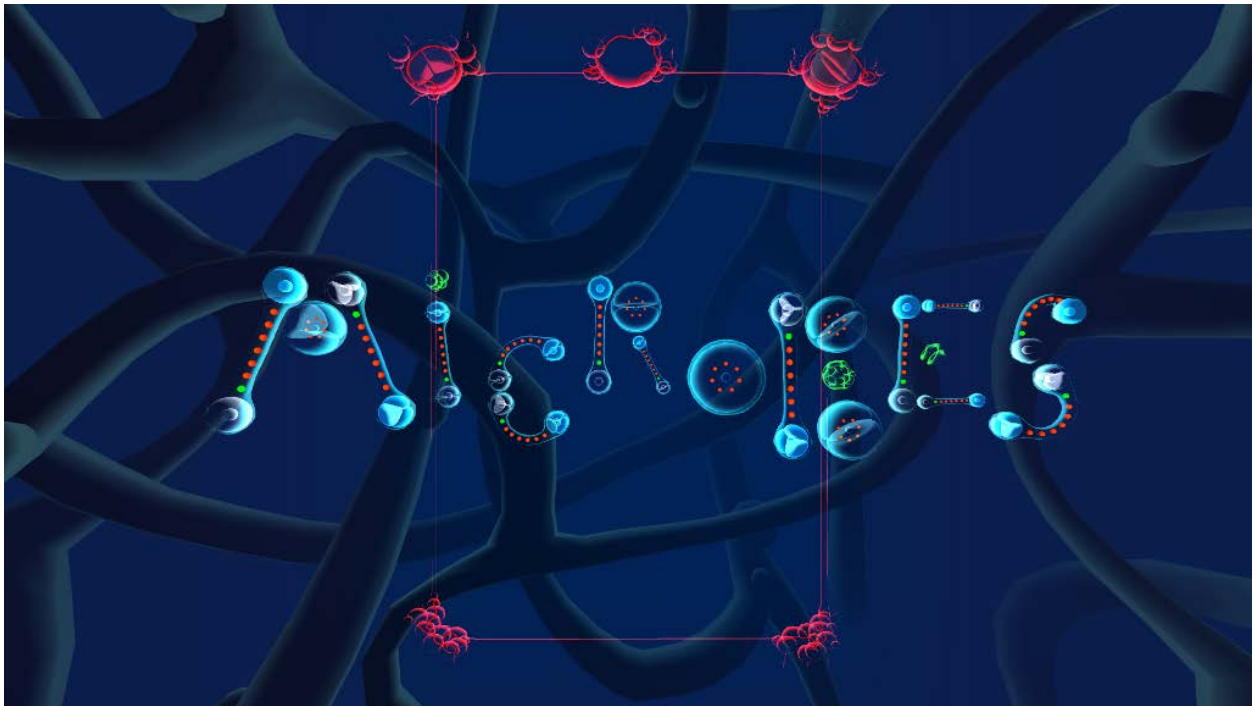


Microbiology and Immunology

UNDERGRADUATE HANDBOOK

2017 – 2018



McGill University

**WELCOME TO THE
DEPARTMENT OF
MICROBIOLOGY AND
IMMUNOLOGY!**

www.mcgill.ca/undergrad.microimm@mcgill.ca

This handbook is designed to provide you with information about undergraduate courses and programs offered in the Department of Microbiology and Immunology at McGill University. The Department offers three programs of study: the Liberal program, the Major program, and the Honours program.

The Administrative Offices are located on the 5th floor of the Duff Medical Building on University Street. Full-time faculty members have laboratories at this location, while associated staff are in nearby research institutes and teaching hospitals.

You are welcome to come and talk to our faculty members and to meet other students. We are here to help you and hope you will enjoy and be enriched by the courses you may take with us.

For specific enquiries, please contact the Student Affairs Officer,
Room 511,
3775 University Street,
Montreal, Quebec, H3A 2B4
Telephone: (514) 398-3915
Undergrad.microimm@mcgill.ca

**BIENVENUE AU
DÉPARTEMENT DE
MICROBIOLOGIE ET
IMMUNOLOGIE!**

www.mcgill.ca/undergrad.microimm@mcgill.ca

Ce guide vous renseignera sur les cours et programmes de premier cycle offerts par le Département de Microbiologie et Immunologie de l'Université McGill. Le Département offre trois programmes d'études: le programme "Liberal", le programme "Major" et le programme "Honours".

Les services administratifs sont situés au 5^e étage du Pavillon Duff Médicale, rue Université. Les membres du corps enseignant à plein temps ont leur laboratoire dans ce pavillon et les membres associés travaillent dans les instituts de recherche et hôpitaux affiliés.

Vous êtes invité(e)s à venir rencontrer les professeurs et les étudiants du Département. Nous sommes là pour vous aider et nous croyons que les cours que vous suivrez sauront vous intéresser et approfondir vos connaissances.

Pour plus de renseignements, veuillez-vous adresser à l'agent des affaires étudiantes,
bureau 511,
3775, rue université,
Montréal (Québec) H3A 2B4
téléphone: (514) 398-3915
Undergrad.mciroimm@mcgill.ca

MICROBIOLOGY AND IMMUNOLOGY

TABLE OF CONTENTS

SCOPE OF MICROBIOLOGY AND IMMUNOLOGY	2
INTRODUCTION.....	3
SERVICES: ENROLMENT, SERVICE POINT, FACULTY OF SCIENCE – SOUSA, DEPARTMENT STUDENT AFFAIRS AND ADVISING	4, 5, 6
REGISTRATION - General Information.....	7
LIBERAL PROGRAM.....	8, 9
MAJOR PROGRAM	10, 11
HONOURS PROGRAM	12,13
SUMMARY OF UNDERGRADUATE PROGRAMS.....	14
INTERDEPARTMENTAL HONOURS IMMUNOLOGY PROGRAM.....	15, 16,17, 18
CAREER AND EMPLOYMENT OPPORTUNITIES.....	19, 20, 21, 22, 23, 24

LINK TO COURSE DESCRIPTIONS <https://www.mcgill.ca/microimm/student-affairs/courses>

LINK TO ACADEMIC MEMBERS <https://www.mcgill.ca/microimm/people>

Revised August 2017

SCOPE OF MICROBIOLOGY AND IMMUNOLOGY

Microbiology is the study of the microorganisms such as bacteria, viruses, unicellular eukaryotes and parasites. Microorganisms play an important role in human and animal disease, food production (bread, cheese, wine), decay and spoilage, contamination and purification of water and soil, production and the recycling of food in lakes and oceans. Microbiologists study these tiny, self-replicating machines in an attempt to understand the basic principles of life: growth, metabolism, cell division, control of gene expression, response to environmental stimuli. Microbiologists are also concerned with controlling or harnessing microorganisms for the benefit of people, by isolating antibiotics or producing vaccines to protect against disease and by developing and perfecting microorganisms for industrial uses.

