



Annual Reporting for Faculty Supported Research Centres and Networks

All Centres (provisional Centres; McGill Centres), Research groups and Networks that receive funding from the Faculty of Medicine and Health Sciences (FMHS) are required to provide two components of reporting:

1. an Annual Report of Activities and Outcomes (see below),
2. a Financial Statement (see attached Excel document).

The reporting period is May 1, 2020 – April 30, 2021.

Deadline: Monday, May 17th, 2021

Please send both documents to the Research Office, Faculty of Medicine and Health Sciences
(riac.med@mcgill.ca)

Continued support from the Faculty is contingent on:

1. the receipt of the reporting documents on time,
2. the evaluation of reported activities by the Faculty's Committee for Oversight of Research Units (CORU),
3. the availability of Faculty funds.

Your strong engagement in the Faculty's mission for continued research excellence and financial stewardship is truly appreciated.

Annual Report of Activities and Outcomes

Please respect the page limits, where indicated, or the report will be returned.

(The accepted font is Times New Roman or Calibri regular 11 pts)

1. Name of the Unit:

The McGill Centre for Microbiome Research

2. Director's contact information:

Irah King, PhD

Associate Professor, Dept. of Microbiology & Immunology

Canada Research Chair in Barrier Immunity

Meakins-Christie Laboratories, Research Institute of the McGill University Health Centre

1001 Decarie Blvd, EM2.2232

Montreal, QC H4A 3J1

<https://www.meakinsmcgill.com/king/>

Extended governance:

Assistant Director

Corinne Maurice, PhD

Assistant Professor, Dept. of Microbiology & Immunology

Canada Research Chair in Gut Microbial Physiology

CIFAR Azrieli Global Scholar, Humans & Microbiome Program

Room 332, Bellini Building,

Life Sciences Complex

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<http://www.mauricelab.ca/>

Centre Program Manager

Cynthia Faubert

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Montreal, QC H4A 3J1

MI4 Microbial Genomics Research Platform

Director

Ken Dewar, PhD

Associate Professor, Department of Human Genetics

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Associate Directors

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Jesse Shapiro, PhD

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MI4 Gnotobiotic Animal Research Platform

Director

Irah King, PhD

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1001 Decarie Blvd, EM2.2232
Montreal, QC H4A 3J1
<https://www.meakinsmcgill.com/king/>

3. If the Unit is a Senate-approved McGill Research Centre, indicate date of approval:

Our Centre received provisional status on December 21, 2020 (see attached letter in **Appendix 1**).

4. Mission Statement of the Unit:

The primary objective of the McGill Centre for Microbiome Research is to integrate and synergize microbiome research activities across academic and clinical institutes, the outcomes of which will provide evidence-based knowledge for the benefit of medicine and public health.

As a joint venture between McGill University and the Research Institute of the McGill University Health Centre (RI-MUHC), the goals of this Centre are to:

- 1) Organize and guide investigator-initiated, cutting-edge research related to microbial community composition, structure and function on or in living organisms.
- 2) Provide educational opportunities to enrich the training of highly-qualified personnel (HQP) in biomedical research spanning, but not limited to, infectious diseases, microbial ecology, immunology, medicine and population health.
- 3) Provide knowledge translation activities (e.g. organization and sponsorship of international conferences; community outreach events) that will initiate new and synergize current microbiome research activities on a national and international scale.
- 4) Partner with industry, government and other stakeholders to ensure Centre sustainability and innovation.

5. Number of Unit members:

The Centre administrates and is served by the MI4 Microbial Genomics Research Platform (formerly the MI4 Microbiome Research Platform) and the MI4 Gnotobiotic Animal Research Platform. These research platforms provide streamlined access to expertise and state-of-the-art infrastructure to understand the relationship between micro-organisms and their hosts.

Based at the Genome Centre and the Duff, The **MI4 Microbial Genomics Platform** brings together and strengthens expertise in microbiology, culturomics, genomics and bioinformatics to assess microbial content and identify key microbes associated with health and disease.

Based at the Research Institute of the MUHC, Glen site, The **MI4 Gnotobiotic Animal Research Platform** provides live animal testing to directly elucidate the effects of specific microbiome types and how microbial communities can be modified and optimized for improved health.

Given this unique structure, investigators can engage the Centre as users and members:

1. A User is defined as a Principal investigator who renders platform services on a fee-for-use basis and/or uses Centre protocols or other documentation for funding applications. Currently, we have 18 users spanning more than 10 departments.

