



# 3rd International Medical Cannabis Conference (CannX 2018) Tel Aviv, Israel, October 14–16, 2018

## Abstracts

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### Innovations in Science and Medicine: Theory/General Aspects

CANNX18-0023

#### Co-Culture, Stigma and Deprivations among Medical Cannabis Patients in Israel

*H. Bonny-Noach*

Ariel University, Department of Criminology, Ariel, Israel

This paper presents the social and cultural aspects and perception of being a medical cannabis user in Israel. The aim of this study is to understand and explore the co-culture and behavioral norms of medical cannabis patients, including: values, behavioral norms, language (slang), symbols, rituals, and more. While cannabis has been defined for many years as a dangerous substance, and cannabis policy in Israel has only changed in the last years, patients of medical cannabis still experience prejudice, discrimination and stigma. This paper shows the way in which medical cannabis patients perceive and process stigma, and how it influences their co-culture, affects their interactions and experiences with others, as well as their medical cannabis treatment, and why is it important for professionals to understand this co-culture.

CANNX18-0039

#### Cannabis Is Personal: The Intersection Between Human Genetics and Cannabis

*L. May*

CEO & Founder of EndoCanna Health, Seattle, USA

In 2018 with more and more consumers having access to legal Cannabis the interest in incorporating cannabis in to their lifestyles is becoming more and more prevalent. Len May, founder of EndoCanna Health, a research and development bio-technology company specializing in Direct-to-Consumer genetic testing, will walk session goes through how human DNA and the endocannabinoid system interact with Cannabis. This session will walk through the scientific breakthroughs that have been discovered using human genetics to find compatibility for individuals and the cannabis plant.

Conference goers will get insights on:

- Developing Cannabis products based on Human genetics
- The latest breakthroughs in Cannabis and genetics research
- The science of Genetics and Cannabis

How to best educate the Cannabis consumer about Cannabis and the Endocannabinoid system.

CANNX18-0046

#### Rationale to Evaluate Community-Led Interventions Employing Cannabis as Harm Reduction During the Opioid Overdose Crisis

*M.J. Milloy<sup>1</sup>, K. Heed<sup>2</sup>*

<sup>1</sup>British Columbia Centre on Substance Use, Research, Vancouver, Canada; <sup>2</sup>GrowX Global, Operations, Vancouver- BC, Canada

As with many settings throughout North America, Vancouver, Canada, is experiencing an unprecedented public health crisis resulting from opioid overdoses. Sparked by the contamination of the illicit drug supply with novel opioids such as fentanyl, the crisis has caused hundreds of deaths and calls for novel interventions to mitigate the risks of overdose. Evidence from this setting and others have described the ad hoc use of cannabis by people at risk of overdose to modulate their drug use patterns and reduce the risk of drug-related harms. Further, a growing wealth of pre-clinical evidence describes promising interactions between the human endocannabinoid system and various dependence-related processes, such as pain, anxiety/depression and drug withdrawal. In light of this, several community-based groups in Vancouver's Downtown Eastside, an urban neighbourhood with high levels of marginalization, criminalization and overdose, have started unsanctioned programmes to distribute cannabis/cannabinoids to individuals at risk of overdose.

In this presentation, the two speakers will share their knowledge and viewpoints around the planned evaluation of these cannabis-based interventions. Dr. M-J Milloy, an epidemiologist and research scientist, will discuss the scientific rationale for the evaluation and outline the evaluation's objectives and activities. Mr. Kash Heed, a former officer with the Vancouver Police Department who served in the Downtown Eastside, a long-time drug policy reform advocate, and the founder and chief operating officer of GrowX Global, a licensed producer of cannabis in Canada, will share his experiences and explain his company's support for this research project.

**CANNX18-0041**

**Concrete Evidence of Medical Cannabis Saving Lives and How Data Can Help the Cause**

C. Moore<sup>1</sup>

<sup>1</sup>Phillip Millar is the CEO of Medical Marijuana Consulting MMC, Phillip is CEO- Contact person is Director of Marketing, London, Canada

This is a story of a former Combat Infantry/Airborne Officer who served Canada for over a decade in a variety of overseas missions. In doing this, he became intimately aware of the effects of PTSD on soldiers and the positive impacts medical cannabis can have. After a medical release from the military, he completed law school and for a brief period was a prosecutor. His' transition from high-level military operations to the world of law provides an insightful approach to the marijuana industry.

Hundreds of After Action Reports in the military provide him with an excellent ability to extract and learn from mistakes in the cannabis industry, and he is pleased to share them with the audience. The lecturer will address a variety of topics including:

- The lessons learned from the Canadian experience and what to expect when adapting to barriers within different markets.
- How to service medical patients who do not understand medical cannabis and how to expand the market for cannabis use.
- Lessons learned from Canada without holding back.
  - o The mistakes Canada made that other jurisdiction can avoid when introducing new regulations.
- How to get insurance companies to cover medical cannabis.

- o Including examples of successful campaigns and the precedent letters that convinced big insurance companies to pay for cannabis.
- Data that conclusively shows that medical cannabis for PTSD reduces veteran suicides.

