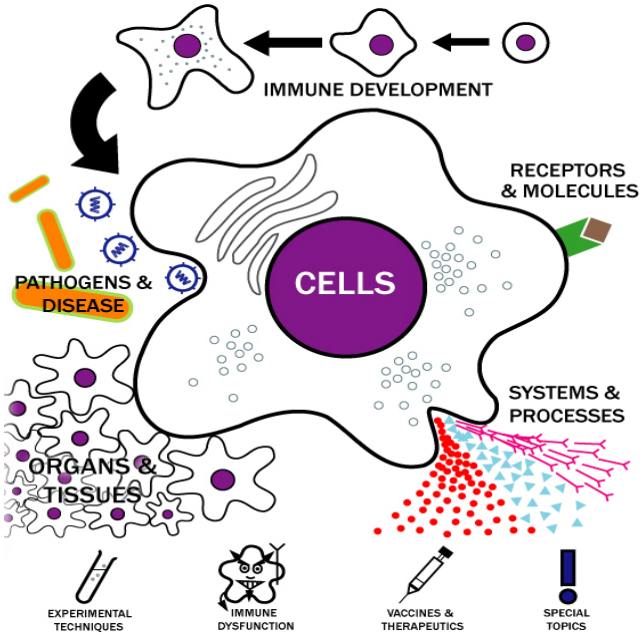
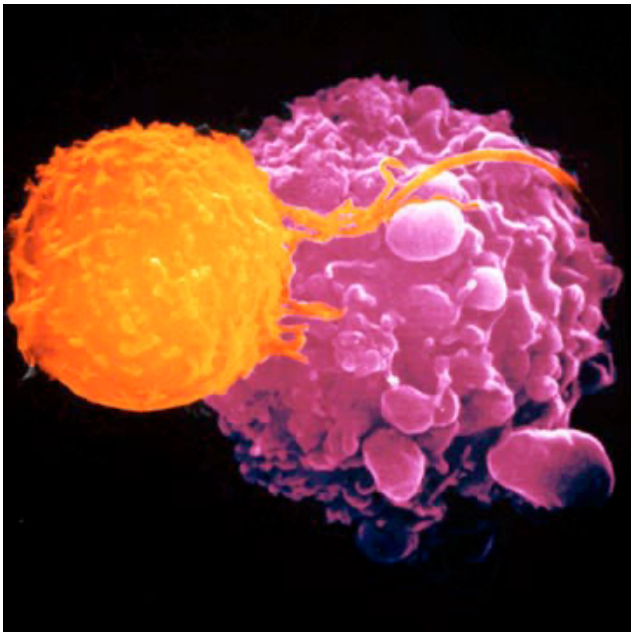
BIOL 2530

Immunology





Spring 2024

Online course that will meet 1 per week for 3 hours

Canvas course site:

Instructor: Aisling Dugan Ph.D.

Office: BioMed Center ~ Room #497

Email: aisling_dugan@brown.edu

Students Hours: Monday 10 am – 12 pm (In person and on Zoom)

Wednesday 11 am - 1 pm (Zoom)

If these times don't work for you, please email me to make an appointment

Zoom link https://brown.zoom.us/j/92191895208 (passcode: brown)

COURSE DESCRIPTION

In this course, we will explore the biology of the mammalian immune system to gain an understanding and appreciation of its importance and complexity. Together, we will learn the experimental and theoretical foundations of immunology. Topics include innate and adaptive immunity; anatomy of immune organs and tissues, structure/function of antibody molecules and T cell receptors; cytokine response, development and maturation of immune cells, and regulation of immune responses through cellular interactions. We will investigate the cells and chemicals that make up each branch of the immune system and learn how cells communicate with each other. Clinically significant issues such as vaccinations, transplantation, inflammation, autoimmunity, cancer, and immunodeficiency like HIV/AIDS infection will be discussed. This course will introduce students to primary literature where interpretative analysis of experimental data will be emphasized.

