



McGILL UNIVERSITY

**DEPARTMENT OF MICROBIOLOGY AND IMMUNOLOGY
2014 ANNUAL REPORT**

Submitted by

J. Madrenas, MD, PhD, FCAHS
Canada Research Chair in Human Immunology
Professor and Chairman

On behalf of the

Primary members of the
Department of Microbiology and Immunology

I. Executive Summary

2014 was a year of continuous growth and development for the Department of Microbiology and Immunology at McGill.

The department welcomed Dr. Martin Richer, from the University of Iowa (and former graduate of our department!), who started as a tenure track assistant professor on October 1, 2014. His arrival completes the third recruitment in the context of departmental faculty renewal in the last three years. In addition, a fourth recruitment was confirmed (Dr. Corinne Maurice from Harvard University) who will be starting as a tenure-track Assistant Professor in our Department on January 1, 2015. Our critical mass and expertise was further expanded with the relocation to our department of Professor Mary Stevenson, a tenured professor at McGill. We successfully completed the 3 yr. reappointment process for Drs. Connie Krawczyk and Irah King, completed the relocation of one member to the Goodman Cancer Centre (Dr. C. Krawczyk), and completed the departure of a faculty member (Dr. Mathias Gotte) to become departmental chair at the University of Alberta.

In terms of Academic Development, 2014 was the year in which we prepared for the Cyclical Review of our unit, after at least 22 years! This exercise provided us an opportunity to examine our performance in research, education and service. The results of this exercise should become apparent in 2015 with the site visit on April and the report and response soon after.

In **Research**, our members, including our recruits from 2012 and 2013, were successful in obtaining external, peer-reviewed grants from CIHR, NSERC, CFI, and other sources. Research successes included 85 publications in high profile journals and invited lectureships around the world. The Microbiome and Disease Tolerance Centre at McGill, a multi-disciplinary and trans-departmental Centre expanded its membership with 2 new primary members and 7 new associate members. As a result of successful operation review, MDTC received funding from the Faculty of Medicine. This together with fundraising provided the opportunity for the first internal research competition with allocation of \$55,000 for innovative collaborative projects.

In terms of **Education**, the department continued the process of undergraduate and graduate program redevelopment. Of particular mention is the first time implementation of the redeveloped MIMM212 within the Small World Initiative (the first Canadian Centre in this program) and of the redeveloped MIMM385.

Our students and trainees continue to excel in national and international venues. Among the many examples provided below, let me single out the awarding of the GG Silver Medal to Daisy Ji. Furthermore, with the departmental success in fundraising (over \$400K), we were able to establish the Steinman Summer Undergraduate Research Awards, and the Wares Family Post-doctoral Fellowship awards to support under-graduate and post-doctoral training in our department.

Finally, in terms of **Service and Administration**, the department embarked in the optimization of financial and human resources support through establishment of an Administrative Excellence Centre involving our department and the departments of Anatomy & Cell Biology and Biomedical Engineering.

I would like to thank Drs. Sylvie Fournier and Ciriacco Piccirillo, Chairs of the Departmental Graduate and Undergraduate Education Committees, for their help in the elaboration of this report. It is a true privilege and honor for me to submit the 2014 report documenting the excellence of the members of the Department of Microbiology and Immunology at McGill.

II. Research

a. Major Research Grants Awarded in 2014

The Department continues to be very competitive in the achievement of external peer-reviewed funding. Currently, it received over \$3.5 million yearly from external grants in which our members are primary applicants. Our members also contributed to a total of \$7.5 million in grants as co-applicants.

