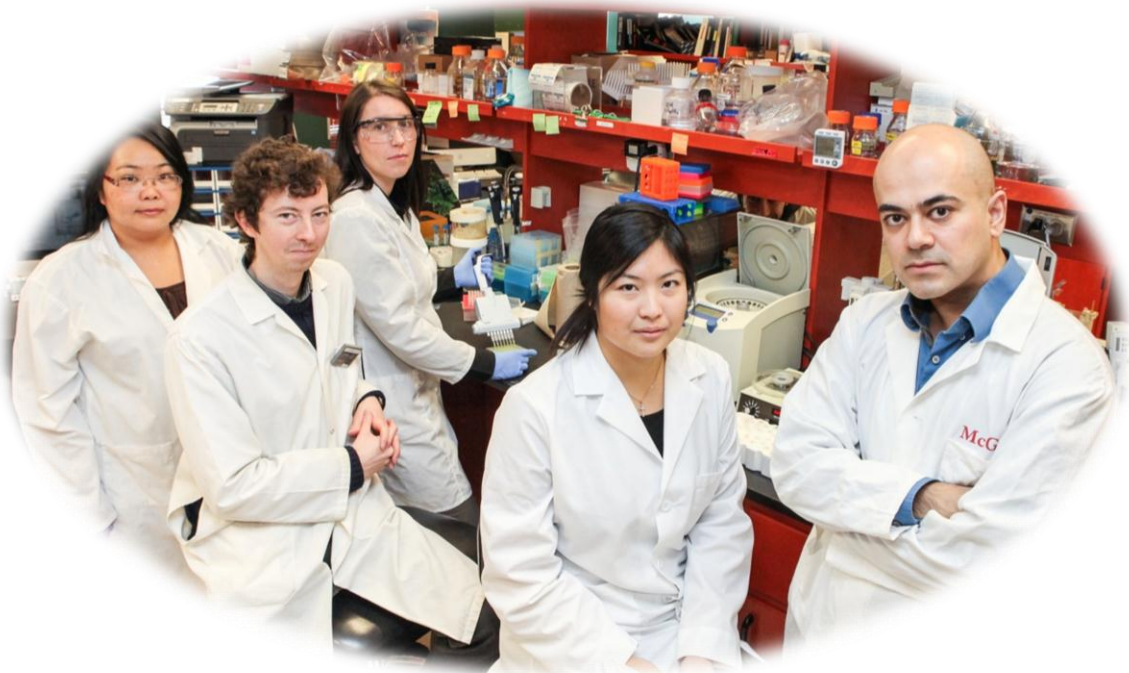


**MCGILL UNIVERSITY**

**DEPARTMENT OF  
MICROBIOLOGY AND IMMUNOLOGY**

**UNDERGRADUATE  
HANDBOOK**

**2014 - 2015**



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

[www.mcgill.ca/undergrad.microimm@mcgill.ca](http://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](mailto:Undergrad.microimm@mcgill.ca)

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

[www.mcgill.ca/undergrad.microimm@mcgill.ca](http://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<sup>e</sup> 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](mailto:Undergrad.mciroimm@mcgill.ca)

# MICROBIOLOGY AND IMMUNOLOGY

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### ***LINK TO COURSE DESCRIPTIONS***

***<https://www.mcgill.ca/microimm/students/undergraduate/courses>***

### ***LINK TO ACADEMIC MEMBERS***

***<https://www.mcgill.ca/microimm/members>***

*Revised April 2014*

## **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 applied microbiology and immunology, 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.