2. A Member is defined as a Principal investigator at McGill University with a published and/or self-identified interest in microbiome research. To become a member, investigators will be invited to submit their CV and a 500 word statement of intent, describing how they can contribute to the goals of the Centre including, but not limited to, governance, attendance at annual meetings, engagement in community outreach and Centre advancement. Applications will be reviewed by Centre leaders (King, Maurice, Dewar, Cousineau, Shapiro) and one external investigator (TBD). Since receiving provisional status in December 2020, we have 6 members that contribute to Centre governance. A formal call for membership will be announced before the end of 2021.

6. Number of members affiliated with McGill's FMHS:

1. Dr. Irah King, Dept of Microbiology and Immunology
2. Dr. Corinne Maurice, Dept of Microbiology and Immunology
3. Dr. Ken Dewar, Dept of Human Genetics
4. Dr. Benoit Cousineau, Dept of Microbiology and Immunology
5. Dr. Jesse Shapiro, Dept of Microbiology and Immunology
6. Dr. Bastien Castagner, Dept of Pharmacology and Therapeutics

7. Unit's website:

We are currently working with information officers at McGill and the MUHC to develop our visibility on the web and social media outlets. An announcement of our Centre launch was made to all the current and prospective Centre members by email communication (**Appendix 2 and 3**). Once established, our website will serve as a primary means of communication to coordinate among our research community, our stakeholders (MI4, MUHC, McGill Faculty and Staff) and the MI4-supported research platforms. The website will also include:

- A. Funding sources
- B. Member list and their institutional affiliation with appropriate links,
- C. Activities supported by the Unit,
- D. Booking system for platform use and services

E. All previous Annual Reports.

Within the larger framework, we are developing an integrated web resource encompassing the MI4 Microbial Genomics Platform, the McGill Genome Centre, and the Canadian Centre for Computational Genomics (C3G). The first launch was focused on genomics in order to serve our most advanced collaborators who are ready to commission fee-for-service genomics activities. More information can be found at <https://www.mcgillgenomecentre.ca/research/microbial-genomics/>.

We are currently working with C3G to implement a broader series of web resources outlining the services we support. The resource has gone through a first cycle of overall design and review and is now being loaded with more complete content. The web portal will be seamlessly interconnected with other associated websites and will give our community information about services, updates and background materials. The web portal invites community interaction and questions through a dedicated email account. The email is monitored by the Centre's program manager (Cynthia Faubert) who is in close contact with Centre leaders (King, Dewar, Cousineau, Shapiro, Maurice) as well as PhD level staff at the Genome Centre (Paccard, Lepage) and C3G (Gonzalez) to ensure timely responses.

8. Summary of past year's goals and objectives of the Unit. (limit: ½ page)

- *Achieve provisional Centre status by the Faculty of Medicine.* Provisional status was awarded on December 21, 2020. Submission of an application for full Centre status is slated for end of 2021.
- *Employ a 1.0 FTE Centre Program Manager.* Ms. Cynthia Faubert, with expertise germ-free and gnotobiotic animal facility management, experimental design support and animal care, was hired on Sept. 1, 2020 and is central to the success of the Centre.
- *Install equipment and initiate operation of axenic (germ-free; sterile) animal housing for microbiome studies.* In coordination with the Animal Resources Division at the MUHC-RI, Ms. Faubert installed and initiated use of the gnotobiotic animal research platform. We are currently housing germ-free mice that have maintained sterile status after three weeks, and a weekly testing protocol in place. Testing of gnotobiotic animals with a minimal microbiota (< 10 bacterial species) is planned for the summer.
- *Develop robust protocols for purification of low and high molecular weight microbial DNA.* We have benchmarked a series of commonly used DNA extraction kits to assess extraction efficiency, reproducibility and biodiversity representation. We have now optimized protocols for low-throughput studies (24 samples or less) while high-throughput and high molecular weight DNA extraction protocol development is ongoing.
- *Expand and publicize bacterial strain availability (local biobank) for microbiology applications.* The development of our anaerobic culturing facility has allowed us to expand our collection of bacterial strains. Currently, we have cultured and banked 112 fecal or skin bacteria isolates from human, canine and murine subjects. We currently house these strains in the Cousineau lab as a temporary measure until we identify a long-term biobank solution.