COURSE FORMAT

This online course will meet one day a week for 3 hours. Each class will start off with a short quiz followed by a 90-minute lecture. After a short break, students will engage with the group by discussing primary literature, bioethics, and research innovations. This will help to contextualize foundational concepts, apply immunological techniques, and learn more about novel breakthroughs. Students are expected to participate in all discussions and this is imperative to keep the course engaging. As such, participation credit will be a valuable component of your grade

COURSE OBJECTIVES

By the end of the semester, students should successfully be able to:

1. Name and describe the function of multiple organs, cells, and molecules that make up the human immune system
2. Detail the differences between the innate and adaptive immune systems
3. Map the origin and developmental stages of immune cells
4. Outline how cells become activated in response to microbial, chemical, and mechanical challenges
5. Communicate how the immune system contributes to autoimmune disease, allergies, cancer, immunodeficiencies, hypersensitivity reactions, organ transplant loss, and host-versus-draft disease
6. Explain the cellular and chemical mechanisms that lead to immunity and immune memory
7. Specify how antibodies inhibit infection and how they are used in clinical applications and molecular biology research
8. Participate in scientific discussions about primary literature and analyze scientific data
9. Propose scientific steps and methods to address an experimental question
10. Discuss ethical issues in the field of immunology & how diversity enriches the field of immunology

TEXTBOOK

Kuby Immunology. Editors: Punt, Stranford, Jones & Owen, 8th edition is the required textbook for this course. I see this book as a necessary component to successfully learn the material we cover in this course.

This textbook is available as a print copy, rental, or digital eTextbook at the Brown Bookstore: or through the publisher. Prices range from $60-200. Three digital copies have also been placed on reserve through the library and the link to these reserve copies is on our Canvas course page. Students can "borrow" each of these digital reserve copies for a period of 3 hours.

TECHNOLOGY & CANVAS

I will utilize Canvas to post announcements, assignments, PowerPoint lectures, and also to collect student assignments and discussion posts. I will also utilize Gradescope and Google Slides for other assignments. The Brown IT Service Center provides support to students and if you need assistance with this technology please call (401) 863-4357 or email help@brown.edu.

GRADING

	% of the final grade
Weekly quizzes (10/12)	30%
Assignments (12)	36%
Final project presentation (1)	20%
Attendance & participation (14 classes)	14%
Total points	**100 %**

Grading Scale: A=88-100% B=75-87% C=62-74% No Credit= below 61%

- **Quizzes**

  Each class will begin with a 10-minute quiz that covers material from the last class. There will be 12 quizzes in total. The lowest two quiz grades will be dropped. Make-up quizzes are not possible, and students are welcome to drop a missed quiz.

- **Assignments**

  Each week students are assigned reading, primary literature and questions, written reflections, bioethical discussions, and design projects. Students can expect ed spend approximately 3 hours outside of the course on these assignments.

- **Final Project**

  Students and provide a 10-minute presentation on a topic of their interest that is connected to Immunology. This may include a therapeutic, an immune disorder, a novel intervention, a breakthrough, or another topic of interest.

- **Late Assignments**

  Assignments are expected to be handed in on time and will receive a 5% reduction in the score for every 24 hours late.

WORKLOAD

This semester, I would recommend students commit **124 and 153 hours** to this course. This works out to 9-11 hours per week. Of course, each student learner is unique and integrates new material at their own pace. The below table provides a time estimate for each activity and this course:

	Hours/week	Hours/semester
Class including exams	3	42
Assignments	3 hour / assignment	36
Studying for quizzes	2 hours / week	24
Reading	1-3 hour / week	12-36
Final presentation	10-15 hours total	10-15
Total		124-153

INCLUSION, DIVERSITY, AND BUILDING EQUITY

We have an opportunity to form a classroom community where each of you feels that you belong in this course and are valued and heard. Learning some of the material in Immunology is difficult. I also recognize we have unique backgrounds and diverse experiences (including race, gender, class, sexuality, religion, education, and ability) some of which can make us feel like we do not belong. First and foremost, please know that I am your advocate, and I will work to support you in this course. I want to see you succeed! You can reach out and talk to me if there is an issue that is affecting your performance in this course and I will work to resolve this with you.

