

**McGill Centre for  
Microbiome Research**



---

# **External Advisory Board Meeting report**

November 30, 2022

---

# Summary

**01.**

General information

**02.**

Presentation of the Centre

**03.**

Presentation of the Board members

**04.**

Focus Questions presented to the EAB

**05.**

Meeting minutes

**06.**

Miscellaneous

**07.**

Actions items

**08.**

Acknowledgment

---

## General information

**Location:** Hotel10

**Date:** November 30, 2022

**Meeting objective:** For this first meeting of the External Advisory Board, the primary objective was to present the progress of our research initiative and to gather recommendations/comments from the Board members.

### Attendees:

Name	Institution	Email
Colin Hill	University College Cork	c.hill@ucc.ie
Elena Verdu	McMaster University	verdue@mcmaster.ca
Rana Samadfam	Charles River laboratories	Rana.Samadfam@crl.com
Corinne Maurice	McGill University	corinne.maurice@mcgill.ca
Benoît Cousineau	McGill University	benoit.cousineau@mcgill.ca
Jesse Shapiro	McGill Unievrity	jesse.shapiro@mcgill.ca
Irah King	McGill University	irah.king@mcgill.ca
Ken Dewar	McGill University	ken.dewar@mcgill.ca
Cynthia Faubert	McGill Unievrity	cynthia.faubert@mcgill.ca

Absent: Iliyan D. Iliev, Weill Medical College of Cornell University, iliev@med.cornell.edu

---

# Presentation of the Centre

**The McGill Centre for Microbiome Research offers turn-key services to collaborators and clients made possible with its two distinct but complementary research platforms. With this specific structure, our Centre provides consultation and experimental design services to make microbiome research accessible to a wide range of scientific domains.**



**“The primary objective of the McGill Centre for Microbiome Research is to offer a hub to integrate and synergize microbiome research activities, the outcomes of which will provide evidence-based knowledge for the benefit of medicine and public health.”**

---

# Presentation of the Centre

The McGill Centre for Microbiome Research offers turn-key services to collaborators and clients made possible with its two distinct but complementary research platforms. With this specific structure, our Centre provides consultation and experimental design services to make microbiome research accessible to a wide range of scientific domains.

## **THE GNOTOBIOTIC ANIMAL RESEARCH PLATFORM**

The Gnotobiotic Animal Research Platform hosts germ-free and gnotobiotic experiments for McGill and MUHC-RI researchers. We also welcome collaborations with other local institutions and industry to build a community of precision microbiome research. The Gnotobiotic Animal Research Platform provides investigators with infrastructure, technical support and consultation services to perform CL1 and CL2 in vivo gnotobiotic studies. The combination of state-of-the-art technology, an extensive quality control program, dedicated and trained personnel allow us to meet a wide variety of research applications.

## **THE MICROBIAL GENOMICS PLATFORM**

The Microbial Genomics Platform strengthens expertise in microbiology, culturomics, genomics and bioinformatics to assess microbial content and identify key microbes associated with health and disease. We provide services to the research community of MUHC, McGill and other institutions, with robust methods for anaerobic microbiology and genomics/bioinformatics applications, and support benchmark studies to constantly develop and refine innovative approaches for the study of the microbiome. We strive for state-of-the-art, cost-efficient, and validated tools for robust results, benefiting research teams at large.

---

# Presentation of the Centre

## **THE GNOTOBIOTIC ANIMAL RESEARCH PLATFORM**

The McGill Centre for Microbiome Research offers a variety of microbiology, genomics, bioinformatics and animal model services. We aim to meet our clients microbiome research specific needs by customizing our knowledge.

Located at the MUHC-Glen site, the Gnotobiotic Animal Research Platform provides live animal testing to directly elucidate the effects of specific microbiome ecologies and how microbial communities can be modified and optimized for improved health. The platform supports clients throughout their project, from the initial contact by offering consulting services to effectively determine needs with the goal of optimizing time and human and financial resources.

### **Specific Infrastructure:**

- Housing capacity of 140 ISOcages;
- Technology allowing both CL1 and CL2 experiments;
- High standard procedures, controlled environment and specialized personal;
- Germ free health status validation prior inoculation for experiments;
- Quality control program developed in collaboration with the Microbial Genomics Platform.

---

# Presentation of the Centre

## THE MICROBIAL GENOMICS PLATFORM

Based at the Genome Centre and the Duff Medical building at the downtown campus, the Microbial Genomics Platform brings together and strengthens expertise in microbiology, genomics and bioinformatics to assess microbial content and identify key microbes associated with health and disease. We can serve clients with a wide range of microbial genomics applications including:

### Microbiomes

- Multiple species culturing, isolation, and identification
- Microbiome DNA extractions
  - 16S survey sequencing (standard primers)
  - 16S survey sequencing (custom primers)
  - Short-read, high-capacity whole genome shotgun sequencing (Illumina, BGI)
  - Long-read whole genome shotgun sequencing and multiple genome assembly (Oxford Nanopore, PacBio)
  - Gnotobiotic mouse animal models
- Transcriptome sequencing