## **COUNSELLING SERVICES**

Some of the sources of information and help available to you include:

### **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). Regular office hours are 9:30 a.m. to 5:00 p.m. Telephone 514-398-7878 or visit their website at [www.mcgill.ca/students/servicepoint/](http://www.mcgill.ca/students/servicepoint/) for more information. You should contact Service Point for all Student Record and Registration matters, which include:

- Help with MINERVA
- Approval and processing of course changes past record deadlines
- Approval and processing of transfer credits and exemptions
- Approval and processing of requests for special final, deferred, and supplemental exams as well as J appeals
- Approval and processing of marks and mark changes for courses administered by Arts and Science
- Student ID cards
- International health insurance
- Student Exchange office
- Exam office
- Official transcript pick-up (Request must be made online via MINERVA)
- Submitting legal documents
- Tuition and Fees information

### **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. Telephone 514-398-5442 or visit their website at [www.mcgill.ca/science/sousa](http://www.mcgill.ca/science/sousa). SOUSA can be contacted for academic advising, outreach, and academic follow-up of records decisions. Their services include:

- Academic Advising including monitoring completion of freshman programs and other general academic issues
- Outreach for students via email about academic issues
- Approval of requests for 600 level courses
- Approval of study away applications, courses, credits, in conjunction with departments
- Faculty approval of exchange applicants
- Graduation approval
- Degree certification
- Advising and orientation of new instructors

## **STUDENT SERVICES**

The Office of the Dean of Students is responsible for the coordination of all Student Services including Counselling and Tutorial Services, Health, Mental Health, Career and Planning Service (CaPS), Office for Students with Disabilities, Student Aid/International Student Advisor. 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](http://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.

## **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 2 - 4 p.m.
- . Wednesdays 10 a.m. - 12 p.m.
- . 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 2014-2015, the advisors are:

<b><u>CHIEF ADVISOR</u></b>	<b><u>Dr. Benoit Cousineau</u></b>	<b><u>398-8929, Room 617</u></b>
<b>Study Away and Exchange Advisor</b>	<b>Dr. Benoit Cousineau</b>	<b>398-8929, Room 617</b>
<b>Medical School Application Advisor</b>	<b>Dr. Dalius Briedis</b>	<b>398-3925, Room 510</b>
<b>U1 ADVISOR letters A to G</b>	<b>Dr. Samantha Gruenheid</b>	<b>398-2138, Room 365 Bellini Building</b>
<b>U1 ADVISOR letters H to M</b>	<b>Dr. Selena Sagan</b>	<b>398-8110, Room 608</b>
<b>U1 ADVISOR letters N to Z</b>	<b>Dr. Hervé Le Moual</b>	<b>398-6235, Room 503</b>
<b>U2 ADVISOR letters A to G</b>	<b>Dr. Greg Matlashewski</b>	<b>398-7479, Room D17 - 5<sup>th</sup> floor</b>
<b>U2 ADVISOR letters H to M</b>	<b>Dr. Sylvie Fournier</b>	<b>398-7273, Room 603</b>
<b>U2 ADVISOR letters N to Z</b>	<b>Dr. Greg Marczynski</b>	<b>398-3917, Room 506</b>
<b>U3 ADVISOR letters A to G</b>	<b>Dr. James Coulton</b>	<b>398-3929, Room 403</b>
<b>U3 ADVISOR letters H to M</b>	<b>Dr. Robert Murgita</b>	<b>398-3927, Room 408</b>
<b>U3 ADVISOR letters N to Z</b>	<b>Dr. Irah King</b>	<b>398-7325, Room 402</b>



## **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](mailto: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.**

## LIBERAL PROGRAM (49 REQUIRED CREDITS)

The Liberal program is the most flexible. It provides a student with a useful concentration in Microbiology and Immunology. Students are required to do at least one minor or minor/concentration in another discipline. A grade of C or better must be obtained in all required courses. A student who has obtained a CGPA of 3.2 or better is eligible to apply for admission to the graduate program in the Department of Microbiology and Immunology. However, it is recommended that students who intend to proceed to Graduate Studies select the Major or Honours program.

