



SOLACE HEALTH
NETWORK

Cannabis & Acquired Brain Injury



SOLACE HEALTH
NETWORK

Overview

- History of Cannabis
- Cannabis 101: Review the basics about cannabinoids, endocannabinoid system and Canadian regulations (ACMPR)
- Research: Cannabis & Acquired Brain Injury
- Patient Case Study



Cannabis History



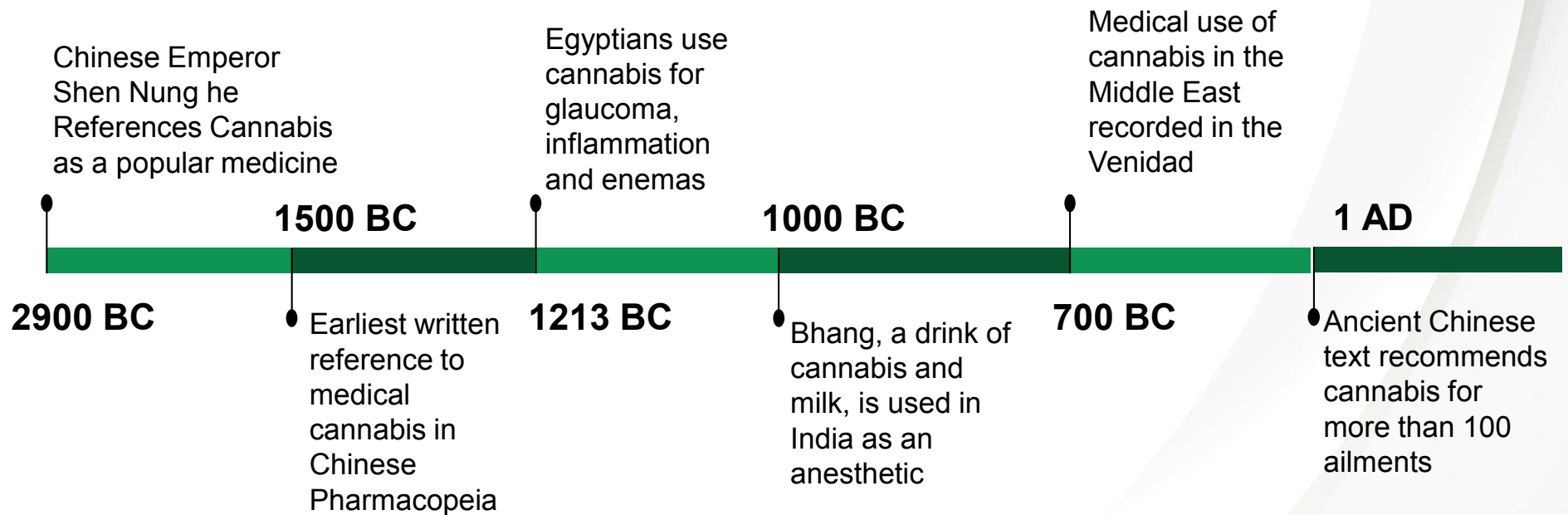
- Medical use dates back 3000 years. Was used therapeutically, recreationally and spiritually.¹
- Earliest documentation of medical use in ancient Chinese (2700 BC.²)

Listed in US pharmacopeia (1850-1941)

- Most prescribed medication in US from 1842-1890s
- Range of conditions including neuralgia, rheumatism, convulsions and chorea

