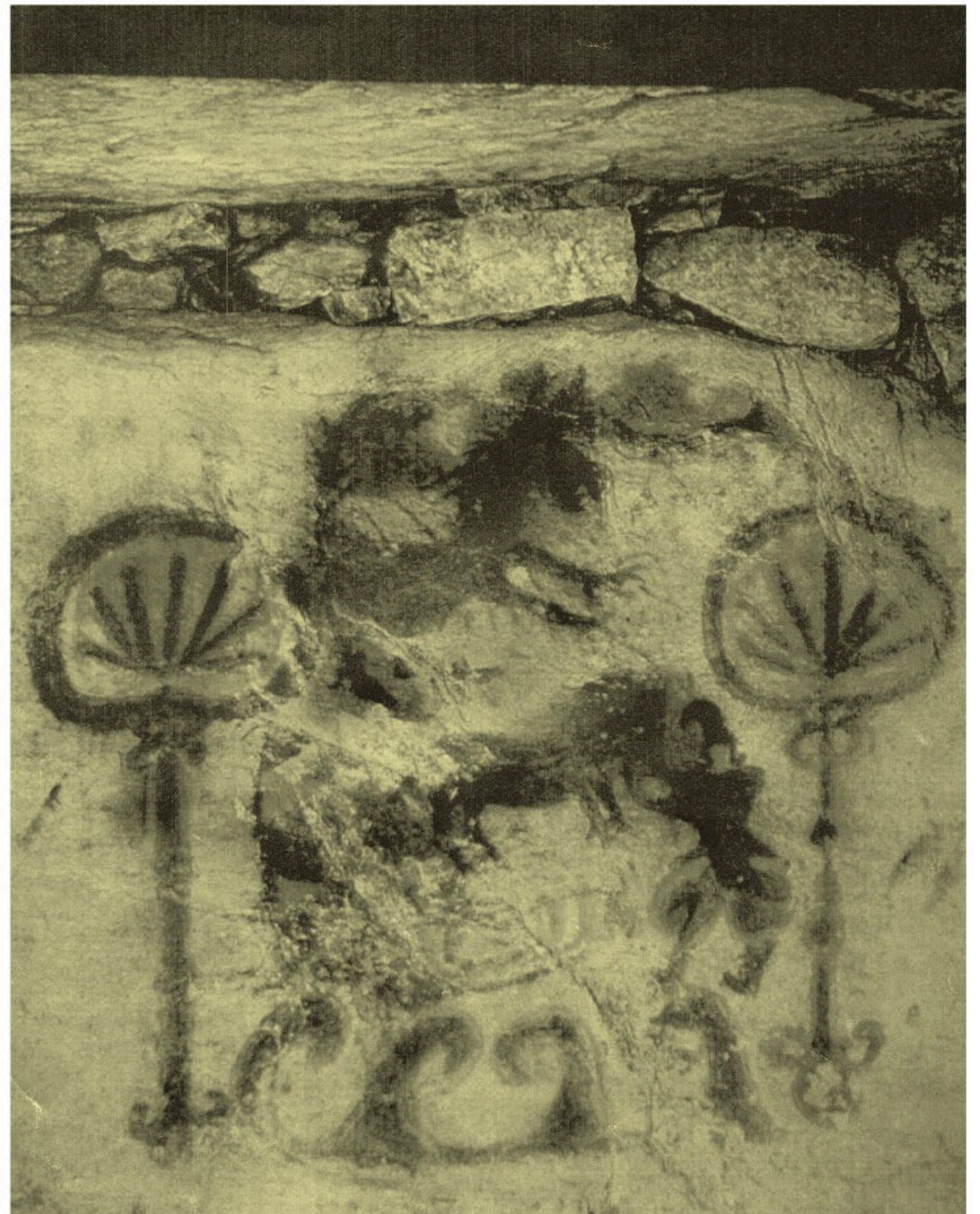
Is Cannabis Really a Medicine?