9. Major achievements enabled by the support obtained from the Faculty. (limit: 1 page)

(see Appendix for suggested metrics)

Note: We care to evaluate how the Unit is doing as a whole greater than the sum of its talents. For this reason, do not list achievements from a single PI member of the Unit. Instead, please report only the achievements from the coordinated efforts of at least two PI members of the Unit.

- Expansion of our platform user group (please see response to item 10 below).
- Protocol development for low biomass microbiomes such as skin and surgical sites (Cousineau, Dewar, Jack, Hart)
- Transitioned from MI4-supported pilot projects to fee-for-service contracts (Hart, Jack, Chalifour, Schurr, Barrett...)

- Improved national and international visibility (New member of the International Microbiome and Multi-Omics Standards Alliance)
- Transitioned from academic-only to academic and industrial clients (InnovaDerm, Charles River laboratories)
- Successfully validated our gnotobiotic animal equipment by importing and housing germ-free mice for an ongoing, extended period
- Cross-platform integration to create a microbial control quality program to monitor the germ-free status of our animals. This program was developed with the close collaboration between Drs. King and Cousineau of the Gnotobiotic Animal Research and Microbial Genomics Platforms, respectively, demonstrating Centre synergy.
- Engaged in numerous Community outreach activities (List provided in **Appendix 4**).

10. New Members who joined the Unit in the past year and their institutional affiliation(s).

Since receiving provisional status in December 2020, we have 6 members (detailed in point 6) that contribute to Centre governance. A formal call for membership will be announced before the end of 2021.

11. Members who have left the Unit over the reported year.

None

12. State how the current and forecasted activities of your Unit align with the Education or Research mission (Strategic Research Plan) of the FMHS and/or other Faculties at McGill (limit: ½ page):

As the microbiome has been shown to impact diverse states of health and disease, the Centre will be closely aligned with the McGill Strategic Research Plan (SRP) that focuses on four major disease themes: Infection and Inflammation, Cancer, Neuroscience and Mental Health and Aging, Disability and Chronic Disease. As the microbiome is greatly impacted by lifestyle choices, our Centre also fits within the SRP priority area of “Genetics and Environmental Determinants of Health and Disease”, “Systems and Networks approaches to health research” and “Personalized Medicine”. In addition, the Centre will provide technical and intellectual support to conduct pre-clinical studies for drug-testing and experimental therapeutics, animal models of disease states, integrated -omics approaches to biomedicine and many other translational research activities that encourage interdisciplinary research and innovation.

This interdisciplinary program will not only foster the success of its members and users, but also train an elite cohort of new researchers with complementary qualifications serving future populations. With the objective of improving the quality of life for all societies, the Center will promote a collaborative inter-institute approach, both at the local and international level, in order to prepare the scientific community to respond to the challenges of health research that will face the next generations.

13. Explain why support from the FMHS continues to be crucial to the operations of the Unit (limit: ½ page):

Official recognition by FMHS as a McGill Research Centre is crucial to build a community of investigators, dedicated staff and trainees around a specific research field. Centre status also facilitates a structure of communication to integrate scientific pursuits across the McGill community and within the greater Montreal area. FMHS support of the McGill Centre for Microbiome Research also provides much needed access to administrative support and consultation as well as funds that will be directly used for trainee support and knowledge dissemination to our members and community at large. Finally, FMHS support provide a foundation for which members can use in funding opportunities as a concrete indicator of institutional support for Microbiome-related research activities.

14. List action items that the Unit has taken or will consider taking in the next year towards growth and sustainability of its operations (limit: ½ page)

- Gain official Centre Approval from McGill Senate
- Increase capacity for investigator-initiated gnotobiotic animal studies
- Increase capacity for and consolidation of anaerobic microbial cultures
- Improve Centre website for member communication, outreach and data access for users/members
- Establish research pipeline and protocols to streamline experimental approaches between platforms
- Double user base and active members through workshop development and affordable platform use
- Establish industry partners for financial support and publicity
- Increase fundraising activity
- Establish a fund for trainee support
- Establish a Scientific Advisory Board of investigators from academia and industry

15. Provide suggestions about how the Faculty could do better to support the Unit and research efforts in general (e.g., centralized data repositories, institutional data management plans, support for software developments, guidance for adopting open-science practices, simplification of administrative procedures, etc.) (no page limit but please be specific and unleash your creativity!)