Immunology is the study of the molecular and cellular basis of host resistance and immunity to external agents such as pathogenic microorganisms. Immunologists attempt to understand the mechanisms by which the body recognizes foreign antigens, generates appropriate antibodies to an enormously diverse spectrum of antigens, and sequesters and kills invading microorganisms. Their discoveries lead to better understanding of vaccination against disease, transfusions and organ transplants, allergies, cancer, autoimmune diseases and immune-deficiency diseases such as AIDS. Immunologists have developed monoclonal antibodies as highly specific tools in diagnosis and treatment of disease. Antibodies may soon be used in conjunction with antibiotics or chemical agents as specific "silver bullets" to attack microbes and cancers.

The disciplines of microbiology and immunology are natural partners in research, and both fields use the modern methods of cell biology, molecular biology and genetics to study basic life processes. The Department of Microbiology and Immunology includes scientists who study microbial physiology and genetics, microbial pathogenesis, molecular virology, cellular and molecular immunology, and parasitology. Students registered in the Department therefore are exposed to these related areas and receive an excellent background in basic biology and chemistry as well as in the more applied areas of biotechnology and medicine.

WHAT DOES A DEGREE IN MICROBIOLOGY & IMMUNOLOGY PREPARE YOU FOR

Many opportunities exist for careers in basic or The Business of Science, medical microbiology, environmental microbiology, and biotechnology. They include positions in industry (pharmaceutical and biotechnology), hospitals, universities, and government agencies (environment, public health and energy, Health Research (Technician, Research Assistant). A degree in microbiology also provides an excellent basis for entering professional and postgraduate programs in medicine, dentistry, the veterinary sciences, research, and education.

For further information, consult the "Career Opportunities" section in this handbook.

INTRODUCTION

HISTORY OF THE DEPARTMENT OF MICROBIOLOGY AND IMMUNOLOGY

Sixty years ago, efforts began to consolidate teaching and research in microbiology within the faculties of Medicine and Science. As a result, a new Department of Bacteriology was founded with Dr. E.G.D. Murray as its first Chairman. Dr. Murray arrived from Cambridge to find that he was the sole staff member of a department whose few laboratories were not designed for bacteriological work. With energy and determination, Murray undertook to create a new department for teaching medical students as well as undergraduate and graduate students in the science of microbial organisms and disease pathogenesis.

Murray's work set the stage for today's extensive network of collaboration with key research institutions, including the Biotechnology Research Institute of the National Research Council, Lady Davis Institute, Institut Armand-Frappier and l'Institut de Recherches Cliniques de Montréal. The Department also has close ties with McGill's teaching hospitals: the Royal Victoria Hospital, the Montreal Children's Hospital, the Jewish General Hospital, the Montreal General Hospital, the Shriners' Hospital for Crippled Children and the Montreal Neurological Institute.

In 1965, the Department's name was changed to Microbiology and Immunology to reflect more accurately its greater scope of research and teaching activities. Additional space enlarged the Department to its present 37,000 square feet, which includes 18 laboratories and service units. Under the direction and guidance of a succession of dedicated Chairmen in the years that followed Professor Murray's exceptional 25 year tenure, the Department expanded to its present complement of professors and support staff which numbers more than 40.

THE DEPARTMENT TODAY

The Department of Microbiology and Immunology concentrates on four key areas of research: cellular and molecular immunology, microbial physiology and genetics, molecular biology of viruses, and medical microbiology. There are research laboratory facilities for fourteen full-time staff members in the Duff Medical Building. Affiliated staff are in nearby research institutes or teaching hospitals.

The Department currently occupies four floors in the Duff Medical Building and includes research laboratories, major equipment rooms including flow cytometry and phosphorimager suites, media and glassware facilities, animal care facility, seminar rooms and an administrative office. The Sheldon Biotechnology Centre, located in a building contiguous to ours, provides the sophisticated services of oligonucleotide and peptide synthesis, protein and DNA sequencing, and computer-aided analysis of macromolecular structures.

ENROLMENT SERVICES - SERVICE POINT

Service Point offers a variety of administrative services for both undergraduate and graduate students. The Service Point Office is located at 3415 McTavish Street (corner of Sherbrooke).

Reception Office Hours: 9:00 a.m. to 5:00 p.m. Service Area hours: Monday, Tuesday, Thursday, Friday: 10am to 4pm; Wednesday: 10am to 5pm. Telephone 514-398-7878 or visit their website at www.mcgill.ca/students/servicepoint/ for more information. You should contact Service Point for all Student Record and Registration matters, which include:

- assistance with course and program registration for Arts and Science students
- information about exams, and approval of requests for supplemental and deferred exams for Arts or Science students
- ranking/recommendation letters for Arts and Science students
- proof of enrolment letters
- certified or translated copies of diplomas
- help with admissions
- help with Minerva
- international health insurance card and exemptions
- McGill ID cards
- official transcript pick-up
- replacement diplomas
- student study-abroad exchange programs
- help with submission of legal documents
- tuition and fees information
- US loans pick-up

FACULTY OF SCIENCE/SOUSA

The office of the Faculty of Science and the Science Office for Undergraduate Student Advising and can provide general and specific information about undergraduate science programs. Both are located in Dawson Hall, room 405 for SOUSA services. **Hours: Monday, Tuesday, Thursday, Friday 9:00 a.m. to 4:30 p.m. Wednesday 10:00 to 4:30 p.m.** Telephone 514-398-5442 or visit their website at www.mcgill.ca/science/sousa. SOUSA can be contacted for academic advising, outreach, and academic follow-up of records decisions. **SOUSA ADVISORS CAN HELP YOU WITH:**

- Freshman Program Advising
- Degree Planning,
- Degree Requirements
- University and Faculty Regulations
- Study Away/Exchange
- Readmission
- Final Exam Issues,
- Interfaculty Transfers, etc.
- SOUSA advisors cannot help you register for restricted or full courses, but they can direct you to the right person or office.

STUDENT SERVICES

The Office of the Dean of Students is responsible for the coordination of all Student Services including Campus Life & Engagement, Career Planning Service (CaPS), Counselling and Mental Health, First Peoples' House, International Student Services, Office for Students with Disabilities, Office of Religious and Spiritual Life, Scholarships and Student Aid, Student Health Service, Tutorial Service. The Office is located at 3600 McTavish Street, Suite 4100. Office hours are 9:00 a.m. to 5:00 p.m., telephone 514-398-3825 or visit <http://www.mcgill.ca/studentsservices> for general information.

FACULTY OF ARTS AND SCIENCE CALENDAR

The regulations and other important details on choosing courses are available online at: www.mcgill.ca/students/courses/calendars

MICROBIOLOGY & IMMUNOLOGY UNDERGRADUATE HANDBOOK

The handbook which you are now reading supplements the calendar with more specific information on programs and courses in the Department. The required courses that are listed in this handbook take precedence over errors that may occur in the calendar. On line information can be found at:

<http://www.mcgill.ca/microimm/undergraduate>

DEPARTMENTAL NOTICE BOARD

The Departmental Notice Board provides current information concerning courses and programs and is located on the fifth floor of the Duff Medical Building. Important information on available scholarships and awards is posted throughout the year.