**CANNX18-0037**

**Clinical Trials: The Santé Cannabis Model**

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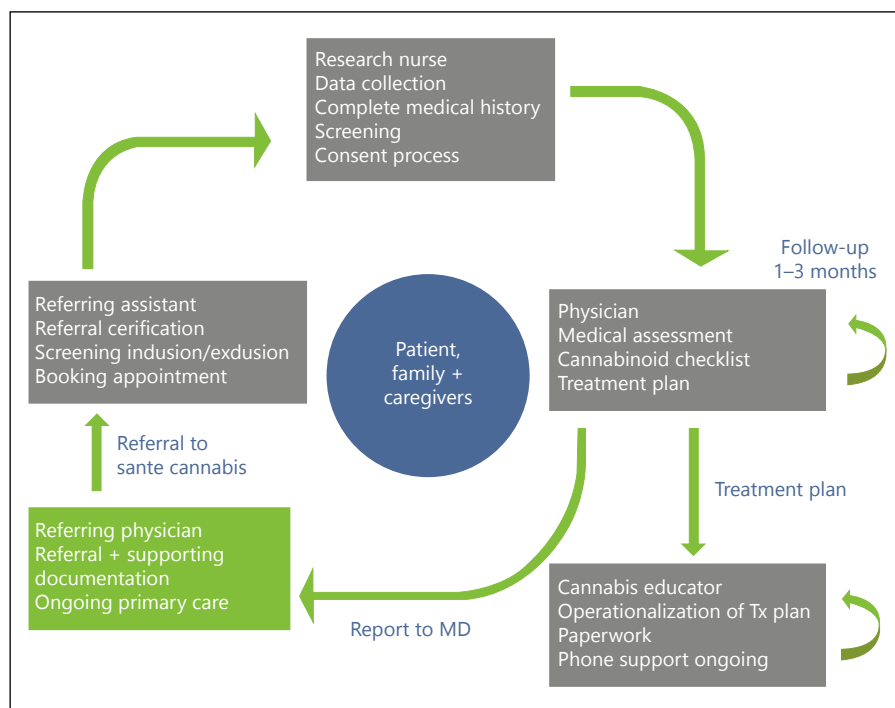
<sup>1</sup>Santé Cannabis, Research, Montreal, Canada;

<sup>2</sup>McGill University, Oncology, Montreal, Canada

**Introduction:** Canada's *Access to Cannabis for Medical Purposes Regulations (ACMPR)*, provide a unique opportunity for medical cannabis clinical research within a well-controlled regulatory framework. Cannabis-specialized clinics are often under-utilized for their capacity for clinical observational research, however some examples of best practice clinics operate unique research models. One such clinic, Santé Cannabis has transitioned its clinical observational data to support product development and trial design, administration and recruitment on behalf of pharmaceutical sponsors.

**Objective:** To describe a specialized clinical research model of patient screening, assessment, data collection, follow-up and monitoring of medical cannabis treatment of a diverse patient population and demonstrate how the analysis of clinical observation can support clinical trial design and development.

**Methods:** Santé Cannabis, a leading specialized medical cannabis clinic with various locations in the province of Quebec, Can-



**Fig. 1.** Santé Cannabis clinical model (For Abstract no CANNX18-0037).

**Table 1.** Santé Cannabis patient demographics and safety data (For Abstract no CANNX18-0037)

Total Patients	
Assessed for medical cannabis treatment	3,415
Followed for at least 3 months	2,952
Gender	
Male	53.4%
Female	46.6%
Age	
>80 Years	4.4%
70–80 Years	8.0%
60–70 Years	19.1%
50–60 Years	25.4%
40–50 Years	18.8%
30–40 Years	14.4%
20–30 Years	8.7%
<20 Years	1.2%
Primary Diagnosis	
Chronic non-cancer pain	49.1%
Cancer	11.7%
Arthritis	11.5%
Anxiety, depression, other mental health condition	9.4%
Epilepsy	5.2%
Inflammatory bowel disease	4.8%
Multiple sclerosis	2.1%
Spinal cord injury or neurological disease	3.2%
Other	3.0%
Number of patients reporting at least one side effect	935
Severity of side effect reported	
Mild	864
Moderate	67
Severe	4
Serious	0
THC:CBD ratio of suspected product	
THC rich	51%
THC:CBD	40%
CBD-rich	9%
Route of administration of suspected product	
Oral administration	68%
Inhalation	30%
Other	2%

ada, has an established clinical research model (Figure 1) and has collected a database of efficacy and side effects from approximately 3000 medical cannabis patients (demographics and safety data in Table 1).

Optimal clinical data obtained from patient and caregiver include the following quantitative and qualitative measurements:

- Complete medical history
- Pain, symptom burden and quality of life validated measurement tools (i.e. Brief Pain Inventory-Short Form, Edmonton Symptom Assessment Scale, EQ-5D-5L)
- Cannabis formulations prescribed, dosage, frequency and route of administration
- Adverse event reporting and severity classification guidelines

**Conclusion:** Specialized medical cannabis clinical research sites may provide valuable data collection, analysis and specific research training to support clinical practices in a collaborative and interdisciplinary setting. The patient database can provide guidance to the development of cannabis-based investigational drugs. These established research models can be adapted to new care settings and to emerging international regulatory environments.

#### CANNX18-0032

### Knowledge and Attitudes About Cannabis Among Mental Health Clinicians

*J. Roberts<sup>1,2</sup>, J. Marcu<sup>1</sup>*

<sup>1</sup>International Research Center on Cannabis and Mental Health, Translational Research, New York, USA; <sup>2</sup>New York University, Silver School, New York, USA

Twenty-nine states in the United States of America have legalized medical cannabis. However, the stigma surrounding cannabis continues and few mental health clinicians have been educated on its use and benefits. This presentation provides data conducted from an international online survey of mental health clinicians on knowledge and attitudes about medical cannabis.

A web-based confidential survey was conducted with IRB approval from NYU on a sample of mental health clinicians. The goal of this survey was to determine what type of knowledge and attitudes mental health clinicians have about cannabis, the endocannabinoid system, and issues specific to medical cannabis use. In addition, questions measuring bias against recommending cannabis for therapeutic reasons and level of knowledge on their state's legal medical cannabis programs.