Autry Parker, MD, MPH, MS

Disclaimers

- The author has no cannabis industry affiliations
- This presentation is solely for the purpose of education regarding the use of cannabis as more states legalize cannabis for medical and recreational use.
- Any opinions expressed during this presentation are those of the author alone and do not represent any official endorsement by the Veterans Administration

Brief History of Cannabis

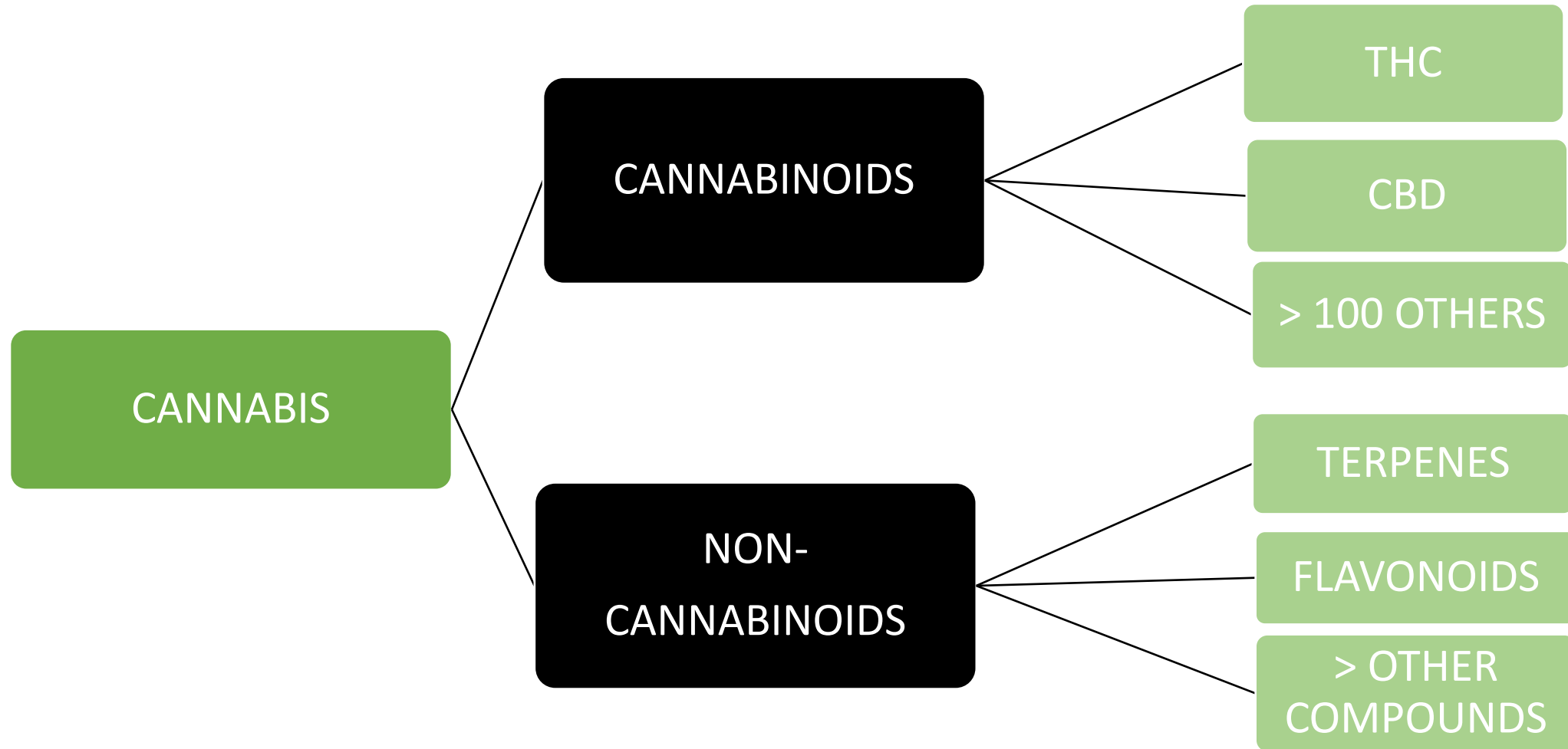


Cannabis on the Move



1920s/1930s	1894	200 BCE	500 BCE	1500 to 200 BCE	4,700 years ago	10,000 years ago
8 Cannabis banned in the U.K. and all 48 U.S. states.	7 Hempseed considered beneficial in moderate doses in the U.K.	6 Cannabis used as a medicine in Egypt and Greece.	5 Cannabis ranks as the most important of all known medicinal plants in Persia.	4 Cannabis used as a medicine in India.	3 Cannabis considered an important herbal remedy in China.	2 Cannabis flowers stored in clay jars in Japan.