- Physical space to consolidate the anaerobic culturing capacity of the Centre
- Financial support to hire and maintain HQP dedicated to microbiome studies and experiments
- Financial support to attend training workshop on best practices in microbiome research (whether experimental, analytical, or software-related)
- Showcase the diversity of microbiome research within McGill with short videos or elevator talks by trainees and principal investigators
- Administrative support for Centre website development

In the attached (Excel) **Year-End Financial Report** please detail:

1. Expenditures of funding provided by the FMHS and other sources, towards meeting the objectives of the Unit,
2. Any in-kind contributions provided to the Unit by other partners and sponsors,
3. Projected budget for the coming year (including request to the FMHS).

Appendix

See attached documents.

Appendix 1 - Provisional status – McGill Centre for Microbiome Research

Appendix 2 - Centre launch meeting – December 18, 2019

Appendix 3 - Official launching of the McGill Centre for Microbiome Research, April 20, 2021

Appendix 4 - Community outreach activities



McGill

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Medicine and
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December 21, 2020

Dr. Irah King
Dept. of Microbiology and Immunology
Meakins-Christie Laboratories
Research Institute of the McGill University Health Centre

Re: Provisional status – McGill Centre for Microbiome Research

Dear Dr. King:

I am writing on behalf of the Faculty of Medicine and Health Sciences to grant approval for the Provisional Research Centre status for the newly-proposed McGill Centre for Microbiome Research under your direction. The proposal clearly demonstrates the breadth and depth of expertise across the McGill community in numerous aspects of microbiome research. The proposed interdisciplinary centre brings together more than 35 faculty members from 19 different Departments, 8 McGill Research Institutes/Locations and 3 different Faculties to advance research in this important and timely domain.

As you are no doubt aware, the granting of Provisional status is for a 2-year period, with the expectation that you will apply for full research centre status before the end of that period. The details of such an application are available from the Office of the VPRI and the application must first be reviewed by the Faculty's Committee for the Oversight of Research Units, chaired by the Associate Dean (Research). During the period of Provisional status, the Faculty will provide the Centre with \$15,000/yr in funding to launch its activities. Please contact Ms. Chrysoula Harakidas in the Faculty's finance office to access the funding.

On behalf of Dean Eidelman, I wish you every success with the development of the Centre.

Best regards,

Sylvain Baillet, PhD
Associate Dean (Research), Faculty of Medicine and Health Sciences

cc: Dr. David Eidelman, VP Health Affairs and Dean, Faculty of Medicine and Health Sciences
Chrysoula Harakidas, Budget Officer, Faculty of Medicine and Health Sciences

Appendix 2 – Centre launch meeting – December 18, 2019

De: Clara Tian, Admin. Coord. McGill-i4 admincooordmcgilli4.med@mcgill.ca

Objet: MI4 Centre for Microbiome Research Meeting

Cc: Irah King, Dr irah.king@mcgill.ca, Donald Sheppard, Dr. don.sheppard@mcgill.ca, Marcel Behr, Dr. marcel.behr@mcgill.ca, Marie Hudson, Dr marie.hudson@mcgill.ca, Kevin O'Neill - MI4 Program Mgr. mi4programmgr.med@mcgill.ca, Tasha Ayinde, Ms. tasha.ayinde@mcgill.ca

Date: 18 décembre 2019 à 10:56

Dear colleagues,

The vast collection of microorganisms that live on or in us (referred to as the microbiome or microbiota) has become a focal point of life science research and translational medicine that spans disciplines ranging from infectious diseases to regenerative medicine and cancer.

As this research field transitions from identifying “who is there” to understanding “what they are doing”, our outstanding community of basic, translational and clinical scientists is in a unique position to greatly move our understanding of the microbiome and its impact on health and disease forward.

With our strengths in mind, we are excited to announce development of the **McGill Centre for Microbiome Research**. This new Centre will build on a foundation of newly-minted MI4-supported research platforms including the downtown McGill campus *MI4 Microbiome Research Platform* - that focuses on bioinformatics and cultivation of the microbiota - and the *MUHC-RI Gnotobiotic Animal Research Platform* that provides *in vivo* manipulation and testing of diverse microbiomes using animal models.

We invite you to a meeting on **Tuesday, January 14, 2020 at 3:00PM-5:00PM (location TBD)** for the following objectives:

1. Discuss the vision of the Centre
2. Define the benefits of becoming a Centre member
3. Identify strategic partnerships and opportunities for funding/resources
4. Define research and training priorities

Please RSVP by replying to this email to help us coordinate the meeting. If you are interested in future activities related to the Microbiome Centre but cannot attend this meeting, please let us know.