### Pathogen Sequencing

- Culturing
- DNA extractions
- Draft genome sequencing and assembly
- Full genome sequencing and assembly
- Transcriptome sequencing

### Bioinformatics support

- Consultation and experimental design
- Data processing
- Data analysis

---

# Presentation of the External Advisory Board (EAB) members



**Colin Hill** has a Ph.D. in molecular microbiology and is a Professor in the School of Microbiology at University College Cork, Ireland. He is also a founding Principal Investigator in APC Microbiome Ireland, a large research Centre devoted to the study of the role of the gut microbiota in health and disease. He is particularly interested in the effects of probiotics, bacteriocins, and bacteriophage. He has published more than 600 papers and holds 25 patents. He was president of ISAPP from 2012-2015. More than 80 PhD students have been trained in his laboratory.



**Rana Samadfam** received both her MSc and PhD in pharmacology from the Université de Sherbrooke. Following her successful postdoctoral training at McGill University, Rana joined Charles River Laboratories in 2006. Dr. Samadfam is a Diplomate of the American Board of Toxicology. She is the recipient of several scientific awards, author of over 125 peer-reviewed publications. Her team has extensive experience in microbiome research with particular focus in conducting efficacy studies with live therapeutics.



**Elena Verdu** obtained a medical degree in Argentina and then pursued a Ph.D. degree in immunology and gnotobiology at the Czech Academy of Science on the effect of commensal bacterial antigens in inflammatory bowel disease and celiac disease. In 2006 Dr. Verdu was appointed faculty at McMaster University, where she developed a program to investigate dietary-microbial-host interactions in gastroenterology. Her research aims at deciphering commensal and opportunistic pathogen metabolism of dietary antigens and how that process affects their inflammatory capacity in the host. She is director of the Axenic and Gnotobiotic facility, Associate Director of the Farncombe Institute at McMaster, and Senior Associate Editor (basic Science) for the journal Gastroenterology. Currently she holds the rank of full professor and a Tier Canada Research Chair in Microbial Therapeutics and Nutrition in Gastroenterology.



**Iliyan Iliev** is an Immunologist and an Associate Professor at the Department of Medicine and the Jill Roberts Institute for Research in IBD at Weill Cornell Medical College, Cornell University, New York. Iliyan Iliev's pioneering research on the gut mycobiota defined a role of commensal fungi in innate mucosal and protective humoral immunity and provided evidence for mycobiota involvement in the pathophysiology of Inflammatory Bowel Disease (IBD). The laboratory applies translational, experimental and computational approaches to study the role of immunity to mycobiota early and later in life, upon therapeutic interventions and during conditions, such as inflammatory bowel disease, allergy, gastrointestinal and lung cancers, and immunodeficiencies, where fungi contribute to pathologies.



---

# Focus Questions presented to the EAB

1. How are microbiome research platforms (e.g. gnotobiotic animal facility/biobank/sequencing infrastructure) financially supported at your institution?

2. Are ties to industry/pharma part of your Centre or platform's revenue scheme?

3. How have you maintained a critical mass of users for your microbiome research platforms?

4. How do you define sustainability for a non-profit academic research Centre?

5. How do you determine collaborator vs. client?

---

# Meeting minutes

Board members have shared expertise and advice on all topics in the format of an open discussion with all the group. Answers provided are paraphrased dialogue between the attendees.

## 1. How are microbiome research platforms (e.g. gnotobiotic animal facility/biobank/sequencing infrastructure) financially supported at your institution?

- **McMaster University (Elena Verdu):** Initial endowment followed by yearly installment by the institution. The facility is living with deficit and recover 2/3 of the costs through perdiem, which can't be raised because customers stop using their services.
- **University College Cork (Colin Hill):** If funded by the government, the Centre must triple the profit it was given. Platforms are living with deficit. The Centre leaders are actively working to get funding from philanthropy, foundations, private investors. Private corporations, pharmaceutical industries regularly approach the Centre to test products. These collaborations are exhausting studies, but it generates a lot of funds (also answers to topic 2).
- **Charles River Laboratory (Rana Samadfam):** Microbiome research involving germ free animals requires a lot of investments and expenses, the financial situation should aim to break even during the first years before expecting to make significant profit.
- **Weill Cornell Medical College of Cornell University (Iliyan Iliev):** Initially few investigators had our own operation. When we grew, we asked the institution to step in. Then staff salary and equipment were purchased upfront from the institution ( when we had critical mass of users for that to financially make sense) and now it is a fee for service.

---

# Meeting minutes

## 2. Are ties to industry/pharma part of your Centre or platform's revenue scheme?

- **Charles River Laboratory (Rana Samadfam):** Collaboration has to be clearly established. Charles River can refer clients asking for mice microbiome research expertise to our Centre. Competition in that field is quite fierce, especially in Europe where research is very advanced there, much more than North America.