Among the major grants awarded to our members as PIs in 2014 are CIHR grants (Drs. Gruenheid, Sagan, and Sheppard), CFI (Dr. Sagan), and NSERC (Drs. Gruenheid, LeMoual, Sagan). In addition, many collaborative grants were awarded in which our members were co-PIs including an NCE (Dr. Sheppard), and from Fonds de la Recherche de Quebec (Drs. Krawczyk, Piccirillo). In addition, two internal Merck-Faculty of Medicine grants were awarded (Drs. Cousineau and Krawczyk).

b. Selected Keynote lectures, plenary Lectures, other significant presentations

Our members were keynote speakers in important national and international meetings, including Keynote and Plenary Lectures at the Ontario-Québec Undergraduate Immunology Conference, the Vincenza International Course in Nephrology, the XXI Mexican Congress of Allergy, Asthma and Pediatric Immunology, the McMaster Institute for Infectious Disease Research Trainee Research Day, the Microbiology & Infectious Diseases Asia Congress, FOCIS Annual Meeting, 3rd CIACCO meeting and the UN-sponsored meeting on leishmaniasis.

In addition, three of our members (Drs. Fritz, King and Piccirillo) participated in the McGill-Riken Symposium in Japan, as part of an ongoing collaborative effort between both institutions.

Our members participated as organizers of international high profile meetings such as the 3rd International Conference on Antimicrobial Research - ICAR2014; the 23rd Congress and General

Assembly of the International Union of Crystallography; and the CIHR Human Immunology Workshop.

c. Publications

Our members published a total of 85 papers during 2014, including in the very top journals such as *Immunity*, *Cell Host&Microbe*, *Nature Chemical Biology*, *Blood*, *Journal of Biological Chemistry*, *Journal of Clinical Investigation*, *PLOS Pathogens*, *Journal of Virology*, *AIDS*, and *Lancet Global Health*. For a list of all publications, please refer to:

http://www.mcgill.ca/microimm/sites/mcgill.ca/microimm/files/publications_3_0.pdf

d. Major Awards in 2014

The Department continues to be successful in enhancing the profile of its members as illustrated by the awards they received. To name a few: Dr. Mark Wainberg was awarded the CACMID outstanding scientist award and the Cubist-ASM Prize for outstanding research; Dr. Irah King received the Bhagirath Singh Early Career Award in Infection and Immunity; Dr. Martin Olivier received the Canadian Society for Immunology Investigator Award for excellence in research over his career; and Dr. Ciriacco Piccirillo was awarded the Anna Maria Solinas Laroche Career Award in Immunology.

e. Awarded Patents

One United States Provisional Patent application (No. 62/008,836) entitled “Soluble Bacterial and Fungal Proteins and Methods and Uses Thereof in Inhibiting and Dispersing Biofilm” was filed jointly The Hospital for Sick Children (Dr L. Howell) and McGill University (Dr D. Sheppard).

III. Teaching

a. Graduate Program

Twenty-five new students, who received a total of \$109,000 in Graduate Excellence Fellowships, were accepted in the graduate program in 2014. This represents a significant increase from recent years. Departmental fellowships, including Graduate Excellence fellowships, were also awarded to 21 of our returning graduate students for a total of \$86,960. Travel awards were also granted to 14 trainees to support presentation of their work at national or international conferences.

The 2014 Wilfred Yaphe awards for the best MSc and PhD final seminars were attributed respectively to Melissa Wares (Dr. Saleh lab) and François Coulombe (Dr. Divangahi lab). Remarkably, François also received the Departmental Gala award for his outstanding achievement in the PhD program. The Departmental Gala award for outstanding achievement in the MSc program was attributed to Phoebe Zhong (Dr. Saleh lab). The first Wares Family

postdoctoral fellowship, a novel award made possible by the departmental Chair success in fundraising, was granted to Dr. Iness Hammami from Dr. Krawczyk laboratory.

In terms of graduate program improvement we should highlight the successful implementation of the electronic student tracking system in 2014. This tool appears very efficient in improving tracking of research progress, program requirements and course work, and will certainly promote on time graduation.

A new graduate course (MIMM 616) was launched in 2014. This course, which is coordinated by Dr. Fournier, examines recent work published by selected speakers of the Infection and Immunity Seminar Series offered by the Department. Students are exposed to fundamental and emerging concepts, and current research approaches that pertain to the interaction between microbes and the immune system. The course is designed to develop skills to synthesize, present and critically evaluate recent original research in infection and immunity, as well as developing research plans, and formulating questions that engage higher level thinking skills (analysis, synthesis, evaluation, and creation). Evaluation is based upon 4 criteria: Oral presentation; Mock grant proposal; Participation; Team evaluation (this aspect of the evaluation aims at providing feedback on the student ability to work efficiently in a team).

