

## Cannabinoids in Medicine – An Option?

# Pain, asthma, AIDS, glaucoma

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# Cannabinoids in medicine

Most research done in field of

- Neurology
- Oncology

Other medical domains less data, more «patient experiences», case reports, basis science studies

# Cannnabinoids in medecine: a puzzle



# Outline

## Cannabinoids for

- Pain
- Asthma
- AIDS
- Glaucoma
- Potential other indications

## Conclusion

# Cannabinoids and pain

- (Endo)cannabinoids have a well documented pain-killing effect, in acute and chronic pain
- Possible mechanisms:
  - Anti-inflammatory effect
  - Anti-spasmodic effect
  - Improved sleep
  - Effect on the perception of pain

# Cannabinoids and pain

MRI study (Pain, Jan 2013) THC in healthy volunteers experiencing pain

*“THC reduced the reported unpleasantness, but not the intensity of ongoing pain and hyperalgesia: the specific analgesic effect on hyperalgesia was substantiated by diminished activity in the anterior mid cingulate cortex. In individuals, the drug-induced reduction in the unpleasantness of hyperalgesia was positively correlated with right amygdala activity.*

*Data suggest that amygdala activity contributes to interindividual response to cannabinoid analgesia, and suggest that dissociative effects of THC in the brain are relevant to pain relief in humans”*

# Cannabinoids and pain

- Cannabinoids may be either an adjunct or a first-line treatment
- Even low-dose vaporized cannabis significantly improves neuropathic pain
- RCT comparing THC to other pain treatment suggest THC is often not well tolerated, especially in elderly

# Cannabinoids and asthma

- Asthma: chronic inflammatory disease of the airways characterized by variable and recurring symptoms, reversible airflow obstruction, and bronchospasm
- Mechanism of effect of cannabinoids
  - Direct anti-inflammatory effect through activation of CB2 receptors
  - Bronchodilation through activation of CB1 receptors in bronchial nerve endings



# Cannabinoids and asthma

- Effect mostly through delta-9-THC, less through other cannabinoids
- Efficacy proven when taken orally, or smoked with vaporiser
- No long term data available
- Combined use of smoked tobacco and cannabis not recommended

# Cannabinoids and AIDS/HIV

- Acquired Immunodeficiency Syndrome and HIV infection
  - Potential complications include all medical domains
  - Poly-medication even in case of absence of disease, with potential side-effects
  - Frequently: nausea, weight loss, neuropathic pain
- Different medications that activate cannabinoid receptor pathways have been tested, and are approved as treatments for cachexia, nausea (medication-related or not) or neuropathic pain in HIV/AIDS

# Cannabinoids and AIDS/HIV

- Positive impact on evolution of HIV infection could be due to improved medication adherence, through effect on nausea, appetite and mood
- Few clinical studies on the effect of cannabinoids on immunity

# Cannabinoids and HIV/AIDS

## Laboratory studies

- cannabinoids administration induce an attenuated progression of HIV (or Simian Immunodeficiency Virus)
- CB2 activation gives a beneficial adjunctive antiviral effects against CD4-tropic viruses (in late stages of HIV-1 infection)

# Cannabinoids and glaucoma

- Glaucoma is a slowly progressive optic neuropathy, one of the major causes of blindness, and related to increased intra-ocular pressure (IOP)
- Cannabinoids decrease IOP via CB1 receptors in eye
  - Animal studies in the eighties
- Suggested mechanism: cannabinoids reduce IOP by acting as indirect sympatholytics and inhibiting norepinephrine release within the eye, via CB1 but also via adrenergic receptors
- Also: neuroprotective effect on retinal ganglion cells

# Cannabinoids and glaucoma

- Cannabigerol less side-effects than cannabidiol (conjunctival erythema and hyperemia)
- Topical application (Canasol)
- High frequency of administration
- Oral forms central side-effects



# Potential « other » indications of cannabinoids in medicine

Recent or ongoing studies in animals/cells:

- Cardiovascular disorders (agonism, antagonism)
  - action of anandamide and 2-AG on the development of atherosclerotic plaque (CB2), as well as an effect on heart rate, blood pressure, vasoactivity and energy metabolism (dyslipidemia and obesity)
- Alzheimer's disease
- Opioid dependence
- .....

# Potential « other » indications of cannabinoids in medicine

Recent or ongoing trials in humans:

- Cannabidiol for inflammatory bowel disease
- Oral THC for fibromyalgia
- Psychiatry and mental health
- .....

More information: [www.cannabis-med.org](http://www.cannabis-med.org)



# Conclusion

- Cannabinoids in medicine: field of ongoing research and potential implications
  - Part of research has been done with THC or suboptimal application forms
- Effects of cannabinoids for different diseases and symptoms related to
  - Anti-inflammatory effect
  - Antispasmodic effect
  - Neuroprotection
  - « mental » effect including increased appetite and perception of symptoms
  - Disease-specific (unknown) effect

# Conclusion

- « Fine tuning » with different cannabinoids for different indications to be done
- For most indications: cannabinoids can currently not be recommended as a first-line treatment (but this might change in the future)
- But: if side-effects are tolerated, cannabinoids, used in a safe application form, can be considered a good alternative treatment for pain, asthma, AIDS, glaucoma as well as several other diseases and symptoms

# Thank you for your attention

- ...and help us advance the puzzle.....

**Cannabinoids in Medicine – An Option?**