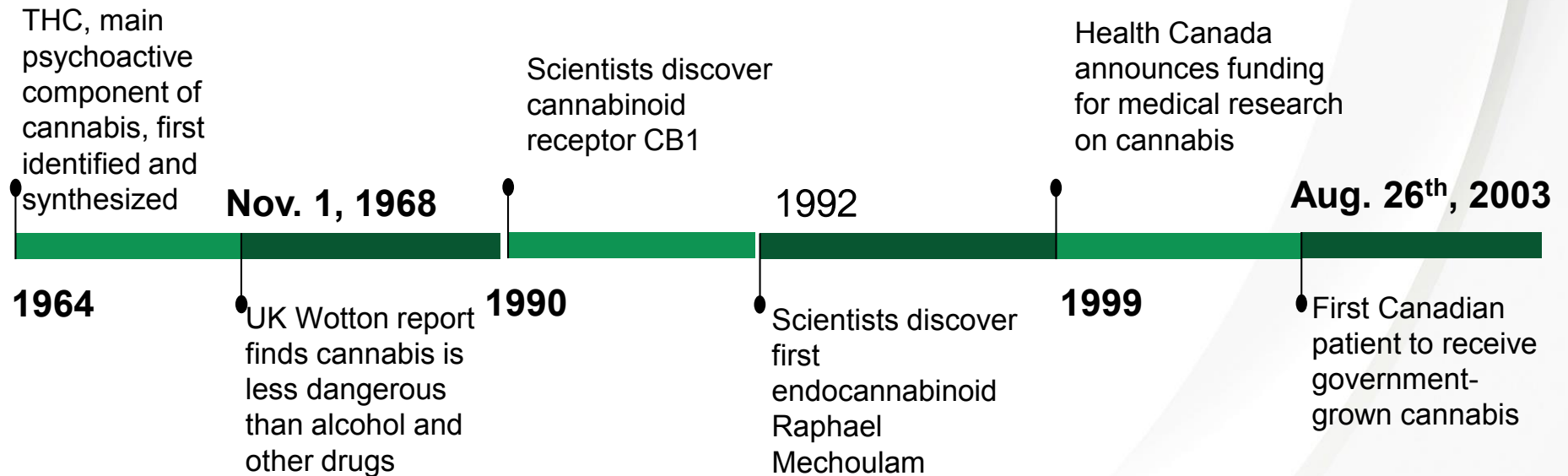


Cannabis History





Cannabis History





Cannabinoids

Endocannabinoids

- Anandamide, 2-AG

Phytocannabinoids

- Derived from cannabis variants
- Over 100 different compounds

- **Two major plant-derived cannabinoids**
 - **D9-tetrahydrocannabinol (THC)**
 - **Cannabidiol (CBD)**

Pharmaceutical/synthetic cannabinoids

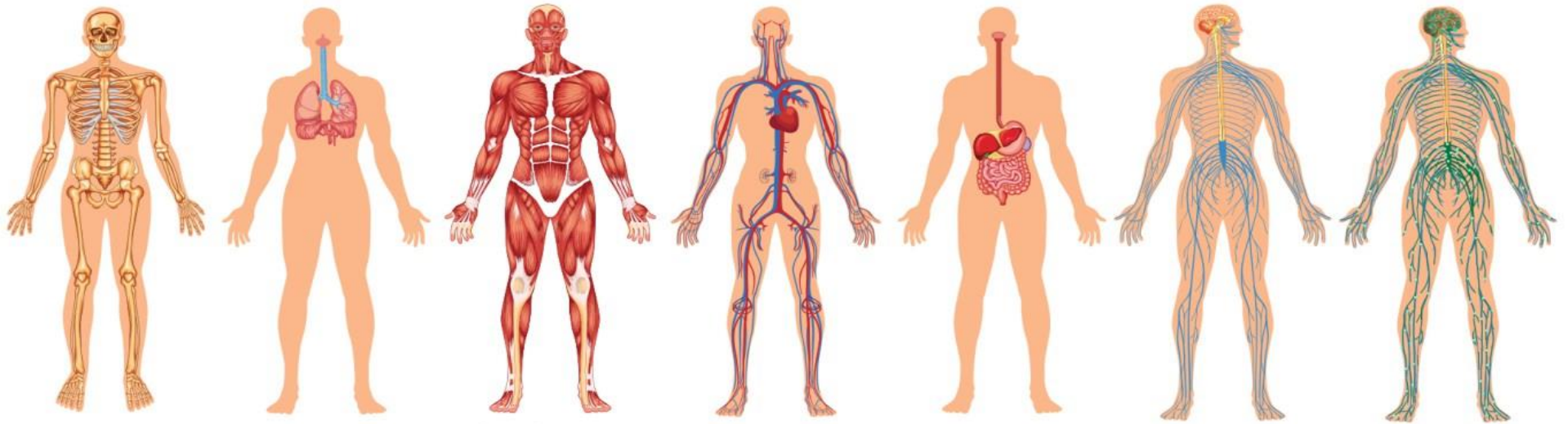
- Nabilone (Cesamet) - synthetic THC mimic
 - Dronabinol (Marinol) – synthetic THC mimic, not available in Canada
 - Nabiximole (Sativex) - mix of THC:CBD (1:1 ratio) derived from cannabis