CODE OF CONDUCT AND MISTREATMENT REPORTING

The Department of Microbiology & Immunology and the Faculty of Medicine are committed to build and promote a respectful and inclusive learning and work environment for teachers and learners. Please find below important links to the Faculty of Medicine Code of Conduct, to the Wellness Enhanced Lifelong Learning (WELL) Office and the Dean of Students Office to learn how to report cases of alleged mistreatments. http://www.mcgill.ca/ugme/files/ugme/code_of_conduct_may2013.pdf
<http://www.mcgill.ca/thewelloffice> <http://www.mcgill.ca/deanofstudents/>

STUDENT AFFAIRS OFFICER

The Office of the Student Affairs Officer is located in Room 511 of the Duff Medical Building. If you wish to enquire about or discuss any aspect of the undergraduate courses or programs offered by the Department of Microbiology & Immunology, you may contact Jennifer DiMassimo, the Student Affairs Officer by calling 514-398-3915 to make an appointment.

Student Affairs Officer Advising Hours

Mondays 15h00 to 16h00; Wednesdays 10h00 to noon;

By appointment.

ACADEMIC ADVISORS

Students are assigned an academic advisor when they first register in the Department of Microbiology and Immunology. There is a Chief Advisor, plus three academic advisors for each year. Students should consult their assigned advisor for program and career planning. These advisors rotate each year so that they follow the student through the three-year program. Commencing 2017-2018, the advisors are:

<u>CHIEF ADVISOR</u>	<u>Dr. Benoit Cousineau</u>	<u>398-8929, Room 617 Benoit.cousineau@mcgill.ca</u>
Study Away and Exchange Advisor	Dr. Benoit Cousineau	398-8929, Room 617 (DUFF) Benoit.cousineau@mcgill.ca
Medical School Application Advisor	Dr. Dalius Briedis	398-3925, Room 510 (DUFF) Dalius.briedis@mcgill.ca
U1 ADVISOR letters A to G	Dr. Jacques Archambault	398-3485, Room D22 (DUFF) Jacques.archambault2@mcgill.ca
U1 ADVISOR letters H to M	Dr. Selena Sagan	398-8110, Room 608 (DUFF) Selena.Sagan@mcgill.ca
U1 ADVISOR letters N to Z	Dr. Hervé Le Moual	398-6235, Room 503 (DUFF) Herve.le-moual@mcgill.ca
U2 ADVISOR letters A to G	Dr. Greg Matlashewski	398-7479, Room D17 - 5th floor (DUFF) Greg.matlashewski@mcgill.ca
U2 ADVISOR letters H to M	Dr. Sylvie Fournier	398-7273, Room 603 (DUFF) Sylvie.fournier@mcgill.ca
U2 ADVISOR letters N to Z	Dr. Greg Marczynski	398-3917, Room 506 (DUFF) Greg.marczynski@mcgill.ca
U3 ADVISOR letters A to G	Dr. Martin Richer	398-4400 X 00538, Room 406 (DUFF) Martin.j.richer@mcgill.ca
U3 ADVISOR letters H to M	Dr. Robert Murgita	398-3927, Room 408 (DUFF) Robert.murgita@mcgill.ca
U3 ADVISOR letters N to Z	Dr. Irah King	398-7325, Room 402 (DUFF) Irah.king@mcgill.ca

MICROBIOLOGY AND IMMUNOLOGY STUDENTS' ASSOCIATION (MISA)

All students registered in Microbiology and Immunology are members of the Microbiology and Immunology Students' Association (MISA). Officers are elected yearly in the spring. MISA sponsors various events throughout the year and represents the Undergraduates at the Departmental level. The MISA office is located in Room 423 of the Duff Medical Building (e-mail: misa@sus.mcgill.ca).

REGISTRATION

UNDERGRADUATE STUDIES

REGISTRATION: GENERAL INFORMATION

Students register via Minerva <http://www.mcgill.ca/minerva-students/>

Important dates: <http://www.mcgill.ca/importantdates/>

New students from Cegep can register in June. Students must attend an orientation/advising session held the last week of August.

DESIGNATION U0, U1, U1, U3:

- first year of study by four-year students (120 credits) is: U0
- second year of study is: U1
- third year of study is: U2
- fourth year of is: U3

Quebec students who enter from CEGEP begin their studies in the U1 year and progress to U2 and U3 (90 credits).

MIMM ORIENTATION FOR NEW STUDENTS

**Orientation/Advising for Microbiology & Immunology students
will be held in the last week of August.**

ATTENDANCE IS STRONGLY RECOMMENDED.

MICROBIOLOGY AND IMMUNOLOGY PROGRAMS

LIBERAL PROGRAM – Core Science Component (49 REQUIRED CREDITS)

This flexible 49-credit program provides students with a strong concentration in Microbiology and Immunology. Students can pursue a minor in another specialty.

A grade of C or better must be obtained in all required courses. A student who has a CGPA of 3.2 or higher can apply for admission to the graduate program in the Department of Microbiology and Immunology. However, we recommend that students who intend to proceed to [Graduate Studies](#) select the [Major](#) or [Honours](#) program. **Students are required to do at least one minor or minor concentration in another discipline.**

U1 Required Courses (18 credits)

* Students who have taken CHEM 212 in CEGEP are exempt and must replace these credits with an elective course(s).

BIOL 200	Molecular Biology	3 Credits
BIOL 202	Basic Genetics	3 Credits
CHEM 212	Intro Organic Chemistry 1	4 Credits*
MIMM 211	Introductory Microbiology	3 Credits
MIMM 212	Laboratory in Microbiology	3 Credits
MIMM 214	Intro Immun: Elem of Immunity	3 Credits

U1 Complementary Course (3 credits)

3 credits, select one from:

BIOC 212	Molec Mechanisms of Cell Funct	3 Credits
BIOL 201	Cell Biology & Metabolism	3 Credits

U1, U2, or U3 Required Course (3 credits)

3 credits, select one from:

BIOL 373	Biometry	3 Credits
MATH 203	Principles of Statistics 1	3 Credits
PSYC 204	Intro to Psychological Stats	3 Credits

U2 Required Courses (15 credits)

MIMM 314	Intermediate Immunology	3 Credits
MIMM 323	Microbial Physiology	3 Credits
MIMM 324	Fundamental Virology	3 Credits
MIMM 384	Molecular Microbiology Lab	3 Credits
MIMM 385	Laboratory in Immunology	3 Credits

U3 Complementary Courses (6 credits)

6 credits selected from:

MIMM 387	The Business of Science	3 Credits
MIMM 413	Parasitology	3 Credits
MIMM 414	Advanced Immunology	3 Credits
MIMM 465	Bacterial Pathogenesis	3 Credits
MIMM 466	Viral Pathogenesis	3 Credits
MIMM 509	Inflammatory Processes	3 Credits

U1, U2 or U3 Complementary Courses (3 credits)

3 credits selected from:

* Students who have taken CHEM 212 or CHEM 222 in CEGEP must replace it with another complementary course.

