



MCGILL
RESEARCH CENTRE
for CANNABIS



Quality Assurance and
Quality Control for Cannabis
Production, Products and Training



CANNABIS SCIENTIFIC SYMPOSIUM:

FROM PLANTS TO PEOPLE

May 12-13, 2022

McGill University-Macdonald Campus
(Sainte-Anne-de-Bellevue, QC)

Hybrid: Virtual
and In Person

KEYNOTE SPEAKER

Dr. Ethan Russo, M.D.

CReDO Science

"Current Research in Cannabis and
the Endocannabinoid System."

PLENARY SPEAKER

Dr. David Finn, Ph.D.

NUI, Galway

"Cannabinoids and Pain: Mechanisms,
Controversies and Future Directions."

SPECIAL GUEST SPEAKER

Dr. Raphael Mechoulam, Ph.D.

Hebrew University Medical Center

"Endogenous anandamide-like compounds."



Health Canada Santé
Canada Canada



Centre universitaire
de santé McGill
Institut de recherche



McGill University
Health Centre
Research Institute

For more information, please visit the **MRCC** or **QAQC** websites.
Abstracts (or other questions) may be sent to cannabis.medicine@mcgill.ca.



MCGILL RESEARCH CENTRE *for* CANNABIS

On October 17th, 2018, Canada became the first G20 country to legalize cannabis for both recreational and medicinal purposes. Yet, there remains uncoordinated research capacity in many domains of cannabis and cannabinoid science. Therefore, the objective of the **McGill Research Centre for Cannabis** is to offer a hub for integrated cannabis-related research activities, the outcomes of which will provide evidence-based knowledge and greatly impact cannabis-related decisions/policies surrounding health, society, and law.

This Centre brings together more than 60 scientists that have diverse, multi-disciplinary expertise that includes plant science, production, and processing; disease models/preclinical research, drug development and clinical trials; social implications as well as health and economic impact studies for guidelines on policies and laws. Through this collaborative effort, the goals of the Centre will be **(1)** to conduct high-quality, cutting-edge research on cannabis; **(2)** provide educational and training opportunities to develop highly-qualified personnel (HQP) in the areas that span agriculture and plant sciences, medicinal/clinical applications and socioeconomic policy; **(3)** offer knowledge translation and mobilization events on cannabis research and its impact on society; and **(4)** interact with the public, industry, government and other stakeholders.

Thus, the McGill Research Centre for Cannabis will harmonize our efforts in understanding cannabis use in Canada and its effect on health and society. By uniting scientists with diverse expertise, we aim to provide evidence-based information to members of the scientific community, government regulatory bodies, physicians, patients, and the Canadian population.

For more information, please go to <https://www.mcgill.ca/cannabis/> or email cannabis.medicine@mcgill.ca

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Sainte-Anne-de-Bellevue, Quebec

Thursday, May 12, 2022 (DAY 1)

8:30 a.m. – 9:00 a.m. Registration and coffee/tea/refreshments; virtual log in

9:00 a.m. – 9:10 a.m. Welcome and announcements (Day 1)
Drs. Carolyn Baglole and Mark Lefsrud

9:10 a.m. – 9:40 a.m. Expert Speaker 1: Dr. Don Smith, Plant Science, McGill University

9:45 a.m. – 12:00 p.m. **SESSION 1: MEDICAL CANNABIS**, chaired by Dr. Nadeem Siddiqui

Dr. Ilse Gantois, McGill University

Zahraa Haidar, McGill University

Martha López-Canul, McGill University

➤ **Coffee/tea break**

Jasmine Randhawa, McGill University

Emily Wilson, McGill University

Maria Luisa Vigano, McGill University

Dr. Yasmina Hachem, McGill University

12:00 p.m. – 1:00 p.m. Lunch provided and networking

1:00 p.m. – 2:00 p.m. Keynote Speaker: **Dr. Ethan Russo, MD** (Founder/CEO of CReDO Science),
“Current Research in Cannabis and the Endocannabinoid System.” (virtual)

2:00 p.m. – 2:30 p.m. Expert Speaker 2: Dr. Reza Sharif, Faculty of Medicine, McGill University