SOLACE HEALTH
NETWORK

Endocannabinoid System:

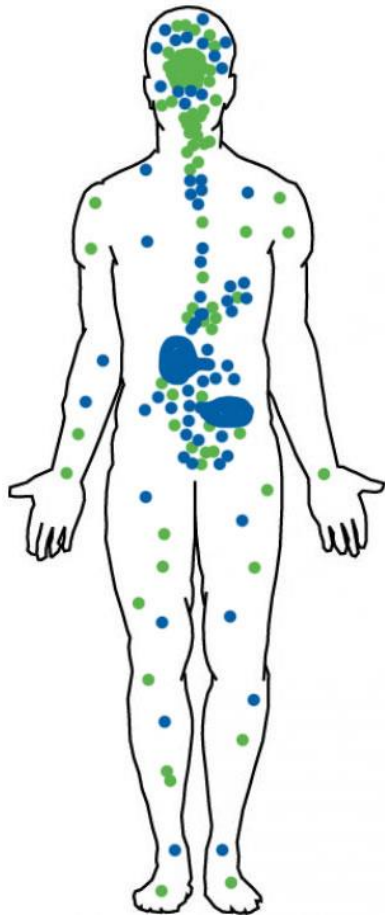
Human Body Systems



Skeletal System Respiratory System Muscular System Circulatory System Digestive System Nervous System Endocannabinoid System



Endocannabinoid System:



CB₁

CB₂

- The **Endocannabinoid System** is a biological system that is capable of interacting with chemical compounds, including those found in cannabis.⁴

Major function:

- Regulation of homeostasis;
- Restore natural balance in the bodies physiological systems.

- **The ECS affects and is involved in :** ⁴

- **Neuroprotectant**

- Immune function

- **Inflammation**

- Appetite

- Metabolism

- Cardiovascular function

- Digestion

- Bone development

- Memory

- **Wake/Sleep cycles**

- **Pain**

- Psychiatric disease

- Psychomotor behaviour

- Reproduction

- **Regulation of stress and emotions**



ACMPR Regulations

- Access to Cannabis for Medical Purposes Regulations
- Cannabis is not an approved therapeutic product but it is approved for medical purposes under ACMPR (Aug 2016)
- The only authorized provider of medical cannabis is a Licenced producer
- LPs are allowed to dispense the following forms of medical cannabis:
 - **Dried cannabis flower**
 - **Oil/Extract**
 - **Fresh cannabis buds or leaves**



ACMPR & Patient Flow

Patient Process Flow

Patient consults
with MD or NP

Practitioner
provides
Medical
Document

Patient registers
with Licensed
Producer &
places order

Licensed
Producer sends
cannabis to
patient via mail

- Intake questionnaire, includes screening of eligible patient and other info, diagnosis confirmation and medical history
- Education and Treatment Plans
- Counselling to assist with registration and product selection
- Booking follow-up (6 weeks to 3 months)