ANAT 261	Intro to Dynamic Histology	4 Credits
ANAT 262	Intro Molecular & Cell Biol	3 Credits
ANAT 365	Cellular Trafficking	3 Credits
ANAT 458	Membranes & Cellular Signaling	3 Credits
BIOC 311	Metabolic Biochemistry	3 Credits
BIOC 312	Biochemistry of Macromolecules	3 Credits
BIOC 450	Protein Structure and Function	3 Credits
BIOC 454	Nucleic Acids	3 Credits
BIOC 458	Membranes & Cellular Signaling	3 Credits
BIOL 300	Molecular Biology of the Gene	3 Credits
BIOL 314	Molecular Biology of Oncogenes	3 Credits
BIOT 505	Sel Topics in Biotechnology	3 Credits
CHEM 203	Survey of Physical Chemistry	3 Credits
CHEM 204	Physical Chem./Biol.Sci. 1	3 Credits
CHEM 222	Intro Organic Chemistry 2	4 Credits*
CHEM 302	Intro Organic Chemistry 3	3 Credits
COMP 364	Comp. Tools for Life Sciences	3 Credits
EXMD 504	Biology of Cancer	3 Credits
MIMM 387	The Business of Science	3 Credits
MIMM 413	Parasitology	3 Credits
MIMM 414	Advanced Immunology	3 Credits
MIMM 465	Bacterial Pathogenesis	3 Credits
MIMM 466	Viral Pathogenesis	3 Credits
MIMM 509	Inflammatory Processes	3 Credits
PATH 300	Human Disease	3 Credits
PHAR 300	Drug Action	3 Credits
PHAR 301	Drugs and Disease	3 Credits
PHGY 209	Mammalian Physiology 1	3 Credits
PHGY 210	Mammalian Physiology 2	3 Credits

If you have passed a CEGEP course that is equivalent to a McGill course, you are exempt from that McGill course and will not receive McGill credit if you take it. Some CEGEP courses provide McGill exemptions no matter what CEGEP you were attending when you took them, while other courses provide exemptions only if taken at certain CEGEPs. To make sure you receive all the exemptions you qualify for, check this link:

<http://www.mcgill.ca/students/transfercredit/prospective/cegep>.

MAJOR PROGRAM (68 REQUIRED CREDITS)

This 68-credit program is designed for students who want to acquire a substantial background in microbiology and immunology, and in related disciplines (chemistry, biology, biochemistry). This will prepare them for professional schools, graduate education, or for entry in industry or in research institutes.

A grade of C or better must be obtained in all required courses. A student who has a CGPA of 3.2 or higher can apply for admission to the graduate program in the Department of Microbiology and Immunology.

U1 Required Courses (26 credits)

* Students who have taken CHEM 212 in CEGEP are exempt and must replace these credits with an elective course(s). ** Students who have taken CHEM 222 in CEGEP are exempt and must replace these credits with an elective course(s).

BIOL 200	Molecular Biology	3 Credits
BIOL 202	Basic Genetics	3 Credits
CHEM 212	Intro Organic Chemistry 1	4 Credits*
CHEM 222	Intro Organic Chemistry 2	4 Credits**
MIMM 211	Introductory Microbiology	3 Credits
MIMM 212	Laboratory in Microbiology	3 Credits
MIMM 214	Intro Immun: Elem of Immunity	3 Credits

One of:

BIOC 212	Molec Mechanisms of Cell Funct	3 Credits
BIOL 201	Cell Biology & Metabolism	3 Credits

U1, U2, or U3 Required Course (3 credits)

One of:

BIOL 373	Biometry	3 Credits
MATH 203	Principles of Statistics 1	3 Credits
PSYC 204	Intro to Psychological Stats	3 Credits

U2 Required Courses (21 credits)

BIOC 311	Metabolic Biochemistry	3 Credits
BIOC 312	Biochemistry of Macromolecules	3 Credits
MIMM 314	Intermediate Immunology	3 Credits
MIMM 323	Microbial Physiology	3 Credits
MIMM 324	Fundamental Virology	3 Credits
MIMM 384	Molecular Microbiology Lab	3 Credits
MIMM 385	Laboratory in Immunology	3 Credits

U3 Required Courses (9 credits)

MIMM 413	Parasitology	3 Credits
MIMM 465	Bacterial Pathogenesis	3 Credits
MIMM 466	Viral Pathogenesis	3 Credits

Complementary Courses (9 credits)

9 credits selected from:

* Students may select either ANAT 458 or BIOC 458, but not both.

ANAT 261	Intro to Dynamic Histology	4 Credits
ANAT 262	Intro Molecular & Cell Biol	3 Credits
ANAT 365	Cellular Trafficking	3 Credits
ANAT 458	Membranes & Cellular Signaling	3 Credits*
BIOC 450	Protein Structure and Function	3 Credits
BIOC 454	Nucleic Acids	3 Credits
BIOC 458	Membranes & Cellular Signaling	3 Credits*
BIOL 300	Molecular Biology of the Gene	3 Credits
BIOL 314	Molecular Biology of Oncogenes	3 Credits
BIOT 505	Sel Topics in Biotechnology	3 Credits
CHEM 203	Survey of Physical Chemistry	3 Credits
CHEM 204	Physical Chem./Biol.Sci. 1	3 Credits
CHEM 302	Intro Organic Chemistry 3	3 Credits
COMP 364	Comp. Tools for Life Sciences	3 Credits
EXMD 504	Biology of Cancer	3 Credits
MIMM 387	The Business of Science	3 Credits
MIMM 414	Advanced Immunology	3 Credits
MIMM 509	Inflammatory Processes	3 Credits
PATH 300	Human Disease	3 Credits
PHAR 300	Drug Action	3 Credits
PHAR 301	Drugs and Disease	3 Credits
PHGY 209	Mammalian Physiology 1	3 Credits
PHGY 210	Mammalian Physiology 2	3 Credits

*If you have passed a CEGEP course that is equivalent to a McGill course, you are exempt from that McGill course and will not receive McGill credit if you take it. Some CEGEP courses provide McGill exemptions no matter what CEGEP you were attending when you took them, while other courses provide exemptions only if taken at certain CEGEPs. To make sure you receive all the exemptions you qualify for, check this link: <http://www.mcgill.ca/students/transferecredit/prospective/cegep>

HONOURS PROGRAM (74 REQUIRED CREDITS)

The Honours program in Microbiology and Immunology combines the substantial background given by the Major program with a challenging opportunity to carry out a laboratory research project in the U-3 year. The required courses that are part of the Honours program offer broad exposure to different areas important to the biomedical sciences, as well as a high degree of specialization in these disciplines. These courses prepare students for a significant research experience under the direct supervision of a professor in the Department. Those who are considering careers in research in the biological sciences or in medicine, or employment in the biotechnology field, are encouraged to take advantage of the special opportunities offered by this Honours program.