2:30 p.m. – 2:45 p.m. ➤ Coffee/tea break

2:45 p.m. – 3:45 p.m. SESSION 2: ANALYTICAL CANNABIS, chaired by Dr. Salwa Karboune

Philip Wiredu Addo, McGill University

Kelly Light, McGill University

Mohammad Bolouki, McGill University

Ryan Puziak, University of Ottawa

Mohsen Hesami, University of Guelph

3:45 p.m. – 4:00 p.m. Break

4:00 p.m. – 5:00 p.m. Three-Minute Thesis Competition, chaired by Dr. Sarah MacPherson

Alec Vista, University of Saskatchewan

Ambreen Khizarhayat, McGill University

Michael Benko, University of Saskatchewan

Justin Bohemen, McGill University

Jung-Hyun Choi, McGill University

Clara Maia, McGill University

Pabitra Das, University of Saskatchewan

Laura Marsal-Garcia, McGill University

Uday Sagili, McGill University

Ankita Srivastava, University of Saskatchewan

Tori Scherle, University of Ottawa

Haleema Tariq, McGill University

J rome Trudel-Brais, McGill University

Corrine Dobson, University of Ottawa



Quality Assurance and Quality Control for Cannabis

Production, Products and Training

QAQC for Cannabis Production, Production and Training Program

The legalization of cannabis in Canada has set the stage for academic researchers, industry and government to work together improving product quality and safety for consumers and communities. Yet, scientifically validated methods for cannabis cultivation, post-harvest processing and formulations are lacking, and different approaches have resulted in inconsistent product yield, potency, and quality.

This NSERC CREATE Program in **QAQC for Cannabis Production, Products and Training** (or QAQCC) aims to address this problem through a collaborative initiative spanning three academic institutions (McGill University, University of Ottawa and the University of Saskatchewan), Health Canada and license holders/industrial collaborators across the country. While fulfilling the requirements their graduate degrees, trainees enrolled in the QAQCC hold internships with cannabis license holders or at Health Canada.

They perform research and contribute toward the development of researched-based methods and improved cannabis cultivation, postharvest handling, and processing, as well as compound extraction and analyses. In doing so, the QAQCC is continually expanding and strengthening much needed links between academics and leaders in the cannabis industry. Upwards of 60 trainees will emerge from the QAQCC program, all with a transversal skillset allowing for smooth transition into the workforce, whether in academia, the public or private sectors.

For more information on the QAQCC, please visit www.qaqcc.com or email qaqcc@mcgill.ca.

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FRIDAY, MAY 13, 2022 (DAY 2)

8:30 a.m. – 9 a.m.	Coffee/tea/refreshments available
8:30 a.m. – 9:15 a.m.	Career Readiness Workshop (virtual) Maurizio Calconi, HIGHFIELD Human Capital
9:15 a.m. – 9:20 a.m.	Announcements (Day 2) <i>Drs. Carolyn Baglole and Mark Lefsrud</i>
9:20 a.m. – 10:00 a.m.	Guest Speaker: Dr. Raphael Mechoulam , Hebrew University Medical Center <i>“Endogenous anandamide-like compounds.” (virtual)</i>
10:00 a.m. – 10:30 a.m.	Expert Speaker 3: Dr. Max Jones, Plant Agriculture, University of Guelph
10:30 a.m. – 11:30 a.m.	<u>SESSION 3: PLANTS</u>, chaired by Dr. Mark Lefsrud Josephine Payment, University of Ottawa Marco Pepe, University of Guelph Cailun Tanney, McGill University Dr. Jamie Ghossein, University of Ottawa Kristian Adamek, University of Guelph* (virtual)
11:30 a.m. – 12:30 p.m.	Lunch provided and networking
12:30 p.m. – 1:30 p.m.	Plenary Speaker: Dr. David Finn , Centre for Pain Research, NUI Galway <i>“Cannabinoids, the endocannabinoid system and pain: mechanisms, controversies, and future directions.” (virtual)</i>
1:30 p.m. – 1:45 p.m.	➤ Coffee/tea break

1:45 p.m. – 3:00 p.m.