Cannabis & Acquired Brain Injury



Cannabis and Acquired Brain Injury

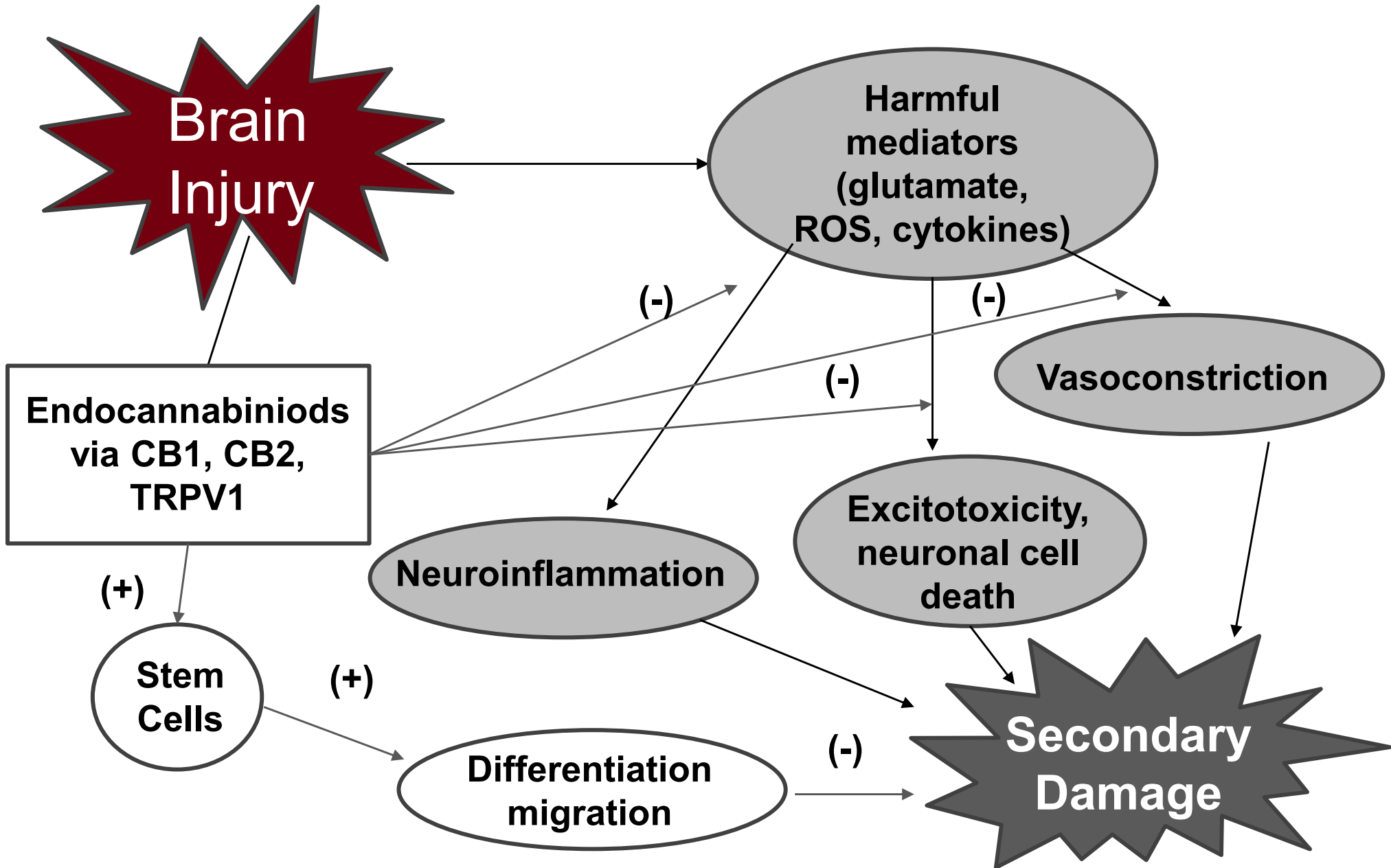
- In 1998, the *Proceedings of the National Academy of Sciences* published a report on the neuroprotective properties of cannabidiol (CBD) and tetrahydrocannabinol (THC), two major components of marijuana.
- This preclinical study on rats would form the basis of a U.S. government-held patent on “Cannabinoids as antioxidants and neuroprotectants.”
- The patent indicates that CBD and THC were found “to have particular application as neuroprotectants ... in limiting neurological damage following ischemic insults, such as stroke or trauma.”