Students intending to apply to the Honours program must complete the Major program in U-1 and U-2. A CGPA of at least 3.5 must be obtained by the end of the U-2 year in order to enter the Honours in U-3. For graduation in Honours, students must pass all required courses with a C or better, and achieve a sessional GPA of at least 3.30 in the U3 year.

The Honours research project course, Independent Studies in Microbiology and Immunology (MIMM 502 D1, D2), is a unique opportunity to gain first-hand research experience, to design and execute scientific experiments using sophisticated methods and equipment, and to participate in the dynamic and creative interactions that contribute to scientific discovery. Students in the project course work in the laboratory alongside a professor, graduate students, and research assistants during two terms. They learn to communicate science in writing and by a seminar presentation. See the course description for registration requirements at <http://www.mcgill.ca/microimm/undergraduate/courses/mimm502>.

Students who wish to apply to the Honours program must indicate in writing to Jennifer DiMassimo, Student Affairs Officer, by the fourth Friday of January of their U-2 year. Since there are a limited number of places available in MIMM 501/502 D1, D2 registration requires approval of the Department.

U1 Required Courses (25 credits)

* Students who have taken CHEM 212 in CEGEP are exempt and must replace these credits with an elective course(s).

** Students who have taken CHEM 222 in CEGEP are exempt and must replace these credits with an elective course(s).

BIOL 200	Molecular Biology	3 Credits
BIOL 202	Basic Genetics	3 Credits
CHEM 212	Intro Organic Chemistry 1	4 Credits*
CHEM 222	Intro Organic Chemistry 2	4 Credits**
MIMM 211	Introductory Microbiology	3 Credits
MIMM 212	Laboratory in Microbiology	3 Credits
MIMM 214	Intro Immun: Elem of Immunity	3 Credits

Continued.....

One of:

BIOC 212	Molec Mechanisms of Cell Funct	3 Credits
BIOL 201	Cell Biology & Metabolism	3 Credits

U1, U2, or U3 Required Course (3 credits)

One of:

BIOL 373	Biometry	3 Credits
MATH 203	Principles of Statistics 1	3 Credits
PSYC 204	Intro to Psychological Stats	3 Credits

U2 Required Courses (21 credits)

BIOC 311	Metabolic Biochemistry	3 Credits
BIOC 312	Biochemistry of Macromolecules	3 Credits
MIMM 314	Intermediate Immunology	3 Credits
MIMM 323	Microbial Physiology	3 Credits
MIMM 324	Fundamental Virology	3 Credits
MIMM 384	Molecular Microbiology Lab	3 Credits
MIMM 385	Laboratory in Immunology	3 Credits

U3 Required Courses (21 credits)

MIMM 413	Parasitology	3 Credits
MIMM 465	Bacterial Pathogenesis	3 Credits
MIMM 466	Viral Pathogenesis	3 Credits
MIMM 501D1	Hons Research Proj - Immunol	6 Credits*
MIMM 501D2	Hons Research Proj - Immunol	6 Credits*
MIMM 502D1	Hons Research Proj - Microbiol	6 Credits*
MIMM 502D2	Hons Research Proj - Microbiol	6 Credits*

* Students take either MIMM 501D1 and MIMM 501D2 OR MIMM 502D1 and MIMM 502D2.

Complementary Course (3 credits)

3 credits selected from:

ANAT 458	Membranes & Cellular Signaling	3 Credits
BIOC 404	Biophysical Methods in Biochem	3 Credits
BIOC 450	Protein Structure and Function	3 Credits
BIOC 454	Nucleic Acids	3 Credits
BIOC 458	Membranes & Cellular Signaling	3 Credits
BIOL 520	Gene Activity in Development	3 Credits
BIOT 505	Sel Topics in Biotechnology	3 Credits

Continued.....

CHEM 203	Survey of Physical Chemistry	3 Credits
CHEM 204	Physical Chem./Biol.Sci. 1	3 Credits
COMP 364	Comp. Tools for Life Sciences	3 Credits
MIMM 387	The Business of Science	3 Credits
MIMM 414	Advanced Immunology	3 Credits
MIMM 509	Inflammatory Processes	3 Credits
PHAR 562	Neuropharmacology	3 Credits
PHAR 563	Endocrine Pharmacology	3 Credits
PSYT 455	Neurochemistry	3 Credits

Continued.....

SUMMARY OF UNDERGRADUATE PROGRAM REQUIREMENTS

DEPARTMENTAL PREFIX:

ANAT = Anatomy **MATH** = Mathematics
BIOL = Biology **MIMM** = Microbiology & Immunology
BIOC = Biochemistry **PHAR** = Pharmacology
BIOT = Biotechnology **PATH** = Pathology
CHEM = Chemistry **PHGY** = Physiology
EXMD = Exp. Medicine **PSYC** = Psychology

	LIBERAL	MAJOR	HONOURS	
U1	MIMM 211 (F) (3)	MIMM 211 (F) (3)	MIMM 211 (F) (3)	
	MIMM 212 (F) (3)	MIMM 212 (F) (3)	MIMM 212 (F) (3)	
	MIMM 214 (W) (3)	MIMM 214 (W) (3)	MIMM 214 (W) (3)	
	BIOL 200 (F) (3)	BIOL 200 (F) (3)	BIOL 200 (F) (3)	
	BIOL 201 OR BIOC 212(W) (3)	BIOL 201(W) or BIOC 212(W) (3)	BIOL 201(W) or BIOC 212(W) (3)	
	BIOL 202 (W) (3)	BIOL 202 (W) (3)	BIOL 202 (W) (3)	
	CHEM 212 (F or W) (4)	CHEM 212 (F or W) (4)	CHEM 212 (F or W) (4)	
		CHEM 222 (F or W) (4)	CHEM 222 (F or W) (4)	
	22 credits	26 credits	26 credits	
U2	MIMM 314 (W) (3)	MIMM 314 (W) (3)	MIMM 314 (W) (3)	
	MIMM 323 (F) (3)	MIMM 323 (F) (3)	MIMM 323 (F) (3)	
	MIMM 324 (F) (3)	MIMM 324 (F) (3)	MIMM 324 (F) (3)	
	MIMM 384 (F) (3)	MIMM 384 (F) (3)	MIMM 384 (F) (3)	
	MIMM 385 (W) (3)	MIMM 385 (W) (3)	MIMM 385 (W) (3)	
		BIOC 311 (F) (3)	BIOC 311 (F) (3)	
		BIOC 312 (W) (3)	BIOC 312 (W) (3)	
	15 credits	21 credits	21 credits	
U3	Total of 9 credits:	MIMM 413 (W) (3)	MIMM 413 (W) (3)	
	- at least 6 from MIMM courses listed on	MIMM 465 (F) (3)	MIMM 465 (F) (3)	
	- plus 3 credits	MIMM 466 (W) (3)	MIMM 466 (W) (3)	
			MIMM 501 or 502 D1 (F) (6)	
			MIMM 501 or 502 D2 (W) (6)	
		+ 9 credits	+ 3 credits	
	9 credits	18 credits	24 credits	
SUM	49 CREDITS*	68 CREDITS*	74 CREDITS*	

*Total credits includes 3 credits for BIOL 373 or MATH 203 or PSYC 204. Statistics course for all programs, to be taken in U1 or U2 or U3

Honours Immunology (Interdepartmental) (75 credits)

Students must obtain a U1 GPA or a U2 CGPA of 3.30 for admission to this enrolment-limited program. U1 students should inform one of the program coordinators of their intent to enter the Honours Immunology (Interdepartmental) program during their U1 Winter term and confirm their intention in writing by April 1. U2 or U3 students can apply for admission at any time.

