Immunology
UNIVERSITY OF TORONTO

IMM428/1428H1 Fall 2022
Molecular Immunology

Course & Instructor Information

Course Coordinator & Instructor
Dr. Tania Watts tania.watts@utoronto.ca
Office Hours: please email Dr. Watts for appointment

Course Instructors
Jean-Philippe Julien jean-philipe.julien@sickkids.ca
Alberto Martin alberto.martin@utoronto.ca
Dana Philpott dana.philpott@utoronto.ca
Arthur Mortha arthur.mortha@utoronto.ca

Teaching Assistants
Part I (Julien and Martin lectures): Audrey Kassardjian, audrey.kassardjian@mail.utoronto.ca

Part II (Watts lectures): Alex Luchak, alexander.luchak@mail.utoronto.ca

Part III (Philpott and Mortha lectures): Ling Ling Tai, siuling.tai@mail.utoronto.ca

Lectures
Lectures in this course will be held **in-person** on **Tuesday/Thursday, 10:10 – 11:00 AM; Room 1087 Sidney Smith Hall (100 St. George Street)**. Copies of lectures slides will be posted online and at the discretion of the lecturers' recordings of the lectures may be shown by zoom and posted online after the session.

Masks

While the University of Toronto's mask mandate has been paused as of 1 July 2022, the use of medical masks is *strongly encouraged*, although not required, in high density indoor settings where physical distancing is not possible, including our IMM428 classroom. The University is a mask-friendly environment, and we ask everyone to respect each other's decisions, comfort levels, and health needs. The University will continue to monitor public health conditions to adjust our response as needed, and we will update you on any changes.

In addition, individuals in specific circumstances may continue to be required to wear masks in all settings, subject to changes in provincial or federal requirements, such as those who have been recently exposed to COVID-19 or to someone with symptoms.

It is vitally important that, even with the easing of provincial measures, we remain vigilant, conscientious and show kindness to one another.

Reference Material
Although there is no required text for this course, any recent edition of Janeway, Travers *et al.* Immunobiology text (e.g. 9th Edition), which most of you already have, will serve as a "first resource" for you. Instructors will be providing you with reference lists of key papers or reviews that they will be discussing. In fourth-year courses we expect you to start reading some of the primary literature. Immunology is an experimental science, and you will find that in this course it is not just facts and concepts that are being

relayed, but also that the experimental foundations for these facts and concepts are stressed. Thus, you may have to consult the primary literature to clarify in your mind an experimental approach which was discussed in class but which you did not fully grasp because you were unfamiliar with it. **We highly recommend that you read the recommended papers and do the practice exam questions to become familiar with the kind of problems we ask during the assessment.**

Review Sessions

Although you are always free to seek out individual instructors for clarification of the lecture material. For the past several years the classes have found it useful that we held some group review sessions at which TA and/or instructors were present to answer questions posed by the students. These are strictly **optional** and no new material is deliberately presented. A group review session will be held in person or by Zoom, a few days before each assessment- to be arranged by the TA for each section (link to be provided in the Quercus portal). For the power point assignment, TA will provide a guidance/ FAQ session on the assignment at a pre-arranged time.

Arts & Science Calendar Course Overview (24L)

This course will focus on the molecular and cellular biology of immune recognition. The course will emphasize historical and recent experimental evidence leading to our current understanding of immune recognition. Subtopics are subject to change and have recently included mechanisms of diversification of immunoglobulin receptors, T cell –MHC interactions, T cell activation and signaling mechanisms; receptors of the innate immune system; biology of innate lymphoid cells.

Pre-Requisites: BCH210H1/BCH242Y1, BCH311H/CSB349H1/MGY311Y1/PSL350H1, IMM350H1/IMM351H1.