The findings of this study demonstrate the disconnect between current research on the science of therapeutic cannabis use, the endocannabinoid system, and mental health clinicians' knowledge. Furthermore, the data presents unique findings about how mental health clinicians have internalized stigma about cannabis and how stigma impacts clinicians' comfort in discussing medical cannabis use with their clients. Clinicians also report not having an understanding about their state's medical cannabis programs rules and regulations.

The findings of this study highlight a disconnect in current clinical practice and identify specific issues that need to be addressed to create a more knowledgeable profession for social workers who work with clients using medical cannabis. Mental health clinicians report lacking education about topics specific to medical cannabis such as biphasic effect, microdosing, method of consumption, and the entourage effect of medical cannabis use need to be addressed. Furthermore, the findings indicate a significant bias between what clinicians think about cannabis and how they feel about recommending it to their clients. In addition, clinicians report not agreeing with the Gateway Theory or solely abstinence-based models but are uncomfortable recommending cannabis for treatment of many ailments. This study has yielded important results that are important to the field of social work. This study demonstrates that stigma and lack of education about cannabis research exists. Due to the limitations of the study design, further research is needed.

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## Innovations in Science and Medicine: Practical Aspects

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CANNX18-0034

### Medical Cannabis Oil: Results from the First-in-Human Phase 1, Double-Blind, Randomized, Placebo-Controlled Study

M.F. Arboleda<sup>1,2</sup>, E. Prosk<sup>2</sup>, G. Chamberland<sup>3</sup>, A. Viganò<sup>1,2</sup>

<sup>1</sup>McGill University Health Center, Oncology- Supportive and Palliative Care Division, Montreal, Canada; <sup>2</sup>Santé Cannabis, Research, Montreal, Canada; <sup>3</sup>Tetra Bio-Pharma, Research, Montreal, Canada

**Introduction:** Despite the growing popularity of medical cannabis oil for its easy administration, precise concentration of tetrahydrocannabinol (THC) and cannabidiol (CBD) and indication for the control of a variety of symptoms, data concerning its safety, tolerability and pharmacologic characteristics are still lacking. In order to start filling this gap, we deployed a first in-human Phase 1 trial of a pharmaceutical-grade cannabis oil capsule, PPP005, containing 10 mg THC and 10 mg CBD.

**Method:** A single-center, double-blind, Phase 1, randomized, placebo-controlled trial was designed and developed in two consecutive parts: 1) Part A, which consisted of a single dose of PPP005 or placebo-to match capsule, administered orally in a fasted state in the morning of Day 1; 2) Part B, which consisted of daily doses of PPP005 or placebo capsule, administered for seven consecutive days. Plasma samples were analyzed for CBD, THC and its primary metabolite 11-hydroxy-THC. Safety data (i.e. cardiodynamic monitoring, vital signs, hepatic and renal function and adverse events) were analyzed prior to initiating the multiple dose portion of the study.

**Results:** Ten healthy subjects were enrolled between March and April 2018 (mean age 42.1 years, SD±11.7; 60% male). After a single dose of PPP005, plasmatic levels of THC, 11-hydroxy-THC and CBD were detectable at 1.75 (±0.69) hours, 1.5 (±0.4) hours and 1.66 (±0.75) hours respectively. The mean peak plasma concentration ( $C_{max}$ ) of THC and CBD were 1.62 (±0.95) ng/ml and 0.89 (±0.38) ng/ml respectively. Detectable blood concentration of 11-hydroxy-THC remained up to 24 hours after single administration. Forty percent of the subjects reported adverse events, of which the majority (83%) were classified as mild (tolerated, not requiring discontinuing cannabis oil). No clinically significant abnormalities were reported from electrocardiogram and/or vital signs after single and multiple dosing. Likewise, there was no hepatic or renal impairment detected.

**Conclusion:** Capsules of medical cannabis oil containing 10 mg THC and 10 mg CBD were found to be safe and well-tolerated. In order to determine the clinical efficacy of cannabis oil, a Phase 2 clinical trial is underway to test different formulations of cannabis oil in patients with cancer and non-cancer related chronic pain.

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CANNX18-0045

### Frequent Cannabis Use Associated with Lower Risk of Non-Fatal Overdose in a Setting with a Community-Wide Opioid Overdose Crisis

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**Introduction:** Unprecedented numbers of deaths from illicit drug overdoses are a public health crisis in many settings in North America. Preliminary evidence from ecologic analyses of population-level datasets, among other sources, have raised the possibility that cannabis/cannabinoids might play a beneficial role in mitigating the crisis. However, individual-level data from individuals at risk of overdose has been lacking.

**Methods:** We used data from three long-running prospective cohorts of people who use illicit drugs at risk of overdose in Vancouver, Canada, a setting with a community-wide overdose crisis. At recruitment and every six months thereafter, participants complete an interviewer-administered structure questionnaire and provide blood and urine for analysis, including a screen of common urine drug metabolites. We used generalized linear mixed-effects analyses to estimate the relationships between cannabis use and reporting a non-fatal overdose in the last six months and having a urine screen positive for fentanyl.