What's in Cannabis?




The Entourage Effect

Cannabinoids and other compounds
may work synergistically

Terpenes Found in Cannabis

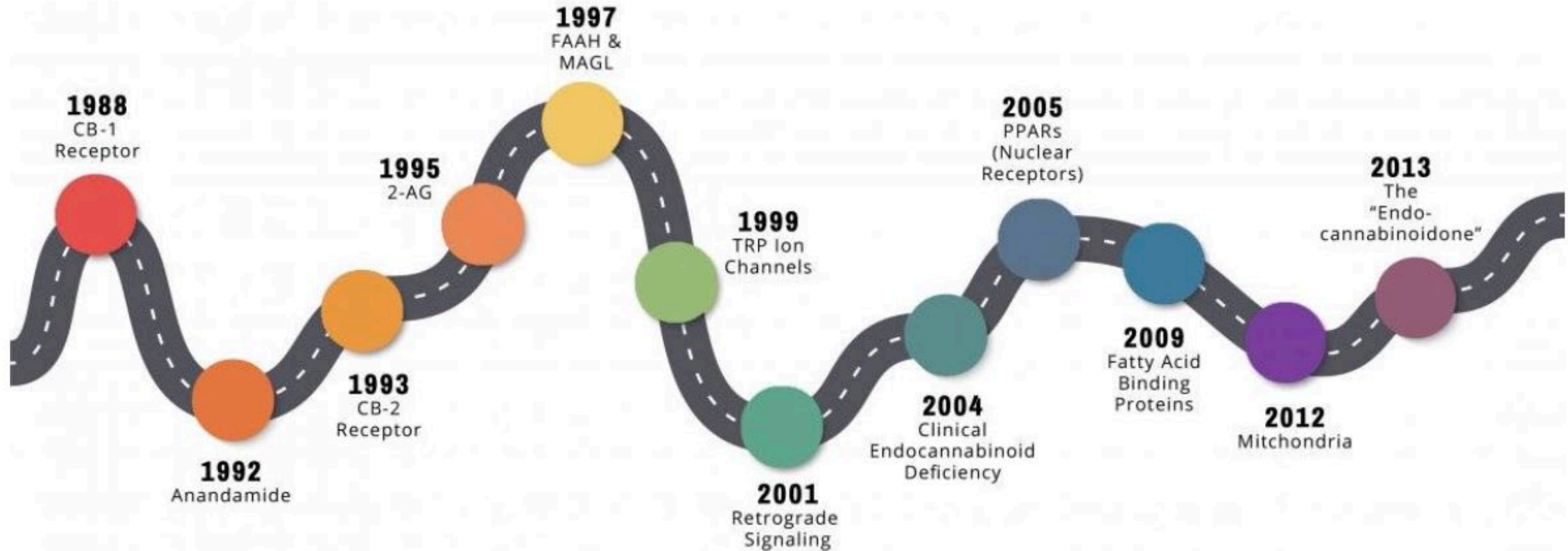
Terpenoid	Commonly encountered in	Pharmacological activity	Synergistic Cannabinoid
Limonene	Lemon 	<ul style="list-style-type: none"> Potent antidepressant/immunostimulant Anxiolytic via 5-HT Apoptosis of breast cancer cells Bactericidal Gastroesophageal reflux 	CBD CBD CBD, CBG CBD THC
Alpha-pinene	Pine 	<ul style="list-style-type: none"> Anti-inflammatory via PGE-1 Bronchodilator activity Acetylcholinesterase inhibitor (memory aid) 	CBD THC THC?, CBD
Beta-Myrcene	Hops 	<ul style="list-style-type: none"> Blocks inflammation via PGE-2 Analgesic Sedating, muscle relaxant, hypnotic Blocks hepatic carcinogenesis by aflatoxin 	CBD CBD, THC THC CBD, CBG
Linolool	Lavender 	<ul style="list-style-type: none"> Anti-anxiety Sedative Local anesthetic Analgesic via adenosine A2a Anticonvulsant 	CBD, CBG? THC THC CBD CCB, THCV, CBBDV

