



MIMM-314 Intermediate Immunology

Winter Term 2023

Course syllabus

1. GENERAL INFORMATION

Description: MIMM-314 is an intermediate level course providing an exposure to Immunology to a broad range of students in a general science program and those specializing in the field of Microbiology and Immunology. This course describes the molecular and cellular basis of the development and function of the immune system in states of health and disease. The course will provide the required framework for more advanced courses in Immunology.

Prerequisite courses: MIMM-214

Number of credits: 3 credits

Name of the Instructor: Dr. C.A. Piccirillo

Professor, Department of Microbiology & Immunology

McGill University and Research Institute of McGill University Health Centre (MUHC)

Centre for Translational Biology IDIGH Program Bloc E, Room E-M2.3248

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E-mail: ciro.piccirillo@mcgill.ca

Teaching Assistant: Orsolya Lapohos

Faculty support: Drs. Fernando Alvarez and Danielle Karo-Atar, post-doctoral fellows

Days and Time: Mondays and Wednesdays from 11:30-1PM (EST)

Lecture location: Duff Medical Building Amphitheater.

Office hours (C.P): 30 minutes before and after each class in amphitheater.



2. LEARNING OUTCOMES

After taking MIMM-314, students should be able to:

- Describe the basic mechanisms, distinctions and functional interplay of innate and adaptive immunity
- Define the cellular/molecular pathways of humoral/cell-mediated adaptive responses
- Define the basic mechanisms that regulate immune responses and maintain tolerance
- Explain the cellular and molecular aspects of lymphocyte activation, homeostasis, differentiation, and memory.
- Understand the molecular basis of complex, cellular processes involved in inflammation and immunity, in states of health and disease
- Describe basic and state-of-the-art experimental methods and technologies
- Integrate knowledge of each subsystem to see their contribution to the functioning of higher-level systems in health and disease
- Apply understanding of basic and state-of-the-art experimental methods and technologies in the design of research plan to test specific hypotheses
- Through use of primary research publications, understand the scientific process/rationale leading to hypothesis and scientific discovery
- Translate understanding of basic mechanisms into identification of biological, clinical and therapeutic implications
- Through use of medical case reports, identify “disease defects” and define molecular or cellular targets for therapeutic intervention: “Immunological problem-solving”
- Effectively communicate understanding of basic mechanisms and therapeutic implications



3. LECTURES:

DATE		TOPIC	LECTURER
		BLOCK I Innate and inflammatory processes of the immune system	
January 4	W	Course overview	Dr. C. Piccirillo
January 9	M	<i>Introductory lecture Block I</i> Let's review!	Dr. Irah King
January 11	W	A brief history of innate immunity	Dr. Irah King
January 16	M	Mechanisms of innate immune sensing	Dr. Irah King
January 18	W	Applied innate immunity: <i>the making of the COVID mRNA vaccine</i>	Dr. Irah King
January 23	M	Complexity at the edges: the diverse origins and functions of the innate immune system at barrier sites	Dr. Irah King
January 25	W	Walking the immunological tightrope: <i>Disease tolerance vs. Immunopathology</i>	Dr. Irah King
January 30	M	New concepts of immunity against parasitic helminths	Dr. Irah King
February 1	W	Blurring the lines between innate and adaptive immunity	Dr. Irah King



DATE		TOPIC	LECTURER
		BLOCK II Molecular basis of immune responses: <i>Lymphocyte activation and effector functions</i>	
February 6	M	Immunosurveillance <i>T cell trafficking to lymphoid and non-lymphoid tissues</i>	Dr. C. Piccirillo
February 8	W	Turning immune responses on/off: <i>Mechanisms of T cell activation</i>	Dr. C. Piccirillo
February 13	M	Immune responses to infections: <i>T cell decisions and effector differentiation</i>	Dr. C. Piccirillo
February 15	W	Development of immunological memory: <i>Lessons from the COVID-19 pandemic</i>	Dr. C. Piccirillo
February 20	M	B cells: Classic hits and newer tracks	Dr. V. Abadie
February 22	W	The B side of Celiac Disease	Dr. V. Abadie
February 27 - March 3		STUDY BREAK – No classes	
		BLOCK III: Regulation of immune responses in health and disease	
March 6	M	Mid-term examination (in class, 30% of grade)	Dr. C. Piccirillo