SESSION 4: SAFETY, STANDARDS, COMMUNITY & POLICY

Chaired by Dr. Carolyn Baglole

Dr. Inteaz Alli, McGill University

Vincent Desaulniers Brousseau, McGill University

Noel Galuschik, University of Saskatchewan

Gunel Valikhanova, McGill University

Dr. Antonio Vigano, McGill University* (**virtual**)

Dr. Yasmina Hachem, McGill University* (**virtual**)

3:00 p.m. – 3:30 p.m.

Expert Speaker 4: Dr. Cory Harris, Biology Department, University of Ottawa

3:30 – 3:45 p.m.

Awards and closing remarks

Drs. Carolyn Baglole and Mark Lefsrud

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PRESENTATION LIST

SESSION 1: MEDICAL CANNABIS

Cannabidiol (CBD) as a treatment for Autism Spectrum Disorder

I. Gantois^{1*}, J. Choi¹, L. M. Garcia¹, N. Siddiqui¹, N. Sonenberg^{1*}

¹Department of Biochemistry, Rosalind and Morris Goodman Cancer Institute, McGill University, Montreal, Canada.

*Corresponding author: ilse.gantois@mcgill.ca; nahum.sonenberg@mcgill.ca

Differential inflammatory profile in the lungs of mice exposed to cannabis smoke with varying THC/CBD ratios

Zahraa Haidar^{1,2,3}, Hussein Traboulsi^{1,2,3}, David H. Eidelman^{1,2,3} and Carolyn J. Baglole^{1,2,3,4,5*}

¹Research Institute of the McGill University Health Centre, Montreal, Quebec, Canada;

²Meakins-Christie Laboratories, Montreal, Quebec, Canada; Departments of ³Medicine,

⁴Pathology and ⁵Pharmacology & Therapeutics and ⁵Biochemistry, McGill University, Montreal, Quebec, Canada.

*Corresponding author: carolyn.baglole@mcgill.ca

THC in Insomnia Associated to Neuropathic Pain: Effects on Sleep Architecture and Firing Activity of the Reticular Thalamic (RT) Neurons

López-Canul Martha G¹, Oveisi Anahita¹, Maria Luisa Vigano¹, Qianzi He¹, Antonio Farina¹, Gabriella Gobbi^{1*}

¹Department of Psychiatry, McGill University, Montreal, QC, Canada. *Corresponding author: gabriella.gobbi@mcgill.ca

The role of endocannabinoid system in the mouse ovary

J. Randhawa; E. Madogwe; C. Baglole; E. Wilson; H. Traboulsi; R. Duggavathi*

Animal Science, McGill University, 21111 Lakeshore Rd., Sainte-Anne-de-Bellevue, QC, H9X 3V9

*Corresponding author: raj.duggavathi@mcgill.ca

AhR regulates pulmonary Inflammation from cannabis smoke

Emily T. Wilson^{1,3}, David H. Eidelman^{1,2} and Carolyn J. Baglole^{1,2,3*}

¹Research Institute of the McGill University Health Centre, Montreal, QC H4A 3J1, ²Department of Medicine, McGill University, Montreal, QC H4A 3J1³, Department of Pharmacology and Therapeutics, McGill University, Montreal, QC H3G 1Y6

*Corresponding author: carolyn.baglole@mcgill.ca

***In vitro* effects of cannabinoids on myeloid inflammatory cells**

M. Vigano; S. Grech; S. Samarani; C. Costiniuk*

McGill University Health Centre Research Institute, 1001 Decarie Blvd, Montreal, Quebec H4A 3J1 *Corresponding author: cecilia.costiniuk@mcgill.ca

Sex differences in the use of medical cannabis for pain control in patients with cancer: results from the Quebec Cannabis Registry

Y. Hachem; P. Kasvis; H. Kim; R. Kilgour; A. Vigano*

*Medical Cannabis Program in Oncology, McGill University Health Centre, 1001 Boulevard Décarie, Montreal, QC, H4A 1J3 *Corresponding author: antonio.vigano@mcgill.ca