Course	Credits	Department	Title
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### Required statistics course to be taken in U1, U2 or U3 year (3 credits)

BIOL 373 (F)	(3)	Biology	Biostatistical Analysis
or			
MATH 203 (F or W)	(3)	Math	Principles of Statistics 1
or			
PSYC 204 (F or W)	(3)	Psychology	Introduction to Psychological Statistics

### U1 Required Courses (22 credits)

MIMM 211 (F)	(3)	Micro. & Immuno.	Introductory Microbiology
MIMM 212 (F)	(3)	Micro. & Immuno.	Laboratory in Microbiology
MIMM 214 (W)	(3)	Micro & Immuno	Introduction to Immunology
BIOL 200 (F)	(3)	Biology	Molecular Biology
BIOL 201 (W)	(3)	Biology	Cell Biology and Metabolism
or			
BIOC 212 (W)	(3)	Biochemistry	Molecular Mechanisms of Cell Function
BIOL 202 (W)	(3)	Biology	Basic Genetics
CHEM 212 (F or W)*	(4)	Chemistry	Organic Chemistry 1

### U2 Required Courses (15 credits)

MIMM 314 (W)	(3)	Micro. & Immuno.	Immunology
MIMM 323 (F)	(3)	Micro. & Immuno.	Microbial Physiology
MIMM 324 (F)	(3)	Micro. & Immuno.	Fundamental Virology
MIMM 384 (F)	(3)	Micro. & Immuno.	Molecular Microbiology Lab
MIMM 385 (W)	(3)	Micro. & Immuno.	Laboratory in Immunology

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>

## LIBERAL PROGRAM (continued)

### U3 Required Courses (6 credits)

At least 6 credits must be in courses offered by the Department of Microbiology and Immunology (See list below). The remaining credits must be chosen from the complementary course list. Most flexible program providing space for additional minor or major programs concentration.

Course	Credits	Department	Title
MIMM 387 (W)	(3)	Micro. & Immuno.	Applied Micro. & Immuno.
MIMM 413 (W)	(3)	Micro. & Immuno.	Parasitology
MIMM 414 (A)	(3)	Micro. & Immuno.	Advanced Immunology
MIMM 465 (A)	(3)	Micro. & Immuno.	Bacterial Pathogenesis
MIMM 466 (W)	(3)	Micro. & Immuno.	Viral Pathogenesis
MIMM 509 (W)	(3)	Micro. & Immuno.	Inflammatory Processes

### Complementary Courses in U-1, U-2 OR U-3: (3 credits)

**3 credits must be taken from the following:**

BIOL 300 (F)	(3)	Biology	Molecular Biology of the Gene
BIOL 314 (F)	(3)	Biology	Molecular Biology of Oncogenes
CHEM 203 (F)	(3)	Chemistry	Survey of Physical Chemistry
<b>or</b>			
CHEM 204 (F or W)	(3)	Chemistry	Intro. to Physical Chemistry/Biol.Science
CHEM 222 (F or W)	(4)	Chemistry	Organic Chemistry 2
CHEM 302 (F)	(3)	Chemistry	Organic Chemistry 3
BIOT 505 (W)	(3)	Biotechnology	Selected Topics in Biotechnology
ANAT 261 (F)	(4)	Anatomy	Introduction to Dynamic Histology
ANAT 262 (W)	(3)	Anatomy	Intro. Molecular and Cellular Biology
ANAT 365 (F)	(3)	Anatomy	Cell Biology of the Secretory Processes
ANAT 458 (W)	(3)	Anatomy	Membranes & Cellular Signalling
<b>or</b>			
BIOC 458 (W)	(3)	Biochemistry	Membranes & Cellular Signalling
BIOC 311 (F)	(3)	Biochemistry	Metabolic Biochemistry
BIOC 312 (W)	(3)	Biochemistry	Biochemistry of Macromolecules
BIOC 450 (F)	(3)	Biochemistry	Protein Structure and Function
BIOC 454 (F)	(3)	Biochemistry	Nucleic Acids
BIOC 458 (W)	(3)	Biochemistry	Membranes & Cellular Signalling
EXMD 504 (F)	(3)	Experimental Med.	Biology of Cancer
MIMM 387 (W)	(3)	Micro. & Immuno.	Applied Microbiology and Immunology
MIMM 413 (W)	(3)	Micro. & Immuno.	Parasitology
MIMM 414 (F)	(3)	Micro. & Immuno.	Advanced Immunology
MIMM 465 (F)	(3)	Micro. & Immuno.	Bacterial Pathogenesis
MIMM 466 (W)	(3)	Micro. & Immuno.	Viral Pathogenesis
MIMM 509 (W)	(3)	Micro. & Immuno.	Inflammatory Processes
PATH 300 (W)	(3)	Pathology	Human Disease
PHAR 300 (F)	(3)	Pharmacology	Drug Action
PHAR 301 (W)	(3)	Pharmacology	Drugs and Diseases
PHGY 209 (F)	(3)	Physiology	Mammalian Physiology 1
PHGY 210 (W)	(3)	Physiology	Mammalian Physiology 2