**Results:** Between June 2016 and November 2017, 1459 participants, including 939 (65.1%) males, contributed 3029 interviews, of which 445 (14.7%) contained a report of a non-fatal overdose in the previous six months and 392 (26.8%) reported at least daily cannabis use in the previous six months. In a generalized linear mixed-effects model adjusted for confounders, at least daily cannabis use was negatively associated with reporting a non-fatal overdose (Adjusted Odds Ratio [AOR] = 0.48, 95% Confidence Interval [95% CI]: 0.25–0.91) In a separate generalized linear mixed-effects model adjusted for separate confounders, having a urine drug screen positive for THC was negatively associated with urine positivity for fentanyl (AOR = 0.46, 95% CI: 0.36–0.60).

**Conclusions:** To our knowledge, these results are the first to independently link cannabis use to lower risks of exposure to fentanyl and experiencing a non-fatal overdose. Although drawn from observational data, these findings are consistent with other preliminary evidence identifying a possible beneficial role for cannabis/cannabinoids in addressing the ongoing overdose crisis. Further research, including efforts to gather data on cannabis type, route of administration and dosing, as well as experimental studies among humans, are urgently needed.

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CANNX18-0038

## PTSD & Insomnia: Polysomnographic Evidence of Changes in Sleep Architecture and Sleep/Wake Functioning with Medical Cannabis Treatment

*D. Miri<sup>1</sup>, A. Donath<sup>2</sup>, C. Thirlwell<sup>1</sup>*

<sup>1</sup>Sleep Wake Awareness Program SWAP, Psychiatrist & Sleep Medicine, Toronto, Canada; <sup>2</sup>Tilray, Clinical Relations Manager, Toronto, Canada

For centuries, cannabis was used for sedation and pain management. Studies suggest cannabis can be used as a safe and effective treatment for PTSD and other increased arousal conditions, such as chronic insomnia. However, most studies do not utilize objective polysomnographic sleep studies to study the effects of medical cannabis (MC) on sleep quality and quantity.

This case study was conducted in a community sleep medicine clinic and assessed the effectiveness of MC on sleep quality and quantity, PTSD, and overall improvement of daytime symptoms associated with chronic insomnia. The patient protocol was to utilize CBD oil during the day, taking 0.5 ml in the morning and afternoon, and 1 ml of hybrid CBD:THC oil 1 hour prior to bedtime. This treatment was under the supervision of a sleep medicine specialist, who assessed the polysomnographic sleep study data with the patient outcomes measured through daily sleep diaries, self-report measures of Insomnia Severity Index, PTSD scales, and Daytime Fatigue Severity Scale. Overnight polysomnographic sleep studies were conducted prior to initiation of treatment with MC treatment and 3 months post-initiation of MC treatment.

The patient showed significant improvements in sleep onset latency, wake time after sleep onset, sleep efficiency, insomnia severity, and overall increased daytime energy and functionality with reduced PTSD symptoms post-treatment. Results demonstrate objective polysomnographic data of the effects of treatment with MC on sleep architecture. MC is a promising therapeutic option in conditions with increase arousal of sympathetic nervous system tone, such as PTSD and insomnia.

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CANNX18-0035

## Cannabis Use as an Alternative for Opioids, Antipsychotics and Antidepressants Among Geriatric Patients in a Long-Term Care Setting: A Case Series

*B. Pearson*

Greenly Health Ltd., Medical Research, Sarnia- Ontario, Canada

**Objective:** To describe therapeutic cannabis use as an alternative to opioids, antidepressants and antipsychotics, in geriatric patients in a long-term care setting.

**Introduction:** Seniors in Canada's long-term care (LTC) facilities are twice as likely to be prescribed opioids and three times as likely to be on antidepressants than others their age. On average, LTC patients in Canada are on 9.9 different classes of medications (compared to 6.7 in the community) and research has clearly established a strong correlation between polypharmacy and in-

creased risk of negative health outcomes, falls, adverse drug events, and higher health costs [1].

**Methods:** One hundred and fifty-two patient medical records were reviewed at one nursing home to identify which residents would benefit from: 1) a reduction in polypharmacy and/or 2) trialing an alternative therapy due to poor response to current treatment or negative side effects. Families and patients were heavily embedded in the follow-up process and six patients self-selected to trial cannabinoid therapy. Indications for treatment were chronic pain or responsive behaviours secondary to dementia. Patients were monitored every eight hours over a period of two months.

**Results:** Six patients (all female, average age: 87) were selected. All patients were prescribed a high CBD cannabis oil with a concentration of 5 mg THC:20 mg CBD per 1 ml. Patients were started at a dose of 0.125 ml QID with dose adjustments occurring every four days based on symptoms. Maximum dose did not exceed 1 ml. All four patients on an antidepressant (trazodone) were able to discontinue use. Three out of four patients on opioids (Fentanyl, Percocet, Dilaudid) discontinued use. Three out of three patients on an antipsychotic (Seroquel) discontinued use. No increase in gait disturbances or falls were observed.

**Conclusions:** All patients started on the cannabinoid protocol experienced a large reduction in their opioid, antidepressant and antipsychotic doses. Clinical trials are warranted to test these effects amongst a greater geriatric population.

### Reference

- 1 Canadian Institute for Health Information. Drug Use Among Seniors in Canada 2016. [www.cihi.ca/sites/default/files/document/drug-use-among-seniors-2016-en-web.pdf](http://www.cihi.ca/sites/default/files/document/drug-use-among-seniors-2016-en-web.pdf) Accessed May 17, 2018.