We very much look forward to seeing you in January and starting our new Centre!

Irah, Don, Marcel and Marie

MI4: The McGill Interdisciplinary Initiative in Infection and Immunity

Faculty of Medicine | **McGill University**

Hugessen House | Suite 100 - 3666 McTavish Street |

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E admincooordmcgilli4.med@mcgill.ca

T 514 264 5257



Appendix 3 - Official launching of the McGill Centre for Microbiome Research, April 20, 2021

Dear community,

We are pleased to announce that the McGill Centre for Microbiome Research has officially launched following our provisional research centre status approval. Our Centre aims to integrate and synergize microbiome research activities by offering services through its two distinct but complementary MI4-supported platforms. Using state-of-the-art technology, the Gnotobiotic Animal Research platform at the RI-MUHC will provide mouse models kept under controlled environmental conditions for various experimental applications, while the Microbial Genomics platform on the downtown campus offers expertise and specialized services for pathogen and microbiome sequencing as well as bioinformatics support. With the goal of reaching investigators across the McGill community, our Centre will offer consultation and experimental design services to make microbiome research accessible to a wide range of scientific domains.

Two McGill researchers are joining forces to set up this new Research Centre: Dr. Ken Dewar, Director of the Microbial Genomics Platform, and Dr. Irah King, Director of both the Microbiome Centre and the Gnotobiotic Animal Research Platform. The Microbiome Centre is fortunate to have Dr. Corinne Maurice as Assistant Director with expertise in gut microbiome physiology, Dr. Benoit Cousineau, a molecular bacteriologist, leading the microbial isolation and cultivation laboratory component of the genomics platform and Dr. Jesse Shapiro, also involved in the genomics platform, bringing expertise in microbial evolutionary genomics.

The Microbiome Centre, new member of the International Microbiome and MultiOmics Standards Alliance (IMMSA), is already serving McGill researchers through the Microbial Genomics platform and we are planning to host our first projects within the Gnotobiotic Research platform infrastructure this summer. For the coming year, we will develop an incentive program for pilot experiments under CL1 and CL2 gnotobiotic conditions.

By way of this communication and our new email address (microbiome.centre@mcgill.ca), we would like to create a channel to share the progress of the Centre, but also hear about your research needs and how we can improve our services. Please feel welcome to contact any member of the leadership core directly or with our Centre email address. You may also reach us at microbiome.genome@mcgill.ca for any enquiries pertaining to the Microbial Genomics Platform.

If you wish to be removed from this list, please let us know at any time.

We are thrilled to support your scientific goals and ambitions as we continue to build the collaborative vision of the Microbiome Centre.

McGill Centre for Microbiome Research leadership team

Appendix 4- Community outreach activities

- 1) *Why Do Some People Weather Coronavirus Infection Unscathed?* – by Undark, a nonprofit, editorially independent digital magazine. Contribution of Dr. Irah King, PhD, August 24th, 2020.

<https://undark.org/2020/08/24/covid-19-infection-asymptomatic/>

- 2) *Scientists Explore Why Some People Are Able To Live With An Infection Unscathed* – by Undark, a nonprofit, editorially independent digital magazine. Contribution of Dr. Irah King, PhD, August 29, 2020.

<https://www.npr.org/sections/health-shots/2020/08/29/906268526/scientists-explore-why-some-people-are-able-to-live-with-an-infection-unscathed>

- 3) *Tracking down the pandemic in the sewers: Update with Alexandre Touchette* – by Radio-Canada. Contribution of Dr. Irah King, PhD, April 12, 2020.

<https://ici.radio-canada.ca/ohdio/premiere/emissions/les-annees-lumiere/segments/reportage/165150/covid-sras-egouts-epuration-gastro-intestinal>

- 4) *The Influence of Gut Virome and the Immune System on Intestinal Health* – Webinar sponsored by Charles River Laboratory. Contribution of Dr. Irah King, PhD and Dr. Corinne Maurice, PhD, December 10, 2020.

<https://www.criver.com/resources/webinar-pi-ds-influence-gut-virome-and-immune-system-intestinal-health>

- 5) *Four reasons to come to terms with viruses* – by Radio-Canada. Contribution of Dr Corinne Maurice, PhD and Dr Jesse Shapiro, PhD, May 16th, 2020.

<https://www.youtube.com/watch?v=3WKn9ZsUnys>