Accessibility and Accommodations

I work to ensure the full participation of all students in my classroom, and like Brown University, I am committed to the full inclusion of all students. If you need accommodations or think you may need accommodations please make an appointment so we can discuss this in more depth. If you need accommodations or think you may need accommodations, you may reach out yo Student Accessibility Services (SAS) for their assistance (seas@brown.edu, 401-863-9588). Please inform your instructors early in the term if you require accommodations.

TIPS FOR SUCCESS

- **Attendance** -Attending and engaging with the class is key to doing well in this course. If there are extenuating circumstances for an absence, please contact me as soon as possible and we can work together to develop a plan.
- **Note Taking** – PowerPoint slides will be available to you before each class. For many, notetaking on the printed slides or digital notes on the pdf version of the slides allows a student to focus on the lecture and jot down a few

notes without attempting to transcribe the whole lecture.

- **Textbook** – The textbook is a great resource for reviewing material that is not immediately clear or straightforward. The textbook will often give more depth or details on an issue and this can help to clarify topics. Some students learn better by relying more on the textbook and the lectures help supplement the learning process. A digital copy of the textbook with be available to all on the Course Reserve link on our Canvas course page.
- **Seek help** – Come and see me and/or reach out to our TA if you are confused or if the material is unclear to you. During Student Offices, I will be in my office available to work with you. I can also be available by appointment. We are here to help you succeed in this course!
- **Studying** –One effective strategy is to construct your own written study guide after each class. Engaging with the material frequently is the best method for long-term knowledge. This will also help you identify concepts that are confusing or opaque and seek out help well before any exam.

CLASS RECORDINGS

I will work to record lectures although technical issues arise so I cannot guarantee all lectures will be recorded. Students have my permission to audio record my lectures, but not guest lectures. If you have questions or concerns about this please reach out to me. All lectures and other course materials are copyrighted.

ACADEMIC INTEGRITY

Brown's Academic Code details Brown University's policy on academic integrity and penalties for violating the academic code. Please familiarize yourself with these policies. There will be no tolerance for plagiarism and cheating and all cases will report to a Case Administrator of the Academic Code.

LECTURE SCHEDULE

Class	dates	TOPIC	READING	Assignments
Module 1: History, Anatomy, and Innate Immunity				
1	W 1/24	Course Overview & Introduction to Immunology	Kuby – Chapter 1	Introduction video
2	W 1/31	Immune organs and cells	Kuby – Chapter 2	Assignment #1
3	W 2/7	Innate Immunity	Kuby – Chapter 4	Assignment #2
4	W 2/14	Complement	Kuby – Chapter 5	Assignment #3
Module 2: Adaptive Immunity				
5	W 2/21	B cells: Development, differentiation, & activation	Kuby – Chapter 6.1-6.4 and Chapter 9, & 11	Assignment #4
6	W 2/28	Antibody: structure, function and therapy	Kuby – Chapter 3.1-3.2.1, Chapter 6.1-6.4, Chapter 12: 433-437, Chapter 20.1-20.7	Assignment #5
7	W 3/6	T cells: Receptors, development, & activation	Kuby – Chapter 6.5, 7, 8, 10	Assignment #6
8	W 3/13	Cytokines	Kuby – Chapter 3.3	Assignment #7
Module 3: Immune System Disorders				
9	W 3/20	Allergies & Hypersensitivities	Kuby – Chapter 15	Assignment #8
	W 3/27	Spring Break – No class		
10	W 4/3	Tolerance and Transplantation	Kuby – Chapter 16.1 & 16.3	Assignment #9
11	W 4/10	Autoimmunity	Kuby - Chapter 16.2	Assignment #10
12	W 4/17	Cancers and Immunotherapy	Kuby – Chapter 9	Assignment #11
13	W 4/24	Immunodeficiency and animal models	Kuby – Chapter 18	Assignment #12
14	W 5/1	Final presentations		Final presentation
	W 5/8	No class		Written part of the final project

** Syllabus is subject to change. Students will be notified of any changes **