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CANNX18-0028

## A New Formulation of Cannabidiol and Chitosan for the Treatment of Dyslipidemia and Weight Gain

*D. Robinson<sup>1</sup>, S. Prutchi Sagiv<sup>2</sup>, N. Ben Shalom<sup>3</sup>*

<sup>1</sup>Rabin Medical Center, Orthopedics, Petach Tikvah, Israel;

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The Standard American Diet (SAD), rich in carbohydrates, saturated fats and polyunsaturated fatty acids, is a known risk factor for metabolic diseases including dyslipidemia, a very common condition (up to 50% of the population) in which one or more of the serum lipid (LDL cholesterol and triglycerides) levels are abnormal. Dyslipidemia is responsible for nearly 20% of cerebrovascular disease and 60% of ischemic heart disease. Furthermore, it can lead to increased organ adiposity possibly triggering systemic immune responses.

Cannabidiol (CBD), a non-psychoactive component of Cannabis, is a known immuno-modulator and has been shown to improve metabolic functions, suggesting a possible mitigating role in metabolic syndrome and consequently serum lipid levels. We have developed CLC, a novel, patent-protected formulation of CBD with chitosan, a biocompatible, non-toxic, and non-immunogenic compound that enhances the potential of CBD to significantly reduce blood lipid levels.

**Methods:** Twenty Wistar rats (male, 3 months old) were tested by employing an N of One study design with two exposure periods to the CLC. Following 1 week of acclimatization, the rats were fed a SAD (high fat/high sugar HF/HS) diet for 6 additional weeks, during which, CLC (10 mg per kg/weight) was added to their food on weeks 5 and 7 only. Weight, cholesterol and triglycerides levels were monitored weekly.

**Results:** A significant decrease in cholesterol (fig 1a), as well as improvement in triglycerides/HDL ratio was demonstrated during both CLC treatment periods. Triglyceride levels were also reduced. Furthermore, weight gain following SAD diet administration alone, was reversed with CLC (fig 1b).

**Discussion:** SAD diet caused predictable changes in metabolism causing dyslipidemia and weight gain in the rat model. CLC administration apparently reverses the deleterious effect of SAD diet by reducing weight and cholesterol and triglycerides levels. Clinical trials are planned later this year.

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#### CANNX18-0040

### Heavy Recreational Cannabis Use Negatively Impacts on Bone Health – A Cross-Sectional Study

*A. Sophocleous*<sup>1,2</sup>, *R. Robertson*<sup>3,4</sup>, *N. B. Ferreira*<sup>5</sup>, *J. McKenzie*<sup>2,4</sup>, *W.D. Fraser*<sup>6</sup>, *S.H. Ralston*<sup>2</sup>

<sup>1</sup>European University Cyprus, Department of Life Sciences-School of Sciences, Nicosia, Cyprus; <sup>2</sup>University of Edinburgh, Rheumatology and Bone Diseases Unit- Centre for Genomic and Experimental Medicine- MRC Institute of Genetics and Molecular Medicine, Edinburgh, United Kingdom; <sup>3</sup>University of Edinburgh, Usher Institute of Population Health Sciences and Informatics, Edinburgh, United Kingdom; <sup>4</sup>National Health Service, Muirhouse Medical Group, Edinburgh, United Kingdom; <sup>5</sup>University of Nicosia, Department of Social Sciences- School of Humanities and Social Sciences, Nicosia, Cyprus; <sup>6</sup>University of East Anglia, Department of Medicine, Norwich, United Kingdom

Preclinical studies have shown that the endocannabinoid system plays a key role in bone metabolism via the type 1 (Cnr1) or type 2 (Cnr2) cannabinoid receptors. These observations together with the recent developments in the medical use of cannabis worldwide and the full legalisation of marijuana for recreational purposes in some countries, prompt us to investigate the impact of recreational cannabis use on bone health. The study was conducted with 284 individuals recruited from a local community in Edinburgh. Bone mineral density (BMD), fat mass and other relevant clinical variables were recorded. Of the 284 individuals recruited 170 (59.9%) were regular cannabis smokers, and were divided into two groups based on lifetime cannabis smoking episodes; moderate users (<5000 episodes; n = 56) and heavy users (>5000 episodes; n = 114). Controls were tobacco smokers who did not smoke cannabis (n = 114). Heavy cannabis users were younger than controls (p < 0.005), had a higher dietary calcium intake (p < 0.005), a lower body mass index (BMI) (p < 0.01) and were more likely to use other illicit drugs (p < 0.005). Heavy cannabis users had lower BMD in the hip (p < 0.005), lumbar spine (p < 0.005) and femoral neck (p < 0.05) than controls. Fractures were more common in heavy cannabis users (rate ratio = 2.17; p < 0.001). Serum biochem-

ical analyses showed that heavy cannabis users were significantly likely to lose (p < 0.045) and form new bone matter (p < 0.01) when compared to controls, suggesting a higher bone turnover. Multiple regression analysis showed that heavy cannabis use was an independent predictor of low BMD at lumbar spine, femoral neck, and total hip, accounting for 5.4% (p = 0.035), 3.9% (p = 0.01) and 5.8% (p = 0.001) of the variance, respectively. Mediation analysis showed that the effects of heavy cannabis use on total hip and femoral neck BMD were direct, but on spine BMD were indirect and mediated through low BMI. We conclude that recreational heavy cannabis use has a negative impact on bone health, and that more studies are needed to ascertain the potential impact of regulated cannabis consumption for medicinal purposes.

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#### CANNX18-0024

### Fungi Get “High” with the Synthetic Cannabinoid HU-210?

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<sup>1</sup>Hebrew University, Biofilm Research Laboratory, Jerusalem, Israel; <sup>2</sup>Hebrew University, Pharmacy, Jerusalem, Israel

Very very little studies have been conducted on the effect of cannabinoids on the microbial world. We have tested the effect of synthetic cannabinoid on fungi in planktonic and biofilm environments.