DATE		TOPIC	LECTURER
March 8	W	Allergies and immunotherapies	Dr. Christine McKusker
March 13	M	Protecting thy self: <i>Mechanisms of peripheral tolerance I</i>	Dr. C. Piccirillo
March 15	W	Protecting thy self: <i>Mechanisms of peripheral tolerance II</i>	Dr. C. Piccirillo
March 20	M	Gatekeepers of peripheral tolerance: <i>Regulatory T cells I</i>	Dr. C. Piccirillo
March 22	W	Gatekeepers of peripheral tolerance: <i>Regulatory T cells II</i>	Dr. C. Piccirillo
March 27	M	Environmental sensing mechanisms in inflammation: <i>Control mechanisms of gene expression in T cells</i>	Dr. C. Piccirillo
March 29	W	Re-establishing immune control: <i>Therapies for inflammatory or immune diseases</i>	Dr. Carolyn Jack
April 3	M	Losing thy self: <i>Autoimmune diseases</i>	Dr. C. Piccirillo
April 5	W	Tumor immunology and immunotherapy	Dr. C. Piccirillo
April 10	M	Mystery Case I: <i>small work group exercise and evaluation</i> (10% of grade)	Dr. C. Piccirillo
April 12	W	Mystery Case II: <i>small work group exercise and evaluation</i> (10% of grade)	Dr. C. Piccirillo
April 13-29 To be determined		Final exam (in person, 40% of grade)	Dr. C. Piccirillo



DATE		TOPIC	LECTURER

4. INSTRUCTIONAL METHOD

- Students will be responsible for reviewing and reading lecture material **BEFORE** attending lectures.
- Teaching approach favors interactive student participation, and will build on **OUT-OF-CLASS** readings and learning.
- In class, small group presentations and discussions
- Case reports and Immunological problem-solving
- Class attendance is *very highly* recommended.

5. LECTURERS

Dr. C. Piccirillo	RI-MUHC (Glen site)	ciro.piccirillo@mcgill.ca
Dr. I. King	RI-MUHC (Glen site)	irah.king@mcgill.ca
Dr. Christine McCusker	RI-MUHC (Glen site)	christine.mccusker@mcgill.ca
Dr. Carolyn Jack	RI-MUHC (Glen site)	carolyn.jack@mail.mcgill.ca
Dr. Valérie Abadie	University of Chicago	vabadie@medicine.bsd.uchicago.edu

6. COURSE EVALUATION

- **Mid-term exam (30%):** There is one (1) mid-term exam (90 minutes) which will cover lectures up to and including February 15th, inclusively. This is a timed, multiple choice exam of Type 1 and 2 questions and will only cover material included in Blocks 1 and 2. The exam will be offered in person during the normal lecture timeslot and location.
- **Final Exam (40%):** The final exam covers the entire course but will emphasize course material from Blocks 2-3. The final exam will be held in-person and will consist of multiple choice questions.
- **Mystery Case preparation and evaluation (10%):** small groups of students will be assigned a specific topic which will need to be researched and prepared out-of-class. During the scheduled class lectures (April 5 or 10), small group discussions will be held



followed by an evaluation. Topics will be assigned to students 3 weeks before their scheduled dates.

