

BIO 495/595 Special Topics in Biology: The Plagues that Made Us

3-credits

Summer 2024 Syllabus for Online

Meeting Location: Canvas

Dates: May 13 – June 21



Plague Doctor Schnabel von Rom; 1656 by Paulus Fürst. Colored copper plate. Original held by the [British Museum](#)

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Office Hours: By Appointment – just send me an email; Also, typically on Thursdays I will set aside a couple of hours for “Ask Me Anything” time. I will confirm the exact timing by Canvas announcement every week.

Course Description. We will examine the coevolution of infectious agents and the vertebrate immune system. Historical and societal impacts of major immunological impact (e.g., cancer, pandemics, vaccination) will also be studied. This course is letter graded.

Course Purpose & Objectives. Regarding human adaptive immunity, [Stephen Hedrick](#) said “By selecting for ever-more-devious parasites, the immune system is the cause of its own necessity.” (*Immunity*, 21:607-615, 2004) Vertebrates, and more specific to this class, people, are unique in the mechanisms evolved to *potentially* respond to any non-self threat, particularly through the lymphocytes (defenders). This perceived limitlessness has been shaped by our coevolution with the viruses and microbiota (invaders) that infect us including those that exist peacefully inside and on us. Anyone in this class should have recent memory of one poignant example of infectious agents having societal impact, but – as this class will examine – there’s more than COVID-19. How about HIV, cancer policy, Sweating Sickness of the Tudor times, the Allergic March, and bubonic plague? We will examine the basics of how the immune system interacts with threat and “self” and see how the “invaders” have shaped the “defenders” across scales from the individual, to societies, and over generations.

Objectives for students in this course:

- Outline the human immune system.
- Identify mechanisms for immune system control and evasion according to specific pathogens and cancer.
- Recognize how major historical trends and events were shaped by human interactions with infectious agents.
- Explain recent trends in allergies and autoimmunity.
- Develop a compendium (perhaps a modern bestiary) of select infectious agents and their mechanisms of interaction and evolution with respect to the human immune system.
- **Graduate students only:** present a brief review on an emerging immunological threat new to you.

Course Materials. *Plagues Upon the Earth* by Kyle Harper (2021) Princeton University Press. ISBN: 9780691192123. This text will be referenced particularly for the historical content in the course.

Basic Immunology: Functions and Disorders of the Immune System by Abbas, Lichtman, and Pillai (7th ed. 2023) Elsevier. This text is the primary source for immunology content. The older 6th edition is fine too. **NOTE:** this is the same text that is used for some other immunology courses at UNC!

Other scientific content in the course will be sourced from a variety of materials that are open access or available through UNC Libraries. These other materials will be posted through Canvas and will include:

- readings from the scientific literature
- readings from popular literature
- videos and other multi-media resources

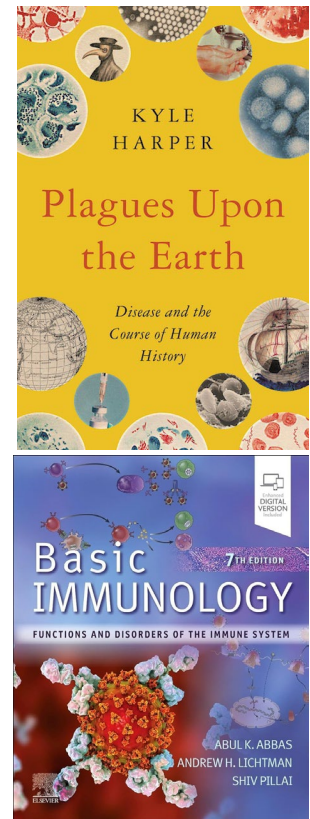
Review of all posted additional materials is **required** unless the Canvas page title starts with **“FYI:”**.

Outline of Course Content.

Each module corresponds to a week.

Recorded lectures and other content are locked until the indicated week.

Assignments unless otherwise stated on Canvas are due by 11:59pm on Sundays.



Module	Topic
1 (May 13-18)	Immunology Basics and the Origins of Human Disease
2 (May 19-25)	How the Immune System Fails (and Evolves)
3 (May 26-June 1)	Pre-Modern History and Immunological Invaders & Defenders
4 (June 2-8)	Allergies and Autoimmunity; Disease in the Columbian Exchange
5 (June 9-15)	Development of Modern Medicine
6 (June 16-21)	Modern Disease Ecology, Emerging Threats, and Therapies

Assignments & Grades. You earn your letter grade by completing the assignments in this course through Canvas. Since they follow along with the readings and recorded lectures, you will want to make sure to maintain a steady schedule engaging with the content, taking notes, asking questions, and researching topics further. At the end of the term, your letter grade will be based on your overall score, which is made up of the assignments distributed in five weighted categories, as follows:

Letter Graded, 10-percent scale

<u>Overall % Range</u>	<u>Assigned Letter Grade</u>
≥90%	A
≥80%, <90%	B
≥70%, <80%	C
≥60%, <70%	D
< 60%	F

- Individual assignments are not curved; however, I reserve the right to curve overall percentages at the end of the semester if necessary.
- Percentages are not rounded.

(60%) Weekly Quizzes. These will assess relevant module learning objectives through questions such as multiple choice, matching, and true/false, as well as written short answer and drawn models. All quizzes will involve a mix of lower-order items and higher-order analysis, including the interpretation of data. There are **six** quizzes, each due by 11:59pm on the end dates of their respective modules.

(25%) Your Modern Bestiary. By the end of the first week of classes you need to select a specific topic of interest relevant to the class, then briefly discuss it with and gain approval from me. Throughout the course, you will develop a compendium of a minimum of 5 academic descriptions of infectious agents and/or medical interventions specific to your topic. The structure and necessary formatting for each entry (1 per week), will be detailed in Canvas and via lecture.

(15%) Formative Feedback. You will occasionally turn in a one sentence “capture” of the main idea of a given module’s topics and/or one question and answer to gauge your active participation in class. Additionally, there will be other discussion activities under this category. One example is “Next Steps” for learning about certain topics, in other words, based on your understanding of one of the assigned readings, what you think should be addressed next in the literature.

GRADUATE STUDENTS. Since this is a double numbered course, there are additional thresholds that must be met for graduate student assessment. The main additional work in this regard will be a recorded 10-15-minute presentation. As a comprehensive assessment for this class, you will prepare a review of an immunological threat. A specific rubric will be available for you in Canvas to further guide your responses. Failure to complete this will automatically drop your grade to a “C” at best if you are enrolled as a graduate student. Graduate student versions of quizzes will also be more advanced than the undergraduate versions.

Late Work Policy. Late work is not usually accepted for this course. Communicate with me as early as possible if you encounter issues completing coursework.

Canvas. This course is administered through canvas.unco.edu. Make sure Canvas *Announcements* and *Conversations* are set to “*Notify me right away*”. This is an account-wide setting accessed by clicking on your account portrait→notifications. Check the course pages daily, as it is expected that just over 3-hours of work per day is necessary for this accelerated Summer format.

The best method for contacting me is via email or the Canvas messaging system. I strive to respond within 24-hours, often sooner.

For real-time conversation with me, schedule a meeting at least 1-day in advance. We can meet in person in my office (Ross 2536), or virtually.