



MICR*4530 Immunology II

Winter 2024

Section(s): 01

Department of Molecular and Cellular Biology

Credit Weight: 0.50

Version 1.00 - January 05, 2024

1 Course Details

1.1 Calendar Description

This course will focus on advanced aspects of the structure and function of the vertebrate immune system in health and disease. Various topics including inflammation, hypersensitivity reactions, immune-mediated diseases such as allergy and autoimmunity, immune response to infection, vaccine development, experimental systems, immunoinformatics and antibody engineering will be discussed.

Pre-Requisites: MICR*3230

1.2 Course Description

Our immune system plays an essential role in protecting us from infection by rapidly recognizing, responding to, and eliminating microbial pathogens. Despite this role, most microbes we encounter are non-pathogenic and mounting continuous robust immune responses would be detrimental. Indeed, we are colonized by billions of microbes, collectively forming our microbiome, that our immune system must be able to differentiate from dangerous pathogens. Exciting advances in immunology show that interactions between these non-pathogenic microbes and the immune system are critical for health. In this course, we will examine this crosstalk between the immune system and microbes. We will discuss how these interactions shape the development and function of the immune system in conditions of health, and how they are disrupted during disease. Through course assignments, students will have the opportunity to develop and propose a therapeutic intervention designed to modulate, restore, or strengthen the immune system's crosstalk with the microbiota.

1.3 Timetable

Lectures Tuesday and Thursday 1:00 – 2:20 pm

MCKN 232

1.4 Final Exam

Date: Thursday April 18th 2023

Time: 11:30 – 2:00

Location: TBA

Exam time and location is subject to change. Please see WebAdvisor for the latest information.

2 Instructional Support

2.1 Instructional Support Team

Instructor: Matthew Sorbara
Email: msorbara@uoguelph.ca
Office: SSC 3255

Office Hours: Dr. Sorbara will be available in SSC3255 for at 12:30 - 1:30pm on Wednesdays and for 20 minutes after class in MCKN 232

2.2 Teaching Assistants

Teaching Assistant (GTA): Ethel Closa
Email: eclosa@uoguelph.ca

3 Learning Resources

3.1 Required Resources

Courselink (Website)
<https://courselink.uoguelph.ca>

MICR*4530 Immunology has a Courselink site, which you can use to review material from lecture PowerPoint slides, track grades, etc. As a 4th year course, there is no required textbook. Primary literature and published reviews that will be discussed in lectures will be posted on Courselink for each week's topics

3.2 Recommended Resources

Immunobiology (Textbook)

Janeway's Immunobiology, 10th Edition, by Kenneth M Murphy, Casey Weaver and Leslie J Berg, 2022, W.W. Norton.

This textbook is also recommended in MICR*3230 (Immunology). It provides useful background content and introduces foundational concepts related the topics discussed in class.

4 Learning Outcomes

4.1 Course Learning Outcomes

By the end of this course, you should be able to:

1. By the end of this course, you will be able to:

- 1) Evaluate how our immune system is shaped through its interactions with microbes during health and delineate how disruption of these interactions can contribute to human disease.
- 2) Design a potential therapeutic intervention to promote beneficial interactions between the immune system and microbes, including developing and articulating the scientific rationale.
- 3) Demonstrate knowledge of the ethical, economic, commercial and social implications of scientific discovery and technological innovation.
- 4) Critically read and interpret primary literature to evaluate the data and any limitations of the experimental approach and identify potential areas for further study

- 5) Communicate scientific concepts in both written and short presentation formats
- 6) Demonstrate a good work ethic by setting goals and meeting deadlines

5 Teaching and Learning Activities

Date	Module	Topics
Week 1 (Jan 9, Jan 11)	Course Introduction	i) Course Overview, ii) Introduction to the microbiome and iii) Strategies to manipulate the microbiome
Week 2 (Jan 16, Jan 18)	<i>Module One</i> : Microbial control of immune system development	i) A 'window of opportunity' for microbiome and immune development. ii) Lessons from germ free animals (ie. changes in lymphoid tissue development) iii) Early B and T cell differentiation and function
Week 3 (Jan 23, Jan 25)	<i>Module One</i> : Microbial control of immune system development	iv) Induction of tolerance responses v) <i>Guest Lecture</i> : Dr. Simone Renwick, UCSD. Shaping our early microbiota development through HMOs
Week 4 (Jan 30, Feb 1)	<i>Module Two</i> : Microbial control of the immune system during health	i) Microbial regulation of innate immune system ii) Microbial regulation of the adaptive immune system iii) Maintenance of tolerance and healthy aging
Week 5 (Feb 6, Feb 8)	<i>Module Two</i> : Microbial control of the immune	iii) Case study: segmented filamentous bacteria SFB

	system during health	iv) Case study: <i>Trichomonas musculus</i> iv) <i>Guest Lecture</i> : Dr. Priyanka Pundir: Skin microbiota, Mast Cells and Wound Healing
Week 6 (Feb 13, Feb 15)	<i>Review class & Midterm</i>	
Week 7 (Feb 20, Feb 22)	Reading Week Break – No Class	
Week 8 (Feb 27, Feb 29)	<i>Module Three: Interactions during Disease</i>	i) The hygiene hypothesis: impacts of disrupting microbe:immune interactions ii) Consequences of altering early life microbial exposure
Week 9 (Mar 5, Mar 7)	<i>Module Three: Interactions during Disease</i>	iii) Case Study: Microbe:immune interactions in Crohn's Disease and Ulcerative Colitis iv) Case study: Microbe:Immune interactions in cancer and cancer immunotherapies
Week 10 (Mar 12, Mar 14)	<i>Module Three: Interactions during Disease</i>	v) Diet (low fiber, malnourishment), the microbiota and the immune system. vi) Systemic impacts of gut microbiota changes
Week 11 (Mar 19, Mar 21)	<i>Module Four: Opportunities for interventions</i>	i) Ongoing efforts to alter immune-interactions Student Presentations
Week 12 (Mar 26, Mar 28)	<i>Module Four: Opportunities for interventions</i>	Student Presentations