- **Online quizzes (15%):** Short, multiple choice type quizzes (2) will be given online at scheduled times during the course.
- **Class participation (5%):** In class participation will be evaluated throughout the semester with pop questions in MyCourses.
- **Missed exams and documented justification:** Students unable to attend the mid-term exam due to medical or non-medical reasons must submit a request for missing the exam WITHIN 1 week of the scheduled mid-term. Students who fail to do so will receive a grade of ZERO for the mid-term. Students must make the request by completing the missed mid-term exam webform available on the MIMM Department [website](#). The Department will evaluate any medical and non- medical situations and reserves the right to make any final decisions regarding what accommodations are reasonable and appropriate in the circumstances. For more information on submitting a request, please go to the Department website at <https://www.mcgill.ca/microimm/>.
- **Deferred (final exam missed) and supplementary exams:** The deferred exam (missed final exam) consists of 90 multiple choice questions (Type 1 and 2). The supplemental exam consists of 10 short essay type questions. Both deferred and supplemental exams are held in August 2023.

6.1 Information related to exam questions

Exam questions are taken primarily from what is covered in the lectures. The lecture slides are made available in pdf form for download from MyCourses. They will remind you of the main concepts covered in class. In order to do well in the course, you will also need to read the relevant sections in the textbook, provided online articles, and attend lectures. Pay attention to what a lecturer may tell you about their expectations regarding exam questions.

Most questions are of the multiple-choice (M-C) type. There is a tendency for M-C questions to test factual knowledge more than understanding, but we do try to include questions which probe understanding and integration of topics. Thus, it is important that you read and think about subsystems and processes, and also consider the “big picture”, which means integrating knowledge of the subsystems to see their contribution to the functioning of higher-level systems.

Although we try to catch errors or ambiguities before you get the exam papers, there will be a problematic question on an exam occasionally. If such a situation should arise, first read the question carefully again to be sure you are not misreading or misinterpreting it. If the Professor or TA is available, you may alert them to a possible error. More importantly, make note of the offending question so you can report it only via email (see section 7 below) to the course coordinator or TA after the exam, but also *choose the answer you think is most likely the one expected by the lecturer responsible for that topic*. Nobody loses a mark if it is agreed that the question is sufficiently defective. The questions are set within the context of, and at the level of



this course. Finding a recent research report showing the answer may not be true in all circumstances does not win you a point for your wrong answer.

7. STUDENT WELLNESS

You're going through a rough period? You feel alone? You want to talk it over? You think you need help? Please consult the Student Wellness Hub for sources of support (<https://www.mcgill.ca/wellness-hub>).

8. CONTACT AND CORRESPONDENCE

For **ALL** queries, questions and comments regarding the course, please direct your correspondence **ONLY** to: immuno314@gmail.com

9. COURSE MATERIAL

The following textbook will serve as a guide to lectures: Janeway's Immunobiology textbook, 9th edition, Murphy and Weaver, Garland Science, 2017. The TA may help you via email and pre-exam tutorial sessions. All key lecture material (mainly lecture slides and review articles) will be posted on MyCourses, and will represent key learning material for students.

10. MCGILL POLICY STATEMENTS

1) McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures" (see www.mcgill.ca/students/srr/honest/ for more information).

L'université McGill attache une haute importance à l'honnêteté académique. Il incombe par conséquent à tous les étudiants de comprendre ce que l'on entend par tricherie, plagiat et autres infractions académiques, ainsi que les conséquences que peuvent avoir de telles actions, selon le Code de conduite de l'étudiant et des procédures disciplinaires (pour de plus amples renseignements, veuillez consulter le site www.mcgill.ca/students/srr/honest/).

2) In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded.

Conformément à la Charte des droits de l'étudiant de l'Université McGill, chaque étudiant a le droit de soumettre en français ou en anglais tout travail écrit devant être noté (sauf dans le cas



des cours dont l'un des objets est la maîtrise d'une langue).

3) In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in this course is subject to change.

4) If you have a disability please contact the instructor to arrange a time to discuss your situation. It would be helpful if you contact the Office for Students with Disabilities at 514-398-6009 before you do this.

5) McGill has policies on sustainability, paper use and other initiatives to promote a culture of sustainability at McGill.

6) Additional policies governing academic issues which affect students can be found in the McGill Charter of Students' Rights (available at www.mcgill.ca/files/secretariat/Handbook-on-Student-Rights-and-Responsibilities-2010.pdf)