Course Learning Objectives

At the end of this course, you should:

- Understand some key structural principles of receptor interactions in the immune system
- Understand key experimental evidence for mechanisms of VDJ rearrangement and class switch recombination.
- Understand key experiments defining T cell recognition of antigen, mechanisms of antigen presentation and costimulation
- Understand experimental evidence for key recognition events in innate recognition of pathogens (TLRs, NLRs, etc)
- Be familiar with the evidence for different subsets of innate lymphoid cells and their biology
- Gain some experience in presenting the contents a scientific journal paper

Evaluation Scheme & Course Assessments

Assessment	% of Grade	Due Date
Assessment 1 – Term Test	36%	October 11, during class time, EX 100
Assessment 2 – Journal Club Presentation	20%	Due November 15, 11:59pm ET

Final Assessment	44%	Dec exam period, TBD

*** Graduate Students in IMM1428H1 will have an additional essay component, worth 20% of the course, with the other assessments weighted at 80% as per above.*

1. Assessment 1 – Term Test (36%)

Assessment 1 will take place on **October 11, 2022** during class time held in the examination centre at 255 McCaul (EX 100). It will be a 50-minute short/long answer examination held during class time. The questions will cover on the material covered by Dr. Julien (9% of course) and Dr. Martin's lectures (27%). The test will be in person, room TBA, likely in the exam centre.

Note that the Assessment 1 grade will be made available before the drop date (November 16, 2022 for Undergraduate students; October 31, 2022 for Graduate students).

Refer to the "Missed Assessment Policy" section below for information on how to request accommodation for a missed test and what accommodations may be possible.

2. Assessment 2 – Journal Club Presentation (20%)

Quercus submission deadline: **November 15, 2022 at 11:59pm**.

Assessment 2 will be worth 20% of the final mark and will cover Dr. Watts' section. Students will put together a 10-minute "journal club" style power point presentation with voiceover. Students will receive their assigned paper 2 weeks in advance by email.

The assignments will be done as a power point with voice over and uploaded into the Assignment section of Quercus for grading. For more support on how to do this with Microsoft PowerPoint, please see: https://support.microsoft.com/en-us/office/record-a-slide-show-with-narration-and-slide-timings-0b9502c6-5f6c-40ae-b1e7-e47d8741161c

Note that the TA for this section will organize a pre-session on expectations and the grading scheme for this assessment.

Accommodation requests for assignment extensions are highly discouraged. Refer to the "Missed Assessment Policy" section below for information on how to request accommodation for a missed assignment and what accommodations may be possible.

3. Final Assessment (44%)

The date and location of the Final Assessment will be scheduled by the Faculty of Arts & Science. It will consist of short or long answer essay questions and is scheduled for 2 hours. The questions will cover on the material covered by Dr. Watts (12%), Dr. Philpott (14%) and Dr. Mortha (18%).

Students who miss the Final Assessment for a valid reason may petition to the Faculty of Arts & Science to write the deferred assessment.

4. Term Paper (IMM1428H students ONLY)

IMM1428 is available as a graduate course. Note: Students in the Immunology Ph.D. program cannot use IMM1428 as part of their graduate credit requirement.

TERM PAPER FOR GRADUATE STUDENTS: For students enrolled in IMM1428H there will be an additional component in evaluating your performance in this course. You will be required to write a term paper of 10-12 double spaced pages in length, not including references or brief figures, on any major topic in the course. You may not, however, choose a topic that is closely related to your own research area. You are free to discuss possible topics with any of the instructors and you must obtain approval from the course coordinator (Dr. Watts) for your essay topic in advance. We are looking for an essay that demonstrates your critical thinking/evaluation of a focused area related to any topic touched on in the course not in your immediate research area. This approval must be obtained by **November 23, 2022.** For grading purposes, the essay will contribute 20% of the final aggregate mark, the balance being made up of the three assessments. Essays must be handed in as a PDF uploaded to the Quercus site. **Due Date: December 7, 2022.** Essays will be graded by the course coordinator with potential input from another faculty member with expertise in the area.

Missed Assessment Policy

- This course follows the University of Toronto's Policies on missed tests and assignments, and requires students to complete an Absence Declaration on ACORN for illness-related circumstances.
- Other reasons for missing course assessments will require prior approval by the course coordinator. If approval is not granted in advance for non-medical reasons, then 0% will be recorded for the missed assessment.
- Note: If you submit an assessment, it will be assumed that you deemed yourself fit enough to do so and your grade will stand as calculated. No accommodations will be made based on claims of medical, physical or emotional distress ***after*** the fact.
- ***Missed Tests:*** Missed tests (term test and final assessment) will be accommodated at the course coordinator's discretion. *Only 1 make-up exam will be scheduled for each of the missed tests, normally within 1-2 weeks after the missed test.*
- ***Assessment 2: Journal Club Presentation*** – Requests for accommodation surrounding the journal club presentation are highly discouraged and will only be accommodated at the course coordinator's discretion. Following the deadline, a penalty of 5% per day will be applied to late submissions.