The HU-210, is a synthetic cannabinoid, 100 to 800 times more potent than the natural THC produced from cannabis plants. HU-210 displays a multiple biochemical, pharmacological, and behavioral effects in eukaryotes. Most of its effects have been proven to be dependent on a selective agonistic activity at CB1 and CB2 cannabinoid receptors.

We have tested the anti candida effects of the synthetic cannabinoid, HU-210, on variety of fungal properties as; minimal inhibitory concentration, anti biofilm effect, alteration in hydrophobicity. The candida chosen to be tested was *Candida albicans* which is often found in fungi infections as in the oral cavity and vaginal infections.

We have found that HU-210 had an effect on several properties of *C. albicans*. It affects fungal survival in planktonic conditions only at very high concentrations. However HU-210 does effect biofilm formation of this type of fungi. It sharply reduces biofilm formation but without killing the cells. It effects other properties of the Candida. It affects the hydrophobic properties of the Candida, turning the fungi toward a more hydrophilic state. The HU-210 also affects transition of candida from yeast to hyphae which is also another virulent parameter of this microbe. It shorten the hyphae and increase the relative amount of yeast form in the biofilm.

These results are indications that synthetic cannabinoids as HU-210 may act as a novel non-classic anti-bacterial agent for treatment of infection diseases. This would hint that other cannabis/cannabinoids may be used as anti-fungal drugs.

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Steinberg holds the H. Leslie Levine Chair in Oral Pathology and Dental Medicine.

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CANNX18-0033

### New Frontiers in Treating Chronic Insomnia in Canadian Veterans with PTSD: Retrospective Analysis Reveals an Innovative Role for Medical Cannabis in Optimizing Sleep/Wake Health

C. Thirlwell<sup>1</sup>, K. Rainville<sup>2</sup>, D. Miri<sup>1</sup>, A. Donath<sup>3</sup>, H. Shulman<sup>4</sup>

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There is a bi-directional relationship between sleep and psychological and physical disorders. Chronic insomnia is primarily the result of autonomic nervous system (ANS) instability with increase sympathetic nervous system (SNS) tone, which perpetuates and exacerbates pain symptoms and adversely affects the immune system (Moldofsky et al 2001; Kruger 2008) and endocrine system (Schafers et al 2008). In veterans suffering from PTSD, there is triggering of the flight & fight system (ie. SNS) and this triggers hyper-vigilance/hyperarousal, resulting in chronic insomnia.

Clinically, chronic insomnia is difficult to treat with standard pharmacological agents. Currently, pharmacologic agents are used as first-line to treat insomnia; these include non-benzodiazepine receptor agonists, benzodiazepine receptor agonists, the selective melatonin receptor agonist ramelteon, and sedating antidepressants. When these do not prove to be effective, then other pharmacological agents are used off label to induce sleep and these include: anti-psychotics, gravol, and even opioid, with adverse side-effects on sleep/wake functioning. Veterans suffering from chronic intractable insomnia will self-medicate with alcohol and street cannabis so as to find the relief of sleep.

Targeting sleep with medical cannabis (MC) treatment has the potential to have a positive effect on co-morbid psychological and physical disorders, while reducing the unwanted side-effects of other pharmaceutical agents. It also has the potential for harm reduction, by decreasing the off label use of pharmaceutical agents and decreasing the risk of self-medication through alcohol or other illicit substances.

This study is a retrospective chart review of 100 Canadian Veterans, who were treated with standard pharmacological agents and then given access to treatment with MC ranging from 3 g–10 g OD. The side-effect profiles of the medications they were prescribed were reviewed. Standardized scales assessing function and sleep quality before and after the initiation of MC revealed a marked improvement in sleep, functioning and improved physical and mental health. Review of the dosing regimens developed by veterans, revealed that daytime microdosing dosing with CBD oil during the day and dosing with hydrid CBD/THC oil and/or high THC whole-plant brought both daytime and nighttime PTSD and SNS hyperarousal under control, resulting in marked improvement in sleep and daytime functioning.

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CANNX18-0044

### The Effects of Cannabis Use on Cardiac Rate and Rhythm in Post-Myocardial Infarction Subjects

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**Introduction:** Between 2002–2014 in the United States, there was a stunning 455% increase in cannabis consumption among adults ages 55–64 years and 333% in ages >64. Since cardiac disease increases dramatically with increasing age, it is increasingly likely that people with heart disease will be regular cannabis users. While it is well accepted that cannabis use increases heart rate (HR), the effects on cardiac rate and rhythm in people with pre-existing heart disease are poorly understood. To directly assess the effect of cannabis consumption on cardiac rate and rhythm, cannabis users (healthy or with a history of myocardial infarction (MI)) were fitted with ZioPatch cardiac monitors. Using ambulatory cardiac monitoring for up to 14 days, we compared cardiac rate and rhythm profiles for one-hour prior to cannabis use to a four-hour period following cannabis use. Subjects with prior MI were age- and sex-matched to subjects with no pre-existing cardiac disease.

**Results:** In this ongoing study, 38 control subjects and 15 post-MI subjects have been enrolled. Cannabis use was associated with non-significant short-term increases in HR in both groups. At 1-hr post use, HR in control subjects was  $4.5\% \pm 10.6\%$  higher than HR 1 hour prior to consumption; in the post-MI group, HR 1-hr post consumption was  $1.2\% \pm 10.2\%$  higher than pre-consumption. In the post-MI group, there was an increased incidence of supraventricular tachycardia (SVT) with 57.2% of post-MI subjects experiencing SVT compared to 28.9% of the control subjects. Similarly, there was an increase in the incidence of non-sustained ventricular tachycardia (VT) in post-MI subjects with 35.7% of post-MI subjects experiencing VT compared to 5.3% of the control subjects. When post-MI cannabis users were compared to post-MI subjects who did not use cannabis, the post-MI cannabis users still demonstrated an increase in the frequency of both SVT and VT compared to post-MI subjects who did not use cannabis.