## MAJOR PROGRAM (68 REQUIRED CREDITS)

The Major Program is designed for students who want to acquire a substantial background in microbiology and immunology and related disciplines (chemistry, biology, biochemistry) which will prepare them for professional schools, graduate education, or entry into jobs in industry or research institutes. A grade of C or better must be obtained in all required courses. A student who has obtained a CGPA of 3.2 or better is eligible to apply for admission to the graduate program in the Department of Microbiology and Immunology.

Course	Credits	Department	Title
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### Required statistics course to be taken in U1, U2 or U3 year (3 credits)

BIOL 373 (F)	(3)	Biology	Biostatistical Analysis
or			
MATH 203 (F or W)	(3)	Math	Principles of Statistics 1
or			
PSYC 204 (F or W)	(3)	Psychology	Introduction to Psychological Statistics

### U1 Required Courses (26 credits)

MIMM 211 (F)	(3)	Micro. & Immuno.	Introductory Microbiology
MIMM 212 (F)	(3)	Micro. & Immuno.	Laboratory in Microbiology
MIMM 214 (W)	(3)	Micro & Immuno	Introduction to Immunology
BIOL 200 (F)	(3)	Biology	Molecular Biology
BIOL 201 (W)	(3)	Biology	Cell Biology and Metabolism
or			
BIOC 212 (W)	(3)	Biochemistry	Molecular Mechanisms of Cell Function
BIOL 202 (W)	(3)	Biology	Basic Genetics
CHEM 212 (F or W)*	(4)	Chemistry	Organic Chemistry 1
CHEM 222 (F or W)*	(4)	Chemistry	Organic Chemistry 2

\* 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>

### U2 Required Courses (21 credits)

MIMM 314 (W)	(3)	Micro. & Immuno.	Immunology
MIMM 323 (F)	(3)	Micro. & Immuno.	Microbial Physiology
MIMM 324 (F)	(3)	Micro. & Immuno.	Fundamental Virology
MIMM 384 (F)	(3)	Micro. & Immuno.	Molecular Microbiology Lab

MIMM 385 (W)	(3)	Micro. & Immuno.	Laboratory in Immunology
BIOC 311 (F)	(3)	Biochemistry	Metabolic Biochemistry
BIOC 312 (W)	(3)	Biochemistry	Biochemistry of Macromolecules

**\*These courses are prerequisites for MIMM 465 (F) and MIMM 466 (W), and therefore must be taken in U2 MAJORS continued**

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<b>Course</b>	<b>Credits</b>	<b>Department</b>	<b>Title</b>
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**U3 Required Courses (9 credits)**

MIMM 413 (W)	(3)	Micro. & Immuno.	Parasitology
MIMM 465 (F)	(3)	Micro. & Immuno.	Bacterial Pathogenesis
MIMM 466 (W)	(3)	Micro. & Immuno.	Viral Pathogenesis