For graduation in the Honours program, the student must complete a minimum of 90 credits, and achieve a CGPA of not less than 3.30. The immunology courses ([BIOC 503](#), [MIMM 214](#), [MIMM 314](#), [MIMM 414](#), [MIMM 509](#), [PHGY 419D1/D2](#), [PHGY 513](#), [PHGY 531](#)) must all be passed with a grade not less than B.

Required Courses (48 credits)

U1 Required Courses

20 credits selected as follows:

* Students select either [BIOC 212](#) or [BIOL 201](#).

** Students select either [PHGY 209](#) or [MIMM 211](#).

BIOC 212 Molecular Mechanisms of Cell Function	(3 credits) *
BIOL 200 Molecular Biology	(3 credits)
BIOL 201 Cell Biology and Metabolism	(3 credits) *
CHEM 212 Introductory Organic Chemistry 1	(4 credits)
CHEM 222 Introductory Organic Chemistry 2	(4 credits)
MIMM 211 Introductory Microbiology	(3 credits) *
MIMM 214 Introductory Immunology: Elements of Immunity	(3 credits)
PHGY 209 Mammalian Physiology 1	(3 credits) *

U2 Required Courses

13 credits from the following:

ANAT 261 Introduction to Dynamic Histology	(4 credits)
BIOC 311 Metabolic Biochemistry	(3 credits)
BIOC 312 Biochemistry of Macromolecules	(3 credits)
MIMM 314 Intermediate Immunology	(3 credits)

U3 Required Courses

15 credits from the following:

MIMM 414 Advanced Immunology	(3 credits)
PHGY 419D1 Immunology Research Project	(4.5 credits)
PHGY 419D2 Immunology Research Project	(4.5 credits)
PHGY 513 Cellular Immunology	(3 credits)

Complementary Courses (27 credits)

U1 Complementary Courses

6 credits chosen for U1 complementary courses in the following manner.

3 credits selected from:

BIOL 373 Biometry	(3 credits)
MATH 203 Principles of Statistics 1	(3 credits)
PSYC 204 Introduction to Psychological Statistics	(3 credits)

plus 3 credits selected from the following:

* Students take either PHYG 209 or [MIMM 211](#).

** Students take either [CHEM 203](#) or [CHEM 204](#).

ANAT 214 Systemic Human Anatomy	(3 credits)
ANAT 262 Introductory Molecular and Cell Biology	(3 credits)
BIOL 202 Basic Genetics	(3 credits)
BIOL 205 Biology of Organisms	(3 credits)
BIOL 304 Evolution	(3 credits)
CHEM 203 Survey of Physical Chemistry OR	(3 credits) **
CHEM 204 Physical Chemistry/Biological Sciences 1	(3 credits) **
COMP 202 Foundations of Programming	(3 credits)
CHEM 287 Intro Analytical Chemistry and	(2 credits)
CHEM 297 Intro Analytical Chem. Lab. 1	(1 credit)
MIMM 211 Introductory Microbiology	(3 credits) *
MIMM 212 Laboratory in Microbiology	(3 credits)
PHGY 209 Mammalian Physiology 1	(3 credits) *
PHGY 210 Mammalian Physiology 2	(3 credits)

U2 Complementary Courses

12 credits chosen as follows:

6 credits selected from:

Students may take* BIOC 220 and BIOC 320 **or** ** PHGY 212 and PHGY 213 and BIOL 301 or
***MIMM 384 and MIMM 385

BIOC 220 Lab Meth in Biochem & Molecular Biol 1 &	(3 credits) *
BIOC 320 Lab Meth in Biochem & Molecular Biol 2 OR	(3 credits) *
MIMM 384 Molecular Microbiology Laboratory &	(3 credits) ***
MIMM 385 Laboratory in Immunology OR	(3 credits) ***
PHGY 212 Introductory Physiology Laboratory 1	(1 credit) **
PHGY 213 Introductory Physiology Laboratory 2	(1 credit) **
BIOL 301 Cell and Molecular Laboratory	(4 credits) **

plus 6 credits, selected from:

* Students take either [BIOL 309](#) or [MATH 315](#), but not both.

ANAT 365 Cellular Trafficking	(3 credits)
BIOL 300 Molecular Biology of the Gene	(3 credits)
BIOL 309 Mathematical Models in Biology	(3 credits) *
BIOL 314 Molecular Biology of Oncogenes	(3 credits)
CHEM 302 Introductory Organic Chemistry 3	(3 credits)
MATH 222 Calculus 3	(3 credits)
MATH 315 Ordinary Differential Equations	(3 credits) *
MIMM 323 Microbial Physiology	(3 credits)
MIMM 324 Fundamental Virology	(3 credits)
PATH 300 Human Disease	(3 credits)
PHAR 300 Drug Action	(3 credits)
PHAR 301 Drugs and Disease	(3 credits)
PHAR 303 Principles of Toxicology	(3 credits)
PHGY 311 Channels, Synapses & Hormones	(3 credits)
PHGY 312 Resp, Renal, & Cardiovascular Physio	(3 credits)
PHGY 313 Blood, Gastro, & Immune Sys Physio	(3 credits)
PHGY 314 Integrative Neuroscience	(3 credits)

U3 Complementary Courses

9 credits of U3 complementary courses chosen in the following manner:

3 credits selected from:

BIOC 503 Immunochemistry	(3 credits)
MIMM 509 Inflammatory Processes	(3 credits)
PHGY 531 Topics in Applied Immunology	(3 credits)

plus 6 credits selected from:

* Students take either [ANAT 458](#) or [BIOC 458](#), but not both.