The renowned immunologist and pioneer of the famous Danger Model of immunity, Dr. Polly Matzinger from NIAID, delivered the keynote lecture of the 3rd Annual Graduate Research Day that was held on May 16th 2014. At this event, 7 prizes totalizing \$1550 were given for best oral and poster presentations.

b. Undergraduate Program

In the past year, the Undergraduate Program of the Department has continued to redevelopment of its teaching curriculum, a priority established by the Department in recent years. The primary focus of this redevelopment is to establish an appropriate course mapping strategy, (re)define learning objectives, evaluating teaching outcomes and better define roles for lecturers and course coordinators. The major highlights of our Program include:

1. Ongoing development of MIMM Program Outcomes: With support of TLS, the Department generated a unified vision of the content, skills/aptitudes, and learning-integration abilities that our students should acquire upon completion of their undergraduate degrees. This vision has been used, and continues to serve as a reference, for the redevelopment of the Immunology and Microbiology streams.
2. Completion of reform to Immunology Course “*ribbon*”: MIMM-385, an experimental immunology course, has been restructured to adopt a more problem-based approach in the elaboration of laboratory procedures.
3. Completion of reform to the MIMM-314 and MIMM-414 intermediate and advanced immunology course, respectively. The elaboration of unique, small-group learning sessions, and use of active learning represent hallmark changes in these courses.

4. Preliminary redevelopment of the Microbiology Course “*ribbon*.”
5. Inclusion within the U1 MIMM212 lab course (Laboratory in Microbiology) of the Small World Initiative, a multi-institutional research lab course developed at Yale University that aims to provide students with an integrated, hand-on research experience early in the undergraduate program.
6. Active role in the preparation of the 2015 Cyclical Review Process.
7. In collaboration with the McGill Writing Centre, establishment of a writing workshop whose mission is to teach/guide undergraduate students how to write in science.
8. In collaboration with TLS, establishment of the Professor Continuing Education in Teaching (PCET) Program which intends to provide MIMM Professors with opportunities to develop their teaching skills.

c. Success Stories

Five students completed successfully their PhD program, and 6 students obtained their MSc degree during 2014. In addition, Sophie Cousineau (M.Sc. Candidate from the Sagan lab) was awarded the CIHR Frederick Banting and Charles Best Canada Graduate Scholarship – Master’s, and the Max Stern Recruitment Fellowship for Best incoming Graduate Student). Han Xiong (Henry) Wang (Hon. B.Sc. Candidate from the Sagan lab) received a National CIHR Research Training Program in Hepatitis C Summer Student Fellowship, and Annie Bernier (Ph.D Candidate from the Sagan lab) was awarded a National CIHR Research Training Program in Hepatitis C Fellowship. Annie Bernier (Ph.D Candidate from the Sagan lab) and Adam Peres (PhD student in the Madrenas lab) were awarded Fonds de la recherche en santé du Québec Doctoral Fellowships.

IV. Selected External Academic & Community Service

The department is engaged in public education, participating in McGill activities (Homecoming, Open Houses) and engaging local and national community (schools, community organizations, public policy makers) and research and public policies through engagement of funding agencies (FRQ, CIHR, NSERC, NIH, Health charities) and local, provincial and national agencies. Departmental members serve in advisory boards and review committees of CIHR, FRQ-S, NSERC, NIH, WHO.

V. Consulting Activities

Our members were involved in providing expertise and advise to public and private institutions and corporations. Of note, Dr. C. Krwaczyk was a consultant for Kanyr Pharma, Dr. J. Madrenas for the Agency of Science and Technology of Brazil, Dr. M. Olivier for NexPlasmaGen Inc and Leap Medical Labs, Dr. C. Piccirillo for AIHS, Proscan Inc., Broad Foundation, and Dr. D. Sheppard for Merck, and GSK.