**Complementary Courses in U-1, U2 OR U3 (9 credits)**

**An additional 9 credits selected from:**

ANAT 261 (F)	(4)	Anatomy	Introduction to Dynamic Histology
ANAT 262 (W)	(3)	Anatomy	Intro. Molecular and Cellular Biology
ANAT 458 (W)	(3)	Anatomy	Membranes & Cellular Signaling
<b>or</b> BIOC 458 (W)	(3)	Biochemistry	Membranes & Cellular Signaling
ANAT 365 (F)	(3)	Anatomy	Cell Biology of the Secretory Processes
BIOL 300 (F)	(3)	Biology	Molecular Biology of the Gene
BIOL 314 (F)	(3)	Biology	Molecular Biology of Oncogenes
BIOC 450 (F)	(3)	Biochemistry	Protein Structure and Function
BIOC 454 (F)	(3)	Biochemistry	Nucleic Acids
BIOT 505 (W)	(3)	Biotechnology	Selected Topics in Biotechnology
CHEM 203 (F)	(3)	Chemistry	A Survey of Physical Chemistry
<b>or</b>			
CHEM 204 (F or W)	(3)	Chemistry	Introductory Physical Chemistry for Biological Science Students
CHEM 302 (F)	3)	Chemistry	Organic Chemistry 3
EXMD 504 (F)	(3)	Experimental Med.	Biology of Cancer
MIMM 387 (W)	(3)	Micro. & Immuno.	Applied Microbiology and Immunology
MIMM 414 (F)	(3)	Micro. & Immuno.	Advanced Immunology
MIMM 509 (W)	(3)	Micro. & Immuno.	Inflammatory Processes
PATH 300 (W)	(3)	Pathology	Human Disease
PHAR 300 (F)	(3)	Pharmacology	Drug Action
PHAR 301 (W)	(3)	Pharmacology	Drugs and Diseases
PHGY 209(F)	(3)	Physiology	Mammalian Physiology 1
PHGY 210 (W)	(3)	Physiology	Mammalian Physiology 2

Continued.....

## 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.

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.

**Students who wish to apply to the Honours program must indicate in writing to Jennifer DiMassimo, Student Affairs Officer, by the third Monday of February 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.** For graduation from the Honours program, a student must pass all required courses at a level of C or better, and must achieve a sessional GPA of at least 3.3 in U-3.

Course	Credits	Department	Title
<b><u>Required statistics course to be taken in U-1, U-2 OR U-3 year (3 credits)</u></b>			
BIOL 373 (F)	(3)	Biology	Biostatistical Analysis
or			
MATH 203 (F or W)	(3)	Math	Principles of Statistics 1
or			
PSYC 204 (F or W)	(3)	Psychology	Introduction to Psychological Statistics

### **Required courses in U-1 and U-2 (46 credits)**

**Required courses of the Honours Program are the same, as the U-1 and U-2 required courses of the Major Program.**

Continued....

## HONOURS PROGRAM (continued)

Course	Credits	Department	Title
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### U3 Required Courses (21 credits)

MIMM 413 (W) (3)	Micro. & Immuno.	Parasitology
MIMM 465 (F) (3)	Micro. & Immuno.	Bacterial Pathogenesis
MIMM 466 (W) (3)	Micro. & Immuno.	Viral Pathogenesis
MIMM 502D1 (F)(6)	Micro. & Immuno.	Honours Research Project
MIMM 502D2 (W)(6)	Micro. & Immuno.	Honours Research Project

### Complementary Courses (3 credits)

In addition, U-3 students must take one course (3 credits) from the following:

BIOL 520 (W) (3)	Biology	Gene Activity in Development
BIOT 505 (W) (3)	Biotechnology	Selected Topics in Biotechnology
BIOC 404 (W) (3)	Biochemistry	Biophysical Chemistry
BIOC 450 (F) (3)	Biochemistry	Protein Structure and Function
BIOC 454 (F) (3)	Biochemistry	Nucleic Acids
BIOC 455 (W) (3)	Biochemistry	Neurochemistry
BIOC 458 (W) (3)	Biochemistry	Membranes and Cellular Signaling
<b>or</b>		
ANAT 458 (W) (3)	Anatomy	Membranes and Cellular Signaling
CHEM 203 (F) (3)	Chemistry	A Survey of Physical Chemistry
<b>or</b>		
CHEM 204 (F or W) (3)	Chemistry	Introductory Physical Chemistry for Biological Science Students
MIMM 414 (F) (3)	Micro. & Immuno.	Advanced Immunology
MIMM 509 (W) (3)	Micro. & Immuno.	Inflammatory Processes
PHAR 562 (F) (3)	Pharmacology	General Pharmacology 1
PHAR 563 (W) (3)	Pharmacology	General Pharmacology 2

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 12 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	
	12 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



## **INTERDEPARTMENTAL HONOURS IMMUNOLOGY PROGRAM**

**(75 required credits)**

The Honours Program in Immunology is offered by three Departments: Biochemistry, Microbiology and Immunology, and Physiology combining elements of each. The program is a demanding one which will prepare the student for graduate work in immunology.