ANAT 458 Membranes and Cellular Signaling	(3 credits) *
BIOC 404 Biophysical Methods in Biochemistry	(3 credits)
BIOC 450 Protein Structure and Function	(3 credits)
BIOC 454 Nucleic Acids	(3 credits)
BIOC 458 Membranes and Cellular Signaling	(3 credits) *
BIOC 503 Immunochemistry	(3 credits)
BIOL 520 Gene Activity in Development	(3 credits)
MIMM 413 Parasitology	(3 credits)
MIMM 465 Bacterial Pathogenesis	(3 credits)
MIMM 466 Viral Pathogenesis	(3 credits)
MIMM 509 Inflammatory Processes	(3 credits)
PHAR 503 Drug Discovery and Development 1	(3 credits)
PHAR 504 Drug Discovery and Development 2	(3 credits)
PHGY 531 Topics in Applied Immunology	(3 credits)
PHGY 552 Cellular and Molecular Physiology	(3 credits)

CAREER AND EMPLOYMENT OPPORTUNITIES

CAREER AND PLACEMENT SERVICES

McGill University offers Career and Placement Services for its students. This service provides information regarding summer employment, preparing a curriculum vitae, contacting various governmental agencies, and employment opportunities in chosen fields. Counsellor's, are available to answer questions at the office, which is located in the Brown Student Services Building, Suite: 2200, 3600 McTavish St., Montreal, H3A 1Y2, telephone no.: 398-3304.

FUTURE OPPORTUNITIES

A degree in microbiology provides an excellent basis for entering professional and postgraduate programs in biomedical research, education, medicine, dentistry, and the veterinary sciences. Many opportunities exist for careers in pure or The Business of Science, medical microbiology, environmental microbiology, and biotechnology. They include positions in industry (pharmaceutical, agri-food, service and biotechnology), hospitals, universities, research institutes, and government (environment, public health and energy).

The following is a list of the major categories of employers in Microbiology and Immunology.

CATEGORY (EXAMPLE)

PROJECT AREAS

BIOLOGICAL INDUSTRIES (Cedarlane)	Monoclonals, Biological Products
ENERGY INDUSTRIES (Petrocan)	Waste Management, Petro-chemicals
ENVIRONMENT LABORATORIES (Department of Environment)	Environmental Analysis and Monitoring
FERMENTATION INDUSTRIES (Labatt, Seagram, Agropur)	Production and Quality Control
FOOD INDUSTRIES (Maple Leaf)	Quality Control, Meat, Bakeries, etc.
HEALTH AND WELFARE (Government of Canada)	Drug, Food Additives Evaluation
HOSPITALS (Royal Victoria Hospital)	Diagnostic, Research
LABORATORIES (Bioresearch)	Product Testing
MEDICAL LABORATORIES (Provincial Health Labs)	Vaccination, Pathogen Analysis
MEDICAL & SCIENCE SUPPLY COMPANIES (Fisher Scientific)	Marketing, Product Support
MUNICIPAL LABORATORIES (Sewage Management)	Waste Management
PHARMACEUTICAL COMPANIES (Merck Frosst Canada Inc.)	Research, Marketing
PULP AND PAPER INDUSTRIES (Paprican)	Waste Management, Fermentation
UNIVERSITIES (McGill University)	Teaching, Research
WATER RESOURCES (Provincial Water Resources)	Water Contamination Analysis

The following are partial lists of mostly Quebec-based employers, divided by category, who offer employment opportunities in the biomedical, biotechnological and microbiological fields.

HUMAN AND VETERINARY HEALTH CARE

NAME

AMERSHAM PHARMACIA CANADA INC.
Baie d'Urfe
BIO-MÉGA INC.
Laval
BIO-MÉGA DIAGNOSTIC INC.
Laval
BIO-RESEARCH LABORATORIES LTD.
Senneville
BRISTOL MYERS PHARMACEUTIC GROUP
Candiac
CANADIAN MEDICAL RESEARCH ASSOC. INC.
Montreal
CONTINENTAL PHARMA CRYOSAN INC.
Montreal
FRAPPIER DIAGNOSTIC INC.
Laval
BIOCHEM IMMUNOSYSTEMS INC.
Laval
JOHNSON & JOHNSON INC.
Montreal

PROJECT AREAS

Health care, ophthalmic, diagnostic and biotechnological products
Pharmaceutical test kits

Diagnostic kits

Various

Pharmaceuticals

Biomedical research

Vaccines, plasma derivatives, diagnostic kits
Diagnostic kits, cell cultures
Chemical products, veterinary and diagnostic products
Absorption products

AGRI-FOOD

NAME

ACTOL CHEMICALS LTD.
Delson
AGRINOVE AGRI-FOOD COOPERATIVE
Sainte-Claire
AGROPUR AGRI-FOOD COOPERATIVE
Granby
A. LASSONDE & FILS LTD.
Rougemont
CENTRE D'INSÉMINATION ARTIFICIELLE DU QUÉBEC (C.I.A.Q.) INC.
Sainte-Hyacinthe
CHAMPLAIN INDUSTRIES LTD.
Stanbridge Station
DELISLE FOOD INC.
Boucherville
FROMAGES SAPUTO LTD.
Montreal
JOSEPH E. SEAGRAM & SON LTD.
LaSalle
LABATT BREWING COMPANY LTD.
Montreal
LABRADOR LAURENTIENNE INC.
LACTANCIA LTD.
Victoriaville
LANTIC SUGAR LTD.

PROJECT AREAS

Starch modification, polymers and polyvinyls
Concentrated and evaporated milk, UHT milk and juices, milk powder, butter, cheese
Cheese, yogurt, butter, milk, ice cream
fruit drinks
Fruit juices, vegetable juices, fruit drinks

Frozen semente of bull and animal embryo

Food additives, protein, skimmed and concentrated milk, beer yeast
Cheese, yogurt, sour cream, concentrated milk, milk powder
Cheese

Ethylic alcohol, alcoholic beverages

Beer, draught, beer yeast

Natural Spring Resources
Milk powder, butter, cheese

Sugar

Montreal
LIBERTY BRAND PRODUCT INC.
Brossard
MOLSON BREWERIES OF CANADA LTD.
Montreal
NUTRINOR AGRI-FOOD COOPERATIVE
Chambord
OGILVIE MILLS LTD.
Candiac
PURDEL AGRI-FOOD COOPERATIVE
Bic
ROLMEX INC.
Boucherville
ROSELL INSTITUTE INC.
Montreal
SCHENLEY CANADA LTD.
Valleyfield
SEMICO INC.
Sainte-Rosalie

Cheese, yogurt, butter, cream
Beer, draught, beer yeast
Food additives
Food additives and preservatives,
glucides, vegetal proteins
Dairy products and derivatives, bakery
marine products, animal food
Lactic cultures
Freeze-dried lactic cultures
Alcoholic beverages
Seeds

FORESTRY AND PULP & PAPER

NAME

ABITIBI CONSOLIDATED
Montreal
DOMTAR INC.
Senneville
IOGEN INC.
Montreal
NORANDA INC.
Pointe-Claire
PREMIER ENTERPRISES CDN LTD.
Rivière-du-Loup
PULP AND PAPER RESEARCH INSTITUTE
OF CANADA (PAPRICAN)
Pointe-Claire
REED LTD.
Québec
RHIZOTEC LABORATORIES INC.
Chrysostome

SERRES A.M. DION INC.