Cannabinoids



Endocannabinoids	<ul style="list-style-type: none">• Anandamide• 2-Arachidonoylglycerol
Phytocannabinoids	<ul style="list-style-type: none">• THC• CBD• CBN• Epidiolex (Cannabidiol)• Sativex (Nabiximols)
Synthetic Cannabinoids	<ul style="list-style-type: none">• Nabilone (Cesamet)• Dronabinol (Marinol)

ENDOCANNABINOID DISCOVERY TIMELINE



Two Main Cannabinoid Receptors

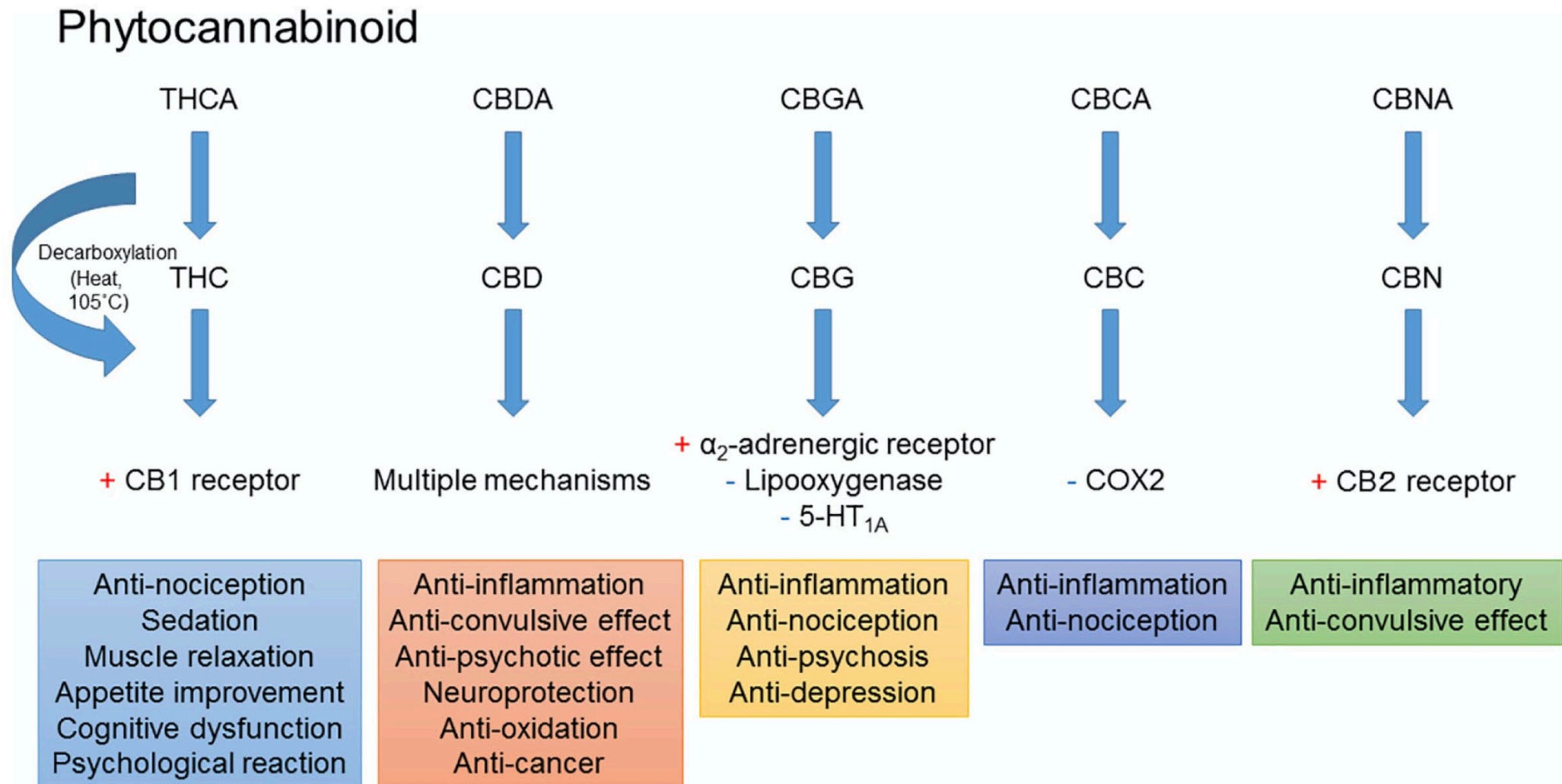
CB1

- Function is to modulate pain, movement, emotion, emesis & seizure threshold

CB2

- Function is to modulate immune function inflammation and pain

Pharmacological Effects of Cannabinoids



The Endocannabinoid System

Neural development—

Immune function—

Cardiovascular function—

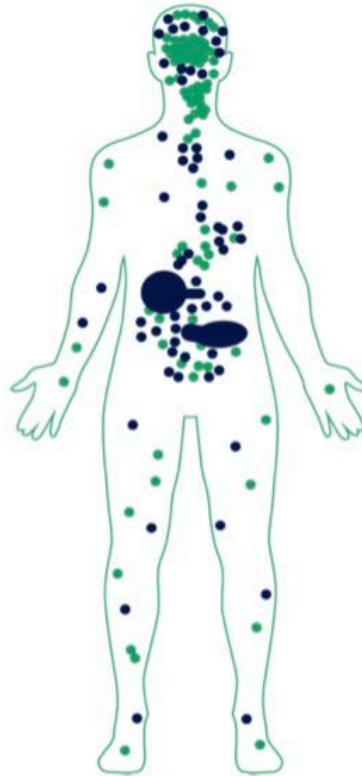
Inflammation—

Appetite—

Digestion—

Metabolism and
energy homeostasis—

Bone development
and bone density—



→ Synaptic plasticity and learning
→ Wake/sleep cycles
→ Memory
→ Regulation of stress and emotional state
→ Psychiatric disease
→ Pain
→ Reproduction
→ Psychomotor behaviour

2017 Comprehensive Review by the National Academies of Sciences, Engineering, and Medicine

- Committee reviewed all relevant literature published between January 1999 and August 2016 (>250 articles/studies included)

CONCLUSIVE OR SUBSTANTIAL EVIDENCE OF EFFICACY

Treatment of chronic pain

Treatment of
chemotherapy-induced
nausea and vomiting

Improving MS spasticity
symptoms

MODERATE EVIDENCE OF EFFICACY

- Improving sleep outcomes in sleep disturbance associated with:
- Sleep apnea
- Fibromyalgia
- Chronic pain
- MS

LIMITED EVIDENCE OF EFFICACY

Increasing appetite and decreasing weight loss associated with HIV/AIDS

Improving symptoms of Tourette syndrome

Improving anxiety symptoms

Improving PTSD symptoms

Better outcomes (i.e., mortality, disability) after a traumatic brain injury or intracranial hemorrhage

Prescription Phytocannabinoids

- Epidiolex (Cannabidiol)
- Nabiximols (Sativex)
Oral Mucosal spray 1:1 ratio THC and CBD