All admissions to the Honours program will be after completion of the U1 year, and a student must have completed 30 credits of U1 courses with a minimum GPA of 3.3. Admission to U3 requires a minimum CGPA of 3.3 in U2. Students who do not maintain Honours standing must transfer their registration to a program in one of the three participating Departments.

For graduation in the Honours program, the student must complete a minimum of 90 credits, and achieve a CGPA of not less than 3.3. In addition, the five core immunology courses must be passed with a grade not less than B. This program is comprised of a core of 56 credits in basic science courses in cell and molecular biology, microbiology, biochemistry and physiology. An additional 21 credits in complementary science courses may be selected from a broad selection of science courses. The remaining 13 credits are free electives to enable the student to explore related science disciplines. An undergraduate research project, seminar and thesis provides an opportunity to directly experience research work in a laboratory with a professor of immunology.

All U1 students who are interested in the program are advised to register in either the Faculty or Major program in Biochemistry or Physiology, or the Major program in Microbiology and Immunology. During their U1 year, students intending to enter the program should inform their advisers of their intent to enter the Honours Immunology Program in U2.

**Students wishing to enter the program must formally apply in writing by April 1 to Dr. Ciriaco A. Piccirillo, Department of Microbiology and Immunology, Montreal General Hospital 1650 Cedar Avenue Room L11.132-144 Montreal, QC H3G 1A4 Tel: (514) 934-1934 ext: 45135 Fax: (514) 934-8332 Email: [ciro.piccirillo@mcgill.ca](mailto:ciro.piccirillo@mcgill.ca)) or Dr. Monroe Cohen, Department of Physiology, Room 1136, McIntyre Medical Sciences Building, 3655 Drummond Street, Montreal, QC, H3G 1Y6 (Telephone 398-4342, Email: [Monroe.cohen@mcgill.ca](mailto:Monroe.cohen@mcgill.ca)).**

All U1 candidates will be interviewed prior to admission. Enrolment is limited and admission may be denied if demand exceeds the number of available places.

## INTERDEPARTMENTAL HONOURS IMMUNOLOGY PROGRAM (continued)

Course	Credits	Department	Title
<b>U-1 Required courses (20 credits)</b>			
BIOL 200	(3)	Biology	Molecular Biology
BIOL 201	(3)	Biology	Cell Biology and Metabolism
or BIOC 212	(3)	Biochemistry	Molecular Mechanisms of Cellular Function
CHEM 212	(4)	Chemistry	Introductory Organic Chemistry 1
CHEM 222 <sup>1</sup>	(4)	Chemistry	Introductory Organic Chemistry 2
MIMM 214	(3)	Micro & Immuno	Introduction to Immunology
PHGY 209	(3)	Physiology	Mammalian Physiology I
or MIMM 211	(3)	Micro. & Immuno	Introductory Microbiology

### **U-1 Complementary courses (6 credits)**

#### **3 credits selected from:**

BIOL 373 or	(3)	Biology	Biometry
MATH 203 or	(3)	Mathematics	Principles and Methodology of Stats 1
PSYC 204	(3)	Psychology	Introduction to Psychological statistics

