INFLAMMATION AND IMMUNITY

SCRB 177 | SPRING 2021

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What happens during an infection? This course will follow the progression of an immune response while exploring the following questions: What is inflammation? How can it both protect us and contribute to disease? Which physiologic processes are regulated by immune cells? In addition to participation in lectures, discussions, and analysis of primary literature, each student will create an original piece of science communication to engage with the general public.

Students will learn to:

- Understand basic principles of inflammation and immunity
- Critically analyze primary literature
- Effectively communicate complex scientific concepts to the general public

Course Canvas Website: **https://canvas.harvard.edu/courses/85283**

Prerequisite:
Life and Physical Sciences A or Life Sciences 1a, (SCRB 10), SCRB 50 or MCB 60 (Molecular biology). Interested students who have not taken SCRB 10 or SCRB 50 / MCB 60 should consult with the instructor prior to enrolling in SCRB 177.

Lecture Times:
Live lectures will be held over Zoom on Tuesdays and Thursdays from 10:30-11:45 AM (EST).

Section Times:
Students are required to attend live weekly 1.5 hour section. Section times will be determined and announced following shopping period.

Textbook:
There is no one textbook that covers all topics in the class. The following book is recommended, but not required. It will prove useful for many of the lectures in the course. Additional resources will be posted on the course website.

Kenneth Murphy and Casey Weaver
Janeway's Immunobiology (9th Edition)
Garland Science/Taylor & Francis Group, LLC
ISBN: 9780815345053

Expectations for Online Class Participation:

This spring, our class will meet through the Zoom online system. We will adopt the **same rules and norms as in a physical classroom**. The participation score will reflect attendance and active involvement in class and section discussions.

***Lectures**:* Lectures are not meant to be passive, didactic experiences; rather, instructor will regularly pose questions to arouse discussion from students. Active participation in lecture is an important part of the learning experience in SCRB 177.

- For everyone's benefit, please join the lecture Zoom meeting in a quiet place and wear classroom-ready clothing.
- Turn on your video and mute your microphone unless you are speaking.
- Close browser tabs not required for participating in class.
- Participate by asking and answering questions and contributing during small group discussions.
- Online lecture should not be recorded, shared, or quoted outside of the class without explicit permission from instructor.
- All students are highly encouraged to attend live lecture. Students who cannot (e.g. due to time zone differences) will need to schedule and participate in synchronous interaction with members of the teaching team in addition to watching recorded lectures.

***Sections**:* Sections will be of two different types depending on the week: "journal club" or problem set discussion. In journal club, students will critically analyze one scientific article accompanying lecture topics and answer guidance questions in preparation for section discussion. These guidance questions will be submitted online prior to the start of section according to instructions. A couple of these meetings will be "Science in the News" journal clubs and the article will be an example of scientific communication in the media (NYT, The Atlantic, etc.). Problem set discussions will involve active problem solving, where students will apply knowledge from lecture to critically analyze data and design experiments to answer. The TF will guide the students through one of the questions from the problem set that is due the following week and answer any questions arising from past lectures. Weekly sections are mandatory. Students are expected to not only attend section, but importantly, to actively participate in discussion. Attendance at sections will be taken by the TF. If students cannot attend section, they must notify their TF in advance. Students may miss one section without penalty but missing more than one section will negatively affect the participation score.

Final Project:

In lieu of a written final exam, students will be asked to create an original work of science communication on a topic covered in the course. Students may choose any topic or type of media they like, as long it is approved by the instructor. Examples include: podcast episode, YouTube video (public service announcement), and written editorial. Details about expectations and structure will be discussed at section halfway through the course. Before beginning work on the project, each student will write a short project proposal, which will be due and approved a month before the deadline. Students will also be required to view their classmates' projects during final exam week.

Problem Sets:

Problem sets are designed to promote engagement with the lecture material. Students are encouraged to work collaboratively, but submitted answers must be the student's own. Some problem set questions will be based on data from scientific articles discussed during "journal club." Problem sets must be submitted online according to instructions. Late problem sets will be deducted 10% per day off of the total score (up until the day at which the answers are posted on the course website, at which point no credit will be given). Extensions are rarely granted except for medical emergencies with proper documentation.