SESSION 2: ANALYTICAL CANNABIS

Freeze-drying of *Cannabis sativa* using real-time relative humidity monitoring and mathematical modeling

P. W. Addo^A; T. Chauvin-Bossé^A; N. Taylor^B; S. MacPherson^A; M. Lefsrud^A, *

^ABioresource Engineering Department, McGill University, Macdonald Campus, 21,111 Lakeshore Road, Ste-Anne-de-Bellevue, Quebec, Canada H9X 3V9. ^BBloom Labs, 173 Dr. Bernie MacDonald Drive, Bible Hill, Nova Scotia, Canada B6L 2H5. *Corresponding author: mark.lefsrud@mcgill.ca

Self-assembly of lysozyme and potato pectic galactan coacervated double emulsions for the suspension of THC and CBD analogs

K. Light; S. Karboune*

McGill University, 21111 Lakeshore, Ste-Anne-de-Bellevue, Sainte-Anne-de- Bellevue, Quebec H9X 3V9 *Corresponding author: salwa.karboune@mcgill.ca

Analytical method development based on the ESI ionization behaviour of cannabinoids

Mohammad Reza Khan Bolouki^a; Mark Lefsrud^{a*}; Jean-Francois Roy^b

^aMcGill University Department of Bioresource Engineering Macdonald Stewart Building 21111 Lakeshore Road Ste-Anne-de-Bellevue, QC, Canada, H9X 3V9 ^bAgilent Technologies Inc. 2250, Alfred-Nobel Blvd, Suite 203, Montreal, QC, Canada, H4S2C9

*Corresponding author: mark.lefsrud@mcgill.ca

Fatty acid amide hydrolase and cannabis: Do high-THC or high CBD extracts predict inhibition?

Ryan Pusiak¹ and Dr. Cory Harris^{1*}

Department of Biology, University of Ottawa, 75 Laurier Ave. E, Ottawa, ON K1N 6N5

*Corresponding author: charris@uottawa.ca

Application of machine learning in cannabis tissue culture

Mohsen Hesami and Andrew Maxwell Phineas Jones*

Gosling Research Institute for Plant Preservation, Department of Plant Agriculture, University of Guelph, Guelph, ON, Canada

*Corresponding author: amjones@uoguelph.ca

THREE MINUTE THESIS COMPETITION

Determination of Postharvest Water Sorption Isotherms for Cannabis

Alec Vista and Dr. Lope Tabil*

Chemical and Biological Engineering, University of Saskatchewan, 57 Campus Drive, Saskatoon, SK, S7N 5A9, Canada

*Corresponding author: lope.tabil@usask.ca

Quantification of Biostimulants: Microbes, oligochitosan and salicylic acid for enhanced cannabis growth and interactions with cannabis chemovar

Ambreen Khizarhayat* and Don. L. Smith

Department of Plant Science, McGill University
21111 Lakeshore, Sainte-Anne-de-Bellevue, Quebec H9X 3V9

*Corresponding author: ambreen.khizarhayat@mail.mcgill.ca

Exploring an extensively diverse collection of *Cannabis sativa*: An interdisciplinary approach

M. J. Benko^{1,2*}; A. Srivastava¹; V. Vujanovic¹; T. Sharbel²

¹Department of Food and Bioproduct Sciences, University of Saskatchewan, Saskatoon SK S7N 5A8 Canada

²Department of Plant Sciences, University of Saskatchewan, Saskatoon SK S7N 5A8 Canada

*Corresponding author: michael.benko@usask.ca

Optimized lighting and defoliation strategies to increase yield and chemical uniformity in *Cannabis sativa*

Justin Bohemen and Mark Lefsrud*

Department of Bioresource Engineering, McGill University: 21111 Lakeshore Road, Sainte-Anne-de-Bellevue, Quebec H9X 3V9

*Corresponding author: mark.lefsrud@mcgill.ca

Treatment of Fragile X syndrome (FXS) with Cannabidiol (CBD)

Jung-Hyun Choi, Ilse Gantois, Laura Marsal Garcia, Nadeem Siddiqui, Nahum Sonenberg^{1*}

Department of Biochemistry, Rosalind and Morris Goodman Cancer Institute, McGill University, Montreal, Canada.