#### **Plus 3 credits selected from:**

ANAT 214	(3)	Anatomy	Systematic Human Anatomy
ANAT 262	(3)	Anatomy	Intro Molecular and Cell Biol.
BIOL 202	(3)	Biology	Basic Genetics
BIOL 205	(3)	Biology	Biology of Organisms
BIOL 304	(3)	Biology	Evolution
CHEM 203	(3)	Chemistry	A Survey of Physical Chemistry
or			
CHEM 204	(3)	Chemistry	Introductory Physical Chemistry for Biological Science Students
CHEM 287	(2)	Chemistry	Introductory Analytical Chemistry
CHEM 297	(1)	Chemistry	Intro. Analytical Chemistry Laboratory
COMP 202	(3)	Computer Science	Introduction to Computing 1
COMP 203	(3)	Computer Science	Introduction to Computing 2
MATH 204	(3)	Math	Principles of Statistics 2
MIMM 211	(3)	Micro. & Immuno.	Biology of Microorganisms
MIMM 212	(2)	Micro. & Immuno.	Laboratory in Microbiology
PHGY 209	(3)	Physiology	Mammalian Physiology 1
PHGY 210	(3)	Physiology	Mammalian Physiology 2

## IHI Program (continued)

### (26) credits to be obtained by these required courses in U-1

- \* Students entering Microbiology from CEGEP are usually exempted from Chemistry CHEM 212, having already taken it in CEGEP (202-202). Students who come from out-of-province must take CHEM 212, which is a prerequisite for CHEM 222.
- ! Students who have taken Organic Chemistry II in CEGEP (202-302) are exempted from Chemistry CHEM 222.
- # Students must take this course in U-1 or U-2.

Course	Credits	Department	Title
<b><u>U2 Required courses (13 credits)</u></b>			
ANAT 261	(4)	Anatomy	Introduction to Dynamic Histology
BIOC 311	(3)	Biochemistry	Metabolic Biochemistry
BIOC 312	(3)	Biochemistry	Biochemistry of Macromolecules
MIMM 314	(3)	Micro. & Immuno.	Immunology
<b><u>U2 Complementary courses (12 credits)</u></b>			
<b>6 credits selected from:</b>			
BIOC 300D1,2(6)		Biochemistry	Laboratory in Biochemistry
<b>or</b>			
MIMM 386D (6)		Micro. & Immuno.	Lab in Microbiology & Immuno.
<b>or</b> PHGY 212(1)		Physiology	Introduction Physiology Lab 1
<b>and</b> PHGY 213(1)		Physiology	Introduction Physiology Lab 2
<b>and</b> BIOL 301(4)		Biology	Cell & Molecular Laboratory
<b>plus two courses, 6 credits selected from:</b>			
ANAT 365 (3)		Anatomy	Cell Biology: Secretory Process
BIOL 300 (3)		Biology	Molecular Biology of the Gene
BIOL 314 (3)		Biology	Molecular Biology of Oncogenes
CHEM 302 (3)		Chemistry	Introductory Organic Chemistry 3
MATH 222 (3)		Math & Stats.	Calculus 3
MATH 315 (3)		Math & Stats.	Ordinary Differential Equations
<b>or</b> BIOL 309 (3)		Biology	Mathematical Models in Biology
MIMM 323 (3)		Micro. & Immuno.	Microbial Physiology
MIMM 324 (3)		Micro. & Immuno.	Fundamental Virology
PATH 300 (3)		Pathology	Human Disease
PHAR 300 (3)		Pharmacology	Drug Action
PHAR 301 (3)		Pharmacology	Drugs and Disease
PHAR 303 (3)		Pharmacology	Principles of Toxicology
PHGY 311 (3)		Physiology	Intermediate Physiology 1
PHGY 312 (3)		Physiology	Respiratory, Renal & Cardiovascular Physiology
PHGY 313 (3)		Physiology	Blood, Gastrointestinal & Immune System Physiology
PHGY 314 (3)		Physiology	Integrative Neuroscience

### (25) credits to be obtained by these required courses in U-2

Continued....