Journal Club Guidance Questions:
Over the course of the semester, students will improve their ability to read scientific articles and critically discuss scientific data. Every few weeks, students will be reading a scientific article and submitting answers to guidance questions, which are designed to help students engage with the primary literature. Guidance questions will be submitted prior to the start of section. Late assignments will be deducted 10% per day off of the total score. Extensions are rarely granted except for medical emergencies with proper documentation.

Grading:

Problem Sets	30%
Final "SciComm" Project	30%
SciComm Project Proposal	10%
SciComm Project Viewing	10%
Journal Club Guidance Questions	10%
Lecture and Section Participation	10%

Inclusivity: This class strives to be an inclusive community, learning from the many perspectives that come from different backgrounds and beliefs. As a community, we aim to be respectful to all, regardless of race, ethnicity, religion, gender, ability, or sexual orientation. We expect that members of the teaching team and students will create an environment that facilitates inquiry and self-expression, while also accepting that others' viewpoints may be different from their own.

Academic Integrity: Discussion and the exchange of ideas are essential to doing academic work. For working on problem sets, you are encouraged to consult with your classmates, course instructor, and TF. However, you must write your own answers and list the names of students with whom you have collaborated on problem sets. Cheating on problem sets, plagiarizing or misrepresenting the ideas or language of someone else as one's own, or any other instance of academic dishonesty violates the standards of our community. For guidelines on how to properly cite work, please see: http://projects.iq.harvard.edu/files/lifesci/files/guide_to_citing_in_the_life_sciences.pdf.
For resources and guidelines on academic honesty, please see: http://honor.fas.harvard.edu.

Accommodations for students with disabilities: Students needing academic adjustments or accommodations because of a documented disability must present a letter from the Accessible Education Office (AEO) and speak with the instructor by the end of the second week of the term. Failure to do so may result in the instructor's inability to respond in a timely manner. All discussions will remain confidential (instructor will contact AEO to discuss appropriate implementation).

LECTURE	DATE		TOPIC

Module 1: The inflammatory response to infection and injury

Week 1: no section

1	1/26	(T)	Our Exquisite Immune System
2	1/28	(Th)	Basic Principles of the Immune Response

Week 2: Journal club

3	2/2	(T)	Innate Immunity I: The First Line of Defense
4	2/4	(Th)	Innate Immunity II: The Cellular Players

Week 3: Journal club

5	2/9	(T)	Adaptive Immunity I: Antigen Recognition
6	2/11	(Th)	Adaptive Immunity II: Antigen Presentation

Week 4: “Science in the News” Journal club

7	2/16	(T)	Adaptive Immunity III: Dynamics of Immunity
8	2/18	(Th)	Vaccines

Week 5: Problem set

9	2/23	(T)	Inflammatory Mediators **PROBLEM SET #1 POSTED**
10	2/25	(Th)	Immune Cell Trafficking

Week 6: Journal club

11	3/2	(T)	Immunity at Barrier Surfaces **PROBLEM SET #1 DUE**
12	3/4	(Th)	Negative Regulation of the Immune Response

Week 7: Discussion / Brainstorming for Final project

13	3/9	(T)	Infectious Disease I
14	3/11	(Th)	Infectious Disease II

Week 8: “Science in the News” Journal club

	3/16	(T)	**WELLNESS DAY**

Module 2: The immune system beyond host defense

15	3/18	(Th)	Defining “Homeostasis”

Week 9: Journal club

16	3/23	(T)	Interplay between Inflammation and Tissue Homeostasis **FINAL PROJECT PROPOSAL DUE**
17	3/25	(Th)	Non-canonical Immune Cell Functions I

Week 10: Problem set

18	3/30	(T)	Non-canonical Immune Cell Functions II **PROBLEM SET #2 POSTED**

Module 3: Pathological inflammation

19	4/1	(Th)	Costs of Inflammation

Week 11: Journal club

20	4/6	(T)	Resistance vs. Tolerance **PROBLEM SET #2 DUE**
21	4/8	(Th)	Autoimmunity

Week 12: Problem set

22	4/13	(T)	Allergy I **PROBLEM SET #3 POSTED**
	4/15	(Th)	**WELLNESS DAY**

Week 13: Journal club

23	4/20	(T)	Allergy II **PROBLEM SET #3 DUE**
24	4/22	(Th)	Inflammation in Cancer I

Week 14: Final project due, no section

25	4/27	(T)	Inflammation in Cancer II **FINAL PROJECT DUE**
	5/6 – 5/12		**FINAL PROJECT VIEWING**