*Corresponding author: nahum.sonenberg@mcgill.ca

Efficacy of Biological Formulation of Root Microbiome and Chemical Profiles on Different Medical Marijuana (*Cannabis sativa*) Chemovars

C. Y. Maia*; S. Jabaji.

Department of Plant Science, McGill University, MacDonald Campus - 21111 Lakeshore Road, Sainte-Anne-de-Bellevue, Quebec, H9X 3V9.

*Corresponding author: clara.maia@mail.mcgill.ca

Application of modern technologies for improvement of drying of Cannabis and extraction efficiency of cannabinoids

P. C. Das; L. G. Tabil*; O. D. Baik

Department of Chemical and Biological Engineering, University of Saskatchewan, 57 Campus Drive, Saskatoon, SK, S7N 5A9, Canada

*Corresponding authors: lope.tabil@usask.ca, oon-doo.baik@usask.ca

Cannabidiol and Phelan-McDermid Syndrome, a model for autism spectrum disorder

L. Marsal-García, I.Gantois; J.Choi; N.Siddiqui; N.Sonenberg*

Rosalind and Morris Goodman Cancer Institute, Biochemistry Department, McGill University, Montreal, QC

*Corresponding author: nahum.sonenberg@mcgill.ca

Microwave-assisted and ultrasound-assisted extraction techniques for the cannabis industry

S. U. K. R. Sagili^A; P. W. Addo^A; M. Lefsrud^A; V. Orsat^{A*}

^A Bioresource Engineering Department, McGill University, Macdonald Campus, 21,111 Lakeshore Road, Ste-Anne-de-Bellevue, Quebec, Canada H9X 3V9. *Corresponding author:

valerie.orsat@mcgill.ca

Cross talk between endophytes for improved Cannabis health and quality of products

Ankita Srivastava^{*1}, Timothy Sharbel², Vladimir Vujanovic¹

¹Department of Food and Bioproduct Sciences, University of Saskatchewan, Saskatoon, SK S7N 5A8, ²Department of Plant Sciences, University of Saskatchewan, Saskatoon, SK S7N 5A8

*Corresponding author: vladimir.vujanovic@usask.ca

Characterizing Phytocannabinoid interactions with the Endocannabinoid System

T. K. Scherle*, C. Harris

Department of Biology, University of Ottawa, 75 Laurier ave. E Ottawa ON, K1N 6N5

*Corresponding author: vsche069@uottawa.ca

Interaction between plant beneficial microbes and cannabis nutrient utilization: growth and quality of outputs

Haleema Tariq and *D.L. Smith

Department of Plant Science, 21111 Lakeshore, Ste-Anne-de-Bellevue, Sainte-Anne-de-Bellevue, Quebec H9X 3V9

*Corresponding author: donald.smith@mcgill.ca

Design, development, and testing of an automated growth system to optimize crop production in an industrial context

Trudel-Brais, J. and Lefsrud, M.*

Department of Bioresource Engineering, McGill University, Macdonald Campus, 21111 Lakeshore Road, Sainte-Anne-de-Bellevue, Quebec, H9X 3V9, Canada *Corresponding author:

mark.lefsrud@mcgill.ca

Investigation of Cannabis Edible Product Metabolism and Digestion

C. C. Dobson*; A. Halabi; C. S. Harris

Department of Biology, University of Ottawa, 75 Laurier Ave. E, Ottawa, ON K1N 6N5

*Corresponding author: cdobs028@uottawa.ca

SESSION 3: PLANTS

Genome-Wide Identification of the Antioxidant Gene Families in *Cannabis sativa*

Josephine Payment & Marina Cvetkovska*

University of Ottawa, 75 Laurier Ave. E, Ottawa, ON K1N 6N5

*Corresponding author: jpaym043@uottawa.ca

A non-invasive gas exchange method to test and model photosynthetic proficiency and growth rates of in vitro plant cultures: Preliminary implications for *Cannabis sativa* L.