## IHI Program (continued)

### U-3 Required courses (15 credits)

<b>Course</b>	<b>Credits</b>	<b>Department</b>	<b>Title</b>
MIMM 414	(3) (F)	Micro. & Immuno.	Advanced Immunology
PHGY 419D1,2(9)		Physiology	Project and Seminar in Immunology
PHGY 513(W)(3)		Physiology	Cellular Immunology

### U-3 Complementary courses (9 credits)

#### **3 credits selected from:**

PHAR 503	(3)(W)	Pharmacology	Drug Design & Development 1
PHGY 531	(3)(W)	Physiology	Topics in Applied Immunology
MIMM 509	(3)(W)	Micro. & Immuno.	Inflammatory Processes

#### **Plus 6 credits selected from:**

BIOL 520	(3)	Biology	Gene Activity in Development
BIOC 404	(3)(W)	Biochemistry	Biophysical Chemistry
BIOC 450	(3)(F)	Biochemistry	Protein Structure and Function
BIOC 454	(3)(F)	Biochemistry	Nucleic Acids
BIOC 458	(3)(W)	Biochemistry	Membranes & Cellular Signaling
or ANAT 458	(3)	Anatomy	Membranes & Cellular Signaling
BIOC 503	(3)(W)	Biochemistry	Immunochemistry
MIMM 413	(3)(W)	Micro. & Immuno.	Parasitology
MIMM 465	(3)(F)	Micro. & Immuno.	Bacterial Pathogenesis
MIMM 466	(3)(W)	Micro. & Immuno.	Viral Pathogenesis
MIMM 509	(3)(W)	Micro. & Immuno.	Inflammatory Processes
PHAR 503	(3)(F)	Pharmacology	Drug Design & Development 1
PHAR 504	(3)(W)	Pharmacology	Drug Design & Development 2
PHGY 531	(3)(W)	Physiology	Topics in Applied Immunology
PHGY 552	(3)(W)	Physiology	Cellular and Molecular Physiology

### (24) credits to be obtained by these required courses in U-3

### **(75) TOTAL NUMBER OF REQUIRED CREDITS IN U-1, U-2, AND U-3**

## 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 applied microbiology and immunology, 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

#### PROJECT AREAS

AMERSHAM PHARMACIA CANADA INC.  
Baie d'Urfe

Health care, ophthalmic, diagnostic  
and biotechnological products

BIO-MÉGA INC. Laval	Pharmaceutical test kits
BIO-MÉGA DIAGNOSTIC INC. Laval	Diagnostic kits
BIO-RESEARCH LABORATORIES LTD. Senneville	Various
BRISTOL MYERS PHARMACEUTIC GROUP Candiac	Pharmaceuticals
CANADIAN MEDICAL RESEARCH ASSOC. INC. Montreal	Biomedical research
CONTINENTAL PHARMA CRYOSAN INC. Montreal	Vaccines, plasma derivatives, diagnostic kits
FRAPPIER DIAGNOSTIC INC. Laval	Diagnostic kits, cell cultures
BIOCHEM IMMUNOSYSTEMS INC. Laval	Chemical products, veterinary and diagnostic products
JOHNSON & JOHNSON INC. Montreal	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.  
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

### **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

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

ROLMEX INC.  
Boucherville  
ROSELL INSTITUTE INC.  
Montreal  
SCHENLEY CANADA LTD.  
Valleyfield  
SEMICO INC.  
Sainte-Rosalie

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

### **PROJECT AREAS**

Process engineering  
Metal biolixiviation

ROCHE LTD. Sainte-Foy	Environmental engineering
SNC LAVALIN GROUP Montreal	Process and environmental engineering
SPECTREX LTD. Montreal	Bioreactor
TEKNIKA GROUP INC. Sherbrooke	Industrial waste treatment

### **MAJOR CANADIAN BIOTECHNOLOGY EMPLOYERS**

#### **NAME**

#### **PROJECT AREAS**

ADRIA LABORATORIES CORP. Mississauga, Ontario	Pharmacology
ALLELIX INC. Toronto, Ontario	Diagnostic Growth Factors Therapeutic Drugs Immunochemical
BIO CAN INC. (Jackson Immunoresearch) Mississauga, Ontario	
BIOMIRA INC. University of Alberta Edmonton, Alberta	Immunodiagnosics Immunotherapeutics
CEDARLANE Hornby, Ontario	Immunochemical
CONNAUGHT LABORATORIES Willowdale, Ontario	Pharmaceuticals Ontario (Insulin) Diagnostic (RHO Gamm)
PALMYRA RESOURCES CORP. Victoria, B.C.	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