**Conclusions:** Cannabis use is associated with non-significant increases in HR and an increase in cardiac arrhythmias in post-MI subjects. These preliminary data suggest that cannabis use by people with a history of MI may contribute to increased arrhythmic burden.



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## New Technologies, New Opportunities

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CANNX18-0022

### Ultrasound-Assisted Extraction of Cannabinoids from *Cannabis Sativa* L.

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Ultrasonication was used to extract bioactive compounds from the inflorescence of *Cannabis sativa* L. such as polyphenols, flavonoids and cannabinoids. The influence of three independent factors (time, input power and methanol concentration) was evaluated on the extraction of total phenols (TPC), flavonoids (TF), ferric reducing ability of plasma (FRAP) and the overall yield. A face-centered central composite design was used for statistical modelling of the response data, followed by regression and analysis of variance in order to determine the significance of the model and factors. Both the solvent composition and the time significantly affected the extraction while the sonication power had no significant impact on the responses. The response predictions obtained at optimum extraction conditions of 15 min time, 130 W power and 80% methanol were 314.822 mg GAE/g DW of TPC, 28.173 mg QE/g DW of TF, 18.79 mM AAE/g DW of FRAP and 10.86% of yield. A good correlation was observed between the predicted and experimental values of the responses, which validated the mathematical model. On comparing the ultrasonic process with the control extraction, noticeably higher values were obtained for each of the responses. Additionally, ultrasound considerably improved the extraction of cannabinoids present in *Cannabis*.

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CANNX18-0026

### Virtual Rehabilitation Centre (VRC), an Integrative, Multi-Modal Follow-Up Tool for Chronic Pain

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The Virtual Rehab Centre was created by its founders to address the growing need for direct patient pain management virtually. With the rapidly expansive increase in technology we have created a rehabilitation centre that is instantly accessible to address pain and injury with specific functional rehabilitation approaches.

With one click of a button, patients have access to multiple health care providers (including Medical, Complementary Adjunctive Medical Therapies, and Lifestyle and continuing Management Strategies). Chronic pain patients are instantly virtually transported to their own health portal. There they can access programs that are going to function for them at their level and appropriate for their diagnosis.

Members can also order all their own home rehabilitation equipment that is uniquely prescribed for their needs. Home

equipment allows patients to continue to enhance their rehabilitation. Members will find everything from exercise equipment (like exercise bands/exercise balls), to home tractions units (to alleviate spinal pressures). This will allow for no confusion over which equipment to start off with or at what strength or size. This is prescribed directly from the clinicians on the website to allow for the optimum fit and utilization.

Many patients with other clinics have found themselves given a set of exercises or a treatment regimen that remains stagnant. Accessing our virtual rehabilitation clinic allows a patient to continue to progress moving past simple basic stretches as members continue to improve. Moving from initial intensive care programs through corrective care and finally into a maintenance phase treatment plan to decrease risk of re-injury. From customized prescribed progressive therapeutic exercise programs to one-on-one consultations, live group classes that are archived for repeated access by members. The Virtual Rehab Centre aims to offer a unique and effective approach to better manage a member's condition.

Through our VRC software tool, we aim to increase patient self-help, agency, and self-belief by providing access to instructional physical and mental rehabilitation content, direct healthcare representative communication, treatment plans and medication management online.

VRC will test the efficacy of Internet-based pain intervention software designed to offer a multi-modal, integrative, and personalized chronic pain management program, address the need for direct patient management virtually.

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CANNX18-0012

### Cannabinoids in Dentistry Future Revolutionary Concept in Dental Treatments

*V. Stahl*

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Today in 2018 many people are still suffering from gum disease, deep dental decays that lead to root canal treatments and tooth loss. Cannabite LifeLong<sup>®</sup> is researching and developing new products using medical cannabis components to cure many problems that still lead to tooth loss. A study published last year reported that 93.9% of adults in the US had some gingivitis, the first stage of gum disease. Gingivitis usually induces swelling and redness of the gum tissues surrounding tooth. Still another study published in 2012 in the US, revealed that 47.2% of the adult population above the age of 30, had periodontitis (which interpreted into 64.7 million Americans). In the event you were over the 65, the chance of having periodontitis would jump to 70.1 percent. Periodontitis is the more complicated stage of gum disease. Soft elastic ligaments are representing the connection between the root and the surrounding bone (PDL). In Periodontal disease, the bacteria are mainly anaerobes, responsible for bone loss and degradation of the PDL.

This disorder contributes to bad breath, loose of teeth, sensitive teeth, pain, gum recessions, decrease the functionality of the masticatory system. Sometimes even spread of infection to other parts of the body. The dental microbiome is constituted of more than 800 microorganism species, using different subsets pre-dominant



**Fig. 1.** (For Abstract no CANNX18-0012).

ing at unique habitats. Cannabite LifeLong® started last year a research with Cannabinoids.

Medical cannabis and its high potential for healing properties will lead to developments of historical impact in the dental field. The first goal of the research is to identify on several different patients the decrease of a specific pathogenic microorganism after Cannabinoid application. In our study, we found a significant reduction of the pathogens after application of several different Cannabinoids. Those facts are leading us to be very optimistic about the possible future treatments of dental disorders, with the well researched properties of the Cannabinoids.