Statement on Academic Integrity

All students, faculty and staff are expected to follow the University's guidelines and policies on academic integrity. For students, this means following the standards of academic honesty when writing assignments, collaborating with fellow students, and writing tests and exams. Ensure that the work you submit for grading represents your own honest efforts. Plagiarism—representing someone else's work as your own or submitting work that you have previously submitted for marks in another class or program—is a serious offence that can result in sanctions. Speak to your course instructor for advice on anything that you find unclear. To learn more about how to cite and use source material appropriately and for other writing support, see the U of T writing support website at http://www.writing.utoronto.ca. Consult the Code of Behaviour on Academic Matters for a complete outline of the University's policy and expectations. For more information, please see http://www.artsci.utoronto.ca/osai and http://academicintegrity.utoronto.ca, and consult this Academic Integrity checklist.

Accessibility Needs

The University of Toronto is committed to accessibility. If you require accommodations for a disability, or have any accessibility concerns about the course, the classroom or course materials, please contact Accessibility Services as soon as possible: disability.services@utoronto.ca or http://studentlife.utoronto.ca/accessibility.

Course Schedule

The tentative schedule for course topics is shown on the following pages. Some adjustments may be made to weekly topics as the course progresses.

Date	Lecture Subject	Prof.
Sept. 8	Introduction to the course content and operational procedures VDJ recombination	Drs. Watts & Martin
Sept 13	VDJ recombination	Dr. Martin
Sept. 15	VDJ recombination	Dr. Martin
Sept. 20	Affinity Maturation and class switch	Dr. Martin
Sept. 22	Affinity maturation and class switch	Dr. Martin
Sept 27	Affinity maturation and class switch	Dr. Martin
Sept 29	Antibody structure	Dr. Julien
Oct. 4	Antibody Functions and Applications	Dr. Julien
Oct. 6	Assays used to measure MHC restriction/T cell recognition	Dr. Watts
October 11	**Assessment 1: Held during class time 36% of course-to be held in EX 100 (Exam centre 255 McCaul)** **27% AM lectures, 9% JP lectures**	Drs. Julien & Martin
October 13	T cell recognition continued	Dr. Watts
October 18	Antigen Processing MHC I and II	Dr. Watts
October 20	Antigen Processing MHC II	Dr. Watts
Oct 25	Antigen processing MHC I	Dr. Watts
Oct 27	T cell activation and costimulation	Dr. Watts
Nov 1	T cell costimulation continued; ***Articles for power point presentation assigned today by direct email to each student;*** *TBA review session this week on expectations of Power point presentation- TA to organize*	Dr. Watts
Nov 3	Innate pattern recognition - TLRs	Dr. Philpott
Nov 7-11	***READING WEEK – NO CLASSES***	

Date	Lecture Subject	Prof
Nov. 15	Innate pattern recognition – cytosolic sensors ***Power point assignment due by midnight through Quercus learn.***	Dr. Philpott
Nov. 17	Innate pattern recognition – cytosolic sensors, inflammasomes	Dr. Philpott
Nov. 22	Biology and function of innate lymphoid cells ***Grad students- require approval of their essay topic by Dr. Watts by today***	Dr. Mortha
Nov 24	Biology and function of innate lymphoid cells	Dr. Mortha
Nov 29	Biology and function of innate lymphoid cells	Dr. Mortha
Dec 1	Biology and function of innate lymphoid cells	Dr. Mortha
Dec 6	Q and A session - Mortha, Philpott, Watts available; ***Grad student essays due today by midnight.***	
Exam week December 10-20	**Assessment 3, Watts/Philpott/Mortha (12%, 14%, 18%)** **Date TBA - please do not make travel plans before Dec 20 until we know exam schedule**	