## 3. How have you maintained a critical mass of users for your microbiome research platforms?

- **McMaster University (Elena Verdu):** The institution has a large researchers community studying the microbiome which facilitate the costs recovery. Since the Centre is a part of the institution structure, clients are there, no need to recruit them.
- **University College Cork (Colin Hill):** The sense of community is important to maintain the mass of users, internal branding and visibility are what attract people. To develop that branding, it is important to determine what drives the Centre – is it to publish quality papers, make money - , what are the goals and how to be different. Creating this image takes longer and costs more investment, but it is necessary to be sustainable and lasts as a Centre. Both platforms can't be sufficient, the Centre must be a well-established unit.
- **Weill Cornell Medical College of Cornell University (Iliyan Iliev):** Weill Cornell and Memorial Sloan Kettering have been hiring a lot of investigators in the area of immunology, and many need GF. For now it has never been a problem, indeed we need more space.

---

# Meeting minutes

## 4. How do you define sustainability for a non-profit academic research Centre?

All Board members mentioned the struggling of being financial sustainable for an academic research Centre, however, they proposed other key elements to consider to be a sustainable Centre:

- **McMaster University (Elena Verdu):** To maintain the clients' mass to cover expenses and make profit, the Centre must create its niche, determine which services could be offered for specific research areas that other institutions can't compete with.
- **Charles River Laboratory (Rana Samadfam):** Getting visibility is essential for a Centre sustainability and the larger unit, the Centre can create a system, a structure to support the research community, and broadcasting this structure will bring clients and eventually financial sustainability.
- **Weill Cornell Medical College of Cornell University (Iliyan Iliev):** I direct a microbiome sequencing/ analysis core myself and my justifications are always based on productivity (number of users from within and outside the institution, papers users publish using our services, etc.), of course self-sustainability ( + \$ balance that covers salaries and operation).

---

# Meeting minutes

## 5. How to you determine collaborator vs. client?

- **McMaster University (Elena Verdu):** Collaborations bring visibility to their Centre and they foster these within their institution. However, parameters of the collaboration must be decided from the start. In their case, the staff is directly involved in the experiments and they required to be co-author of the publications. Clients are strictly using their services, transactional relationship, apply more to research groups who have more experienced in the field.
- **University College Cork (Colin Hill):** Members are important to maintain the Centre activities and the reputation, which will afterwards bring additional members. They don't recruit members, they create a hub that will inspire people to join and be a part of. Members are more than just collaborators, they have to invest themselves in the success of the Centre. They also foster collaboration, but they don't ask for nothing in return, they see these collaborations as a way to build reputation. Agreeing on being co-author can be risky, bad publication on which they don't have control over might affect the reputation.
- **Weill Cornell Medical College of Cornell University (Iliyan Iliev):** No collaborators, only users. For use by members of my lab or collaborators of the lab, I pay with my lab funds.

---

# Miscellaneous

## Microbial Genomics Platform services:

- Many clients try to cut the costs by asking free training to students to analyze their own data instead of paying for expert services. No more free training.
- Same services can be done quicker at a cheaper price outside our platform, it is essential to find what the Centre can do that others can't: training, consultation, experimental designs, but it has to be billed. Sequencing and extractions are an easy service to provide, specialized projects and samples are harder to analyze, customized services should be one of our assets and eventually, need to be publicized more. How do we charge for specialized projects (isolating bacterial species from a mixed community, for example)?

## Centre services:

- The lack of profit must be compensated by the quality of successful research to gain visibility instead.
- The Centre should improve its central pipeline role, put more emphasis in our liaised expertise rather than a simple fee-for-service platform. Our strong client relationship would differentiate us from other platforms with overlapping services.
- Administrative and structural manpower is essential to the Centre success and sustainability, keeping the personal should be a constant concern to keep in mind. The Centre needs these people to push collaboration and partnership forward, and to keep these relationships on the long-term.

---

# Miscellaneous

## Centre services:

- Incentive programs are a good way to get funding and to support research. The idea of providing student stipend support was discussed, but it was decided to prioritize the development of a research incentive program using small grants at this time.
- Metrics and detailed statistics are essential to prove that objectives have been reached. Publications with the Centre name are also an important measure of success.
- One year student fellowships (10K) to support the recruitment of top students that would be eligible for provincial/federal fellowships at the second year of graduate studies was also discussed.

---

# Actions items

## **2023 Action items based on meeting feedback:**

- 1 Establish fee structure for training and labor (i.e. time) for projects beyond DNA processing.
2. Establish incentive program and student fellowships.
3. Define strategies for visibility (webinars, outreach, fundraising, etc).
4. Reexamine 2023 milestones based on success/failures over the past 3 years and develop new milestones to reach.
5. Define our strengths/limitations and framework to build on our strengths.
6. Request info from Faculty of Medicine as to what parameters define “success” for a McGill Research Centre.
7. Add Centre title on all publications from Centre members.



---

# Acknowledgment

The McGill Centre for Microbiome Research leadership thanks the External Advisory Board members for their commitment to our research initiative. We are grateful for the opportunity to share expertise and experiences with esteemed local and international colleagues to foster innovation in microbiome research for the benefit of the scientific community and populations.