M. Pepe; E. D. Leonardos.; T. R. J. G. Marie; B. Grodzinski; A. M. P. Jones*

Department of Plant Agriculture University of Guelph, , 50 Stone Rd E, Guelph, ON, Canada, N1G 2W1

Corresponding author: amjones@uoguelph.ca

The Effect of Microbial Inoculation on Cannabis Trichome Development

C. A. S. Tanney, A. Geitmann*, D. L. Smith*

Department of Plant Science, Macdonald Campus, McGill University, Montreal, QC, Canada

*Corresponding authors: *anja.geitmann@mcgill.ca, donald.smith@mcgill.ca

Cannabis 3.0 – Minor Cannabinoids and Their Therapeutic Applications

Jamie Ghossein¹⁻³

¹Cannabis Orchards Inc., Ottawa, Ontario, Canada

²The Ottawa Hospital, Ottawa, Ontario, Canada

³The University of Ottawa, Ottawa, Ontario, Canada

Accumulation of Somatic Mutations Leads to Genetic Mosaicism in Cannabis

Kristian Adamek¹, Andrew Maxwell Phineas Jones¹, and Davoud Torkamaneh².

¹Department of Plant Agriculture, University of Guelph, Guelph, N1G 2W1, ON, CANADA; and

²Département de Phytologie, Université Laval, Québec, G1V 0A6, QC, CANADA.

Email: kadamek@uoguelph.ca; davoud.torkamaneh.1@ulaval.ca

SESSION 4: SAFETY, STANDARDS, COMMUNITY & POLICY

The Emergence of Industry Standards for Edible Cannabis

Inteaz Alli*

Food Science and Agricultural Chemistry Department, McGill University, Quebec, Canada

*Corresponding author: inteaz.alli@mcgill.ca

Fungal Contamination Monitoring in Legal Cannabis Products: Optimization of Detection and Quantification Method for Mycotoxins in Cannabis Inflorescence and Edible Oil Using UHPLC-MS/MS

Vincent Desaulniers Brousseau¹, Emmanuelle Bahl², Ryan Denkert² and Mark G. Lefsrud¹

¹Biomass Production Laboratory, Department of Bioresource Engineering, McGill University, Sainte-Anne-de-Bellevue, QC, Canada

²Cannabis Laboratory, Health Canada, Longueuil, QC, Canada

A Framework for Canadian Cannabis Research Administration

Noel E. Galuschik* and Jeff Lindsay

Safety Resources, University of Saskatchewan, Saskatoon, SK

*Corresponding author: noel.galuschik@usask.ca

Medical Cannabis among Canadian Veterans and Non-Veterans: A National Survey

Gunel Valikhanova, Ilka Lowensteyn, Mohammed Kaouache, Deborah Da Costa, Mary-Ann Fitzcharles, *Steven Grover

*Corresponding author

The Quebec Cannabis Registry: Investigating the Safety and Effectiveness of Medical Cannabis

A. Vigano*, Y. Moride, Y. Hachem, M. Canac-Marquis, R. Gamaoun, M. Kalaba, M.O. Martel, J. Perez, A. Néron, P. Beaulieu, J. Desroches, M. Ware

Medical Cannabis Program in Oncology, Cedars Cancer Centre, McGill University Health Centre, 1001 Blvd Décarie, Montréal, QC H4A 1J3

Corresponding author: antonio.vigano@mcgill.ca

Barriers to accessing medical cannabis and impact of the COVID-19 pandemic: a Pan-Canadian survey of health care workers

Y. Hachem; S. J. Abdallah; S. Rueda; J. L. Wiese; K. Mehra; J. Rup; J. Cowan; A. Vigano; C. T. Costiniuk*

Division of Infectious Diseases and Chronic Viral Illness Service, Research Institute of the McGill University Health Centre, 1001 boulevard Décarie, Room EM2.3226, Montreal (QC) Canada, H3A 3J1

*Corresponding author: cecilia.costiniuk@mcgill.ca

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THANK YOU FOR YOUR SUPPORT