Week 13 (Apr 2, 4)	Review	

6 Assessments

6.1 Assessment Details

Midterm Exam (30%)

Learning Outcomes: (1,4,5)

Please ensure you are present for the midterm exam, as there will be NO opportunity available to sit the exams at an alternative time. If the midterm is missed, academic consideration will be given providing the appropriate documentation is presented (a note/email from a physician or your program counsellor). In this case, the marks from the midterm will be transferred to the final exam.

Date: Thursday Feb 15th 2024, during normal class hours.

Proposal for a Microbiome-based Therapeutic (35%)

Learning Outcomes (1 - 6)

In teams of two, students will write a proposal describing an important microbe-immune interaction and propose a novel therapeutic to regulate, restore, or promote that interaction (25%). At the end of the course, students will present their proposal in a short pitch presentation describing their proposal (10%). Details of the writing and presentation assignment will be posted on Courselink.

Written Proposal Due Date: March 7th 2023

Presentation Dates: March 19th - March 28th; to be Assigned

Late Penalties (Written Proposal): 10% + 10% / day up to 50%, including weekends. A grade of zero will be assigned after 5 days late

Final Exam (35%)

Learning Outcomes (1,4,5)

The final exam will be worth 35% of the final grade. Two papers will be provided on Tuesday April 2nd. Short answer questions will be related to interpretation of the papers and course concepts. The two papers will be available during the exam.

7 Department of Molecular and Cellular Biology

Statements

7.1 Academic Advisors

If you are concerned about any aspect of your academic program:

- Make an appointment with a program counsellor in your degree program. [B.Sc. Academic Advising](#) or [Program Counsellors](#)

7.2 Academic Support

If you are struggling to succeed academically:

- Learning Commons: There are numerous academic resources offered by the Learning Commons including, Supported Learning Groups for a variety of courses, workshops related to time management, taking multiple choice exams, and general study skills. You can also set up individualized appointments with a learning specialist.
<http://www.learningcommons.uoguelph.ca/>
- Science Commons: Located in the library, the Science Commons provides support for physics, mathematic/statistics, and chemistry. Details on their hours of operations can be found at: <http://www.lib.uoguelph.ca/get-assistance/studying/chemistry-physics-help> and <http://www.lib.uoguelph.ca/get-assistance/studying/math-stats-help>

7.3 Wellness

If you are struggling with personal or health issues:

- Counselling services offers individualized appointments to help students work through personal struggles that may be impacting their academic performance.
<https://www.uoguelph.ca/counselling/>
- Student Health Services is located on campus and is available to provide medical

attention. <https://www.uoguelph.ca/studenthealthservices/clinic>

- For support related to stress and anxiety, besides Health Services and Counselling Services, Kathy Somers runs training workshops and one-on-one sessions related to stress management and high performance situations.

<http://www.selfregulationskills.ca/>

7.4 Personal information

Personal information is collected under the authority of the University of Guelph Act (1964), and in accordance with Ontario's Freedom of Information and Protection of Privacy Act (FIPPA) <http://www.e-laws.gov.on.ca/index.html>. This information is used by University officials in order to carry out their authorized academic and administrative responsibilities and also to establish a relationship for alumni and development purposes.

For more information regarding the Collection, Use and Disclosure of Personal Information policies please see the Undergraduate Calendar.

(<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/intro/index.shtml>)

7.5 Course Offering Information Disclaimer

Please note that course delivery format (face-to-face vs online) is subject to change up to the first-class day depending on requirements placed on the University and its employees by public health bodies, and local, provincial and federal governments. Any changes to course format prior to the first class will be posted on WebAdvisor/Student Planning as they become available.

8 University Statements

8.1 Email Communication

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

8.2 When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

Graduate Calendar - Grounds for Academic Consideration

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

Associate Diploma Calendar - Academic Consideration, Appeals and Petitions

<https://www.uoguelph.ca/registrar/calendars/diploma/current/index.shtml>

8.3 Drop Date

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in their respective Academic Calendars.

Undergraduate Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

Graduate Calendar - Registration Changes

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml>

Associate Diploma Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.shtml>

8.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

8.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to make a booking at least 14 days in advance, and no later than November 1 (fall), March 1 (winter) or July 1 (summer). Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time.

For Guelph students, information can be found on the SAS website

<https://www.uoguelph.ca/sas>

For Ridgetown students, information can be found on the Ridgetown SAS website

<https://www.ridgetownc.com/services/accessibilityservices.cfm>

8.6 Academic Integrity

The University of Guelph is committed to upholding the highest standards of academic integrity, and it is the responsibility of all members of the University community-faculty, staff, and students-to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff, and students have the responsibility of supporting an environment that encourages academic integrity. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Undergraduate Calendar - Academic Misconduct

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

Graduate Calendar - Academic Misconduct

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

8.7 Recording of Materials

Presentations that are made in relation to course work - including lectures - cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

8.8 Resources

The Academic Calendars are the source of information about the University of Guelph's procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

Academic Calendars

<https://www.uoguelph.ca/academics/calendars>

8.9 Illness

Medical notes will not normally be required for singular instances of academic consideration, although students may be required to provide supporting documentation for multiple missed assessments or when involving a large part of a course (e.g.. final exam or major assignment).