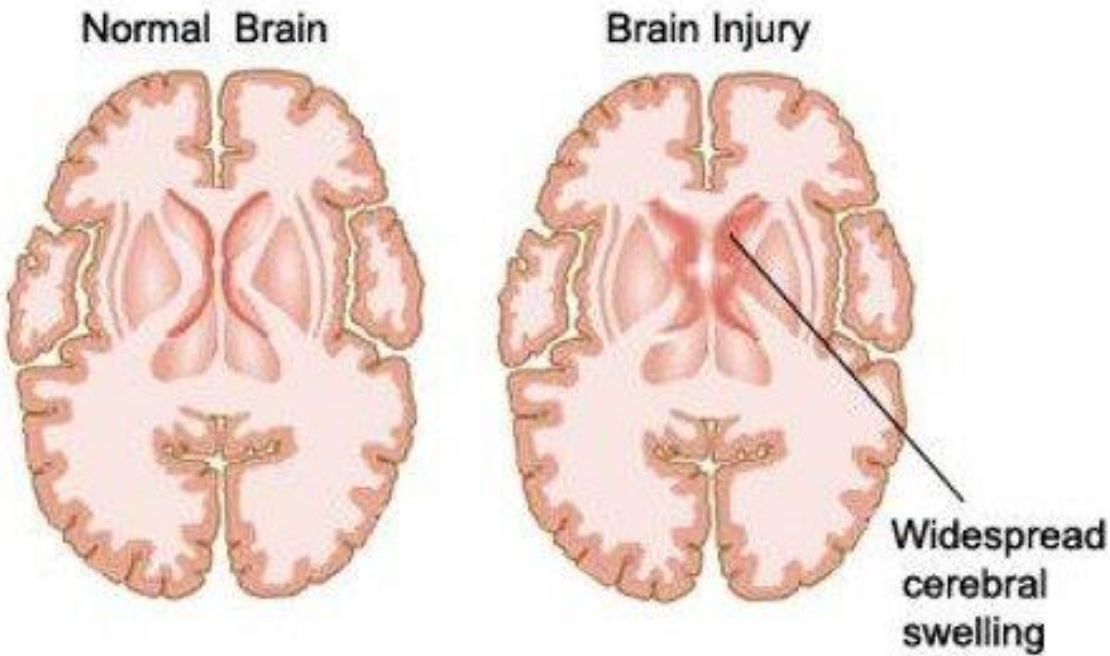


Cannabis and Acquired Brain Injury

- In 2002, the *Journal of Neuroscience* reported that the impact of induced cerebral ischemia is much more severe in CB1 knockout mice than in “wild type” mice with cannabinoid receptors.
- The absence of CB1 was shown to exacerbate TBI-related brain damage and cognitive deficits, indicating that cannabinoid receptors play an important role in neuroprotection.
- This study demonstrated heightened CB1 receptor transmission can limit harmful excitotoxicity by inhibiting glutamate release. CB1 receptor activation also dilates blood vessels, thereby enhancing cerebral blood flow (and oxygen and nutrient supply to the brain).

Cannabis and Acquired Brain Injury





Cannabis Research & Acquired Brain Injury



Cannabis Research and Brain Injury

- Researchers at Tel Aviv University, discovered that cannabis may prevent long-term brain damage by administering THC before or shortly after the injury.
- In fact, Israel Defense Force (IDF) practitioners administer CBD or low-dose THC as a first-line treatment to IDF soldiers – and even enemy combatants – who suffer brain trauma.
- Providing THC from one to seven days prior to, or one to three days after an injury, induces the biochemical processes necessary to protect critical brain cells while preserving long-term cognitive function.



Cannabis Research and Brain Injury

- **Effect of Marijuana Use on Outcomes in Traumatic Brain Injury" (UCLA Medical Center, 2014):**
- In a three-year retrospective review of 446 separate cases of similarly injured patients, researchers found traumatic brain injury (TBI) patients who had a history of cannabis consumption possessed increased survival rates compared to non-consumers (97.6 percent survived surgery, versus 88.5% of those who didn't consume cannabis).



SOLACE HEALTH
NETWORK

Cannabis Research and Brain Injury

- In 2012, a randomized, double blind, placebo-controlled phase II study was published in patients who were comatose as a result of severe TBI.
- This trial (97 patients enrolled) showed treatment with KN 38-7271 (a cannabinoid) improved 1-month survival in these patients (Firsching et al., 2012)

Case Studies

CANNABIS AND ACQUIRED BRAIN INJURY



Case Study # 1-Incident

- DG is a 38 year old survivor that suffered a traumatic brain injury falling down polished wooden stairs while wearing socks - after getting a midnight snack in 2013. Right after he had a subsequent fall and concussion (second time hitting his head again on the door way and floor) resulting in multiple concussions.