PROJECT AREAS

Pulp and paper
Pulp and paper, forestry products, fine
chemical products
Forestry biomass valorization, enzyme
Metal and forestry products
Peat moss, biofilter, compost, peat-based
culture media
Pulp and paper, effluent treatment
Pulp and paper, fine chemicals
Microbial biofertilizers for agricultural plants and Saint-Jean
forestry
In vitro culture of ornamental plants, vegetables Boisbriand
and trees

ENVIRONMENT

NAME

CANADIAN LIQUID AIR LTD.

DEGRÉMONT INFILCO LTD.
Montreal
ECO-RECHERCHES INC.
Pointe-Claire
JOHN MEUNIER INC.
Montreal
SANIVAN INC.

PROJECT AREAS

Assisted oil recovery, pulp and paper, waste water Montréal
treatment
Water treatment equipment
Biological treatment of effluent
Effluent treatment
Environmental protection, treatment of toxic Montreal
industrial wastes

CONSULTING AND ENGINEERING SERVICES

NAME

MONENCO LTD.
Montreal
RECBIOMINE INC.
Montreal
ROCHE LTD.
Sainte-Foy
SNC LAVALIN GROUP
Montreal
SPECTREX LTD.
Montreal
TEKNIKA GROUP INC.
Sherbrooke

PROJECT AREAS

Process engineering
Metal biolixiviation
Environmental engineering
Process and environmental engineering
Bioreactor
Industrial waste treatment

MAJOR CANADIAN BIOTECHNOLOGY EMPLOYERS

NAME

ADRIA LABORATORIES CORP.
Mississauga, Ontario
ALLELIX INC.
Toronto, Ontario

BIO CAN INC.
(Jackson Immunoresearch)
Mississauga, Ontario
BIOMIRA INC.
University of Alberta
Edmonton, Alberta
CEDARLANE
Hornby, Ontario
CONNAUGHT LABORATORIES
Willowdale, Ontario
PALMYRA RESOURCES CORP.
Victoria, B.C.

PROJECT AREAS

Pharmacology

Diagnostic
Growth Factors
Therapeutic Drugs
Immunochemical

Immunodiagnosics
Immunotherapeutics

Immunochemical

Pharmaceuticals Ontario (Insulin)
Diagnostic (RHO Gamm)
Cancer Diagnostic

BIOMEDICAL COMPANIES IN THE MONTREAL AREA

ABBOTT LABS LTD.
ADAMS BRANDS LTD.
AMERSHAM PHARMACIA CANADA
ALGENE BIOTECHNOLOGIES
APOTEX INC.
ASTRA PHARMA CANADA
BAYER CANADA
BECKMAN INSTRUMENTS CANADA
BIOAGRAL INC.
BIOCHEM PHARMA
BIOMATRIX
BIOMERIEUX CANADA INC.
BIORECHERCHE CANADA
BIORTHEX
BIOVET

BOEHRINGER MANNHEIM CANADA
BRISTOL-MEYERS SQUIBB
CRYOCATH TECHNOLOGIES INC.
DESBERGERS LIMITED
ELI LILLY CANADA
FISHER SCIENTIFIC
FORMULEX CANADA INC.
GELMAN SCIENCES INC.
GENEKA BIOTECHNOLOGIES INC.
GIST BROCADES/BIO-INTERMEDIARE
HAEMACURE CORP.
HOECUST MARION ROUSSEL CANADA
HOFFMANN LAROCHE LTD.
ICN CANADA
INTERNATIONAL INSTRUMENTS
INSTITUT ARMAND-FRAPPIER
LABOPHARM INC.
LABORATOIRE MICROBIOCHEM INC.
LABORATOIRES BIOPHARM INC.
MALLINKRODT CANADA
MANDEL SCIENTIFIC
MERCK FROSST CANADA INC.
METHYLGENE INC.
NOVARTIS PHARMACEUTICALS CANADA
NOVOPHARM QUEBEC
NYMOX
PERKIN ELMER CANADA
PFIZER
PHOENIX INTERNATIONAL
POLYMER SOURCE INC
QUANTUM BIOTECHNOLOGIES INC.
RHONE-POULENC-RORER
ROUGIER INC.
RTP PHARMA INC.
SABEX INC.
SARSTEDT W CANADA
SCHERING CANADA INC.
SODEXEN INC.
SPINEX MEDICAL TECHNOLOGIES INC.
THERALIPIDS INC.
THERAPEX
UPJOHN CANADA
VWR CANADA
WELLCOME INC.
WYETH AYERST LTD.

GOVERNMENT RESEARCH CENTRES

BIOTECHNOLOGY RESEARCH INSTITUTE (NRCC)

Montreal

CAPTAIN BERNIER LABORATORY

Longueuil

AGRICULTURE CANADA

SAINT-HYACINTHE FOOD RESEARCH CENTRE

Saint-Hyacinthe

LAURENTIAN FORESTRY CENTRE

Sainte-Foy

ANIMAL PATHOLOGY LABORATORY

Saint-Hyacinthe

LENNOXVILLE RESEARCH STATION

Lennoxville

SAINT-JEAN-SUR -RICHELIEU RESEARCH STATION

Sain-Jean-sur-Richelieu

SAINTE-FOY RESEARCH STATION

Sainte-Foy

CENTRE QUÉBÉCOIS DE VALORISATION DE LA BIOMASSE

Sainte-Foy

INSTITUT DE TECHNOLOGIE AGRO-ALIMENTAIRE

Saint-Hyacinthe

LaPocatière

CENTRE DE RECHERCHE INDUSTRIELLE DU QUÉBEC

Sainte-Foy

MONTREAL BOTANICAL GARDEN

Montreal

QUÉBEC UNIVERSITIES

MCGILL UNIVERSITY

Montreal

- Sheldon Biotechnology Centre
- Office of Industrial Research
- Macdonald College, Ste-Anne-de-Bellevue

UNIVERSITÉ DE QUÉBEC

Abitibi-Témiscamingue

Chicoutimi

Hull

Montréal

- Armand-Frappier Institute, Laval
- Institut National de la Recherche Scientifique (INRS)

Rimouski

Trois-Rivières

UNIVERSITÉ DE MONTRÉAL

Montréal

- Industrial Liaison Office
- Clinical Research Institute of Montréal
- Montréal Cancer Institute
- Ecole Polytechnique de Montréal/Technology Development Centre
- Veterinary School of Medicine, Saint-Hyacinthe

UNIVERSITY OF SHERBROOKE

Sherbrooke

LAVAL UNIVERSITY

Sainte-Foy

- Industrial Liaison Office
- Centre Hospitalier de l'Université de Laval (CHUL)

CONCORDIA UNIVERSITY

Montreal

BISHOP'S UNIVERSITY

Lennoxville