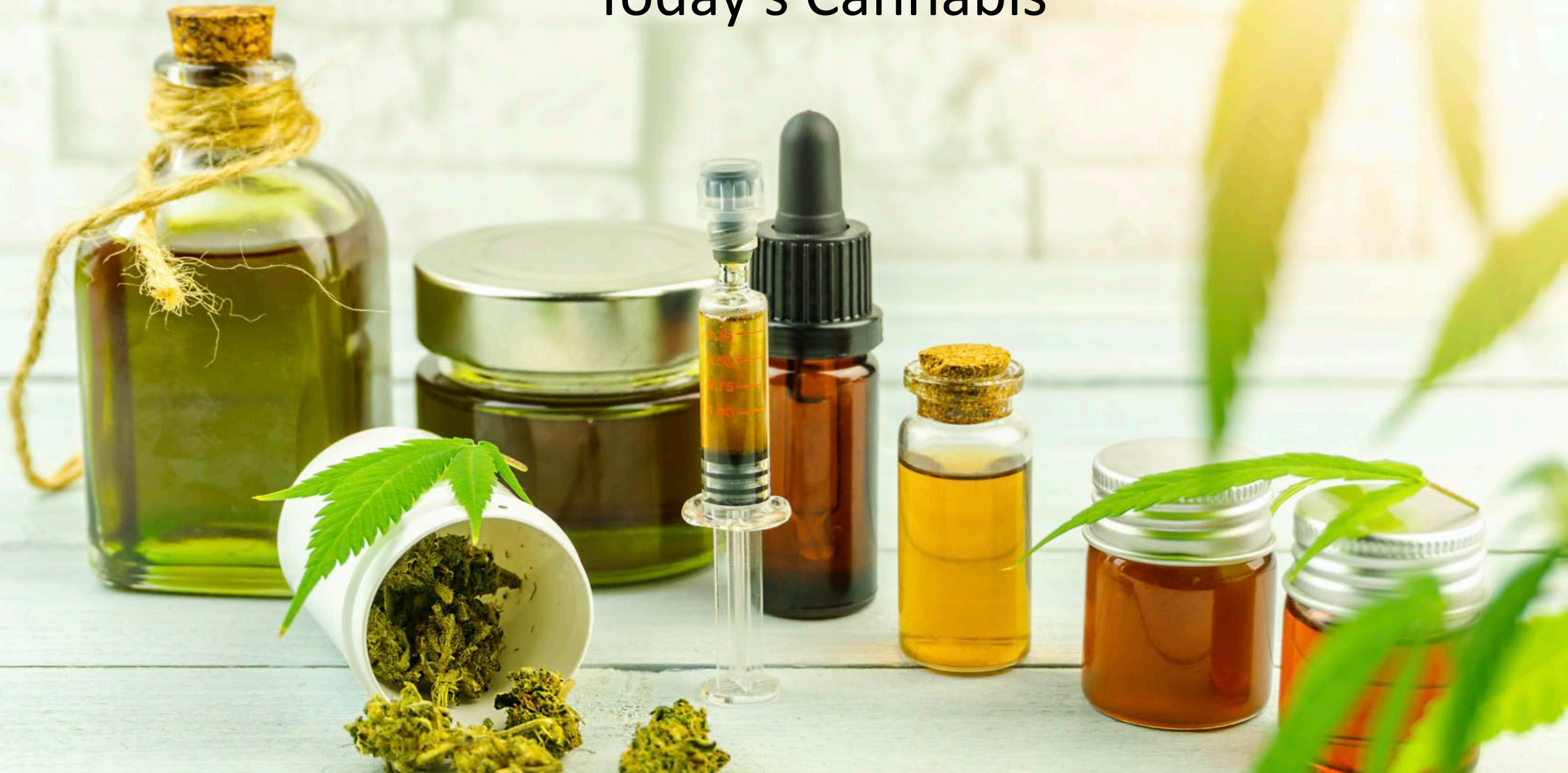


New Cannabis Classification System

- Type I
THC Dominant and CBD content $< 0.5\%$
- Type II
Mixed ratio profile CBD Dominant
- Type III
CBD dominant and THC $< 0.3\%$



Today's Cannabis





Cannabis Edibles

- Dose Restrictions
- Required Warning Labels
- Childproof packaging
- Restrictions on Packaging design to protect children

Cannabis Inhalation Methods

- Smoking
- Vaporization
 - Dry Herb
 - Concentrated oils
 - Dabbing





Cannabis Ingestion Methods

- Sublingual Tinctures
- Oral Mucosal Spray
- Transdermal
- Suppository

The End

- Questions?