His doctor treated the symptoms of post concussion syndrome with the various drugs including SSRIs and Lorazepam (and various other benzodiazepenes) for anxiety and NSAIDs, and Codeine for pain management.



Case Study # 1-Prescriptions prior to cannabis

- He experienced unwanted side effects from the SSRIs and benzos. The side effects lasted much longer than the typical two weeks that doctors suggest would be the adjustment period.
- **Severe dry mouth, nausea, loss of appetite, inability to regulate body temperature, irritability, increased anxiety** were all very pronounced **side effects from the SSRI** that made things worse. His doctor then took him off SSRIs and attempted to treat him with Bupropion (Wellbutrin) - as he thought this would also help treat his long diagnosed ADHD. This wasn't as bad on the side effects, but still **experienced extreme lethargy, nausea and vomiting and increased IBS.**



Case Study # 1-Cannabis Use (Survivor's own words)

- He has not taken a benzodiazepene since he started to consume **cannabis oil** - and his mental health has been in a place where he hasn't had to. He wasn't expecting the mood regulation effects at all - and it came as a very welcomed side effect. His mood and stress levels are better then they have ever been since the injury - and even to a pre-injury level.

His advice to anybody with a TBI looking to try cannabis would be - make sure that CBD becomes part of your medicating. CBD is the game changer, and helps on so many levels from mood to pain without limiting my cognitive abilities of functioning.



Case Study # 2

- NL is a survivor who had her first concussion in 2011 where she hit her head (frontal) on a desk. In 2015, she fell on ice and hit back of her head on ice. And in 2016 as she was a practicing Nurse and while on duty she sustained a injury while helping to restrain a patient (front and back of head injured as well as whiplash). May 2017, She fell while in Kingston, Ontario and fell on a glass counter.
- Its common for brain injury survivors to sustain multiple head injuries






Cannabis Dosing

- Start Low and Slow...
- The optimal dose should improve relief and function, while causing minimal psychoactive impairment
- Approximately 1-3 gram/day has been noted by Health Canada as typical usage with max use 150 g/30 days
- Dosing remains highly individualized and relies to a great extent on titration → trial and error



How Long Do Effects Last?

		Oral Administration	Inhalation
	ONSET	60 – 90 minutes	10 seconds – 1 minute
	PEAK	1 – 2 hours	Approx. 30 minutes
	DURATION	6 – 8 hours	1 – 3.5 hours



Cannabis Side Effects

- Dizziness, drowsiness, feeling faint or lightheaded, fatigue, headache;
- Impaired memory and disturbances in attention, concentration and ability to think and make decisions;
- Disorientation, confusion, feeling drunk, feeling abnormal or having abnormal thoughts, feeling "too high", feelings of unreality, feeling an extreme slowing of time;
- Suspiciousness, nervousness, episodes of anxiety resembling a panic attack, paranoia (loss of contact with reality), hallucinations (seeing or hearing things that do not exist);



SOLACE HEALTH
NETWORK

Cannabis Side Effects

- Impairments in motor skills and perception, altered bodily perceptions, loss of full control of bodily movements, falls;
- Dry mouth, throat irritation, coughing;
- Worsening of seizures;
- Hypersensitivity reactions (contact dermatitis/hives);
- nausea, vomiting; and
- fast heartbeat.



SOLACE HEALTH
NETWORK

Summary

- Still needs more robust research to look at ABI and cannabis but there is a growing amount of anecdotal feedback from survivors and some research showing its benefits via the endocannabinoid system.
- Start low, go slow – titrate up to effect. Starting THC 10% or less and CBD 10% or more. This is just one potential option for symptoms related to brain injury

Questions



Contact info:

Sabrina Ramkellawan
sramkellawan@terrascend.com

Visit our Booth Solace Health
Network if you have any
questions

www.shnclinics.ca
www.solacehealth.com