The large variety of compounds, sources and several applications with different healing properties makes this research very challenging and costly. The future solutions and benefits of many people round the globe, drives us to persistence and believe in our project.

#### References

<https://cannabitedent.com>  
<https://euro-dent.be>

#### CANNX18-0013

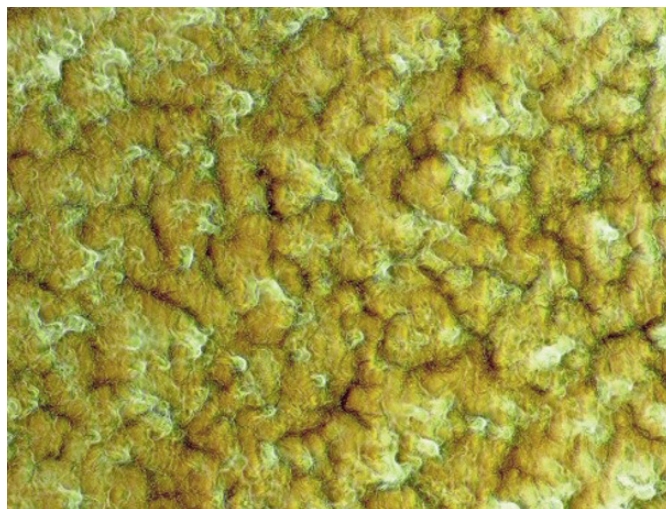
### Cannabinoids in Dentistry Future Revolutionary Concept in Dental Treatments

*V. Stahl*

Cannabite Life Long/Euro Dent Belgium bvba, Dentistry, Mortsels, Belgium

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first goal of the research is to identify on several different patients the decrease of a specific pathogenic microorganism after Cannabinoid application. In our study, we found a significant reduction of the pathogens after application of several different Cannabinoids.

Cannabis produces an assortment compounds called cannabinoids. There are existing many cannabinoids with high healing potential on many cells of the body. The majority of them exist at affordable levels, notably within commercial cannabis products and solutions, which makes it difficult for scientists to accurately watch all of them. Let us have a better look at a number of the significant cannabinoids which may be seen at cannabis products and solutions.

Cannabis does not directly create the most famed cannabinoids connected with the plant life, THC and CBD. All these cannabinoid acids should be “triggered” (decarboxylated), usually by heat, to give the chemicals used. (THC or CBD). However, along with THCA and CBDA, you can find lots of related cannabinoid acids which can produced by the Cannabis plant.

- CBGA (Cannabigerolic acid)
- THCA ( $\Delta^9$ -tetrahydrocannabinolic acid)
- CBDA (Cannabidiolic acid)
- CBCA (Cannabichromenic acid)
- CBGVA (Cannabigerovarinic acid)
- THCVA (Tetrahydrocannabivarinic acid)
- CBDVA (Cannabidivarinic acid)
- CBCVA (Cannabichromevarinic acid)

Following decarboxylation, (heating) all of those cannabinoid acids yields a corresponding cannabinoid Chemical:

- CBG (Cannabigerol)
- THC ( $\Delta^9$ -tetrahydrocannabinol)
- CBD (Cannabidiol)
- CBC (Cannabichromene)
- CBGV (Cannabigerivarin)
- THCV (Tetrahydrocannabivarin)
- CBDV (Cannabidivarin)
- CBCV (Cannabichromevarin)

CBN was discovered to bring about sedation when along with THC, and may possibly also have anti-convulsant (anti-seizure)

anti-inflammatory, antifungal, and antifungal properties. All those properties could be used in the dental field.

Cannabite LifeLong with your Natural teeth<sup>®</sup> in collaboration with the dental office situated in Belgium Europe, Euro Dent Belgium bvba<sup>®</sup>, is achieving valuable results in the field, and maybe shortly will lead to an solution in the Dental field.

#### References

<https://cannabitedent.com>

<https://euro-dent.be>

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## TOPIC: Advanced Agriculture and Production

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CANNX18-0027

### Pros and Cons of Cloning Propagation and How to Shift to Seed Production

*H. Less*

Yarok-MedTech Ltd., Co-Founder, Orot, Israel

Most industrial crops are propagated from seed with only a few exceptions. These are 1) sterile plants that cannot produce seeds, e.g. banana, 2) long lifecycle from seed to maturity making breed-

ing a very long process, impacting the availability of genetically uniform seeds, e.g. trees, and 3) lack of understanding of the genetics that give rise to a desired phenotype which again translates into a lack of genetically uniform seeds, e.g. ornamentals. Cannabis does not fall into any of these categories, yet, most of the commercial growers use mother plants and cloning.

Commercial cannabis growers use clones for one simple reason – the lack of an alternative. Obtaining genetically uniform, high quality seeds at a reasonable price is impossible currently. The use of seedlings produced from tissue culture methods is also expensive and not widely available. Mother plants provide the advantage of being able to claim a unique genetic line and, once established, they are the most economical way to produce new seedlings today. However, there is a significant risk in relying on mother plants for an entire product line. If a catastrophic event damages the mother plants, there will be little chance to reproduce the same products. In addition, the amount of space and resources required to maintain mother plants greatly limits the number of varieties that can be produced.

In this presentation, I propose a solution for eliminating the risk associated with using mother plants. This method can be easily adapted by commercial growers to start an on-site breeding program. The grower will need to master the method of inducing male flowers on female plants throughout six cycles of selfing in a method known as “single seed descent” which will produce genetically uniform seeds related to the starting genetics. From this point onward, cultivation can be done from seeds which will result in identical cultivars every cycle while both reducing operational cost and enable facilitating upscaling.