

## INTRODUCTION TO THE HOST DEFENSE COURSE 2026

Immunology is a relatively new science, although observations of immune phenomena date back to ancient times. It has long been known that individuals who recovered from an infectious disease often acquired complete, long-lasting immunity to the pathogens. Indeed, during severe epidemics, survivors of previous epidemics - who acquired total immunity to the pathogens were the only individuals available to nurse the sick without risk to themselves – the recent Ebola outbreak is an obvious example. The current pandemic with SARS-CoV-2 underscores the essence of understanding immunity at the cellular and molecular levels in fighting against deadly pathogens. The pandemic also underscores the powerful defense mechanisms against viral pathogens when an appropriate vaccination strategy is executed.

The practice of vaccination antedates Koch's conclusive proof that microbial agents cause infectious disease. Von Behring (in the 19th century) discovered antibodies and their importance to immunity. Still, it was not until the 1930s that antibodies were shown to be proteins, and only in the 1960s that B lymphocytes were shown to produce specific antibodies. Soon after, T cells were identified. The field of immunology continues to explode with the identification of various B and T cell subsets. Our current understanding of the regulatory interactions among lymphocyte subsets demonstrates that immune homeostasis is maintained in a non-pathological state; conversely, dysregulatory functions of lymphocytes contribute to immune-mediated diseases, such as autoimmune diseases.

Research in immunology has made a rapid and dramatic advance. Immunological investigations have provided insight into the structural and functional effector mechanisms of immunity and their relationship to the DNA sequence at the molecular level. At the cellular level, the immune response is governed by functionally distinct cell subsets. At the genetic level, the realization that a broad spectrum of immune responses to a given stimulus has provided insight into how a disease can differ from patient to patient. At the system level, provocative insights into how bacterial flora and the environment can uniquely shape the immune system have led to a significant rethinking of the causes of many diseases and syndromes.

At the practical level, immunology as a discipline has progressed toward a mechanistic understanding of how to manipulate the immune system to benefit humans. This field of clinical medicine is still in its infancy, but several highly effective immunologic therapies are already available to practicing physicians. One particular area with advanced knowledge is cell-based immunotherapy. We anticipate you will take away from this course a fundamental understanding of immunology and its implications in Medicine.

***The purpose of the Host Defense course is to provide the principal cellular and molecular mechanisms necessary for understanding the immune system and to provide the foundation for building your career as a physician.***

Understanding Immunology requires a departure from the "read and memorize" approach to

knowledge acquisition. *In the practice of Medicine, immersion is not a collection of absolutes but requires understanding the complex interactions of different cells, tissues, and molecules.*

The most astounding paradox of the immune system is not only its redundancy but also its heterogeneity. Again, like Medicine, immunology appears to ask more questions than it answers. Ideally, it would help to spend time thinking about the cellular interactions and processes that constitute an optimal immune response to understand immunology better. We anticipate that you will find immunology rewarding now and throughout your career.

To fully understand immunology, it is also essential to continue integrating new information into the basic functional framework.

## **GOALS OF THE HOST DEFENSE COURSE**

After Host Defense, you will be able to describe the immunologic strategies employed to mount an effective immune response and counter and avert infectious challenges. You will also fully understand how many different immune cells communicate to mount an effective immune response at the cellular and molecular levels. You will be able to describe the cellular and molecular components of the immune system, how they function in normal and pathological conditions, and identify how a clinician can exploit this knowledge to benefit the patient.

## **HOST DEFENSE GENERAL INFORMATION**

### *"How should I study for immunology?"*

The question is commonly asked and must be addressed by the individual student. The best approach for most students is a combination of lecture review and small-group sessions, lecture handouts, and classroom notes, supplemented by texts and contemporary journal articles.

The lecture handouts provide critical concepts covered in the lecture PowerPoint. These concepts then provide the foundation for solving the clinical vignettes in the small group sessions. Most importantly, students must be able to integrate the concepts and understand the highly interactive nature of immune cells. Students should:

1. Carefully read the handouts.
2. Listen to the lectures.

The course curriculum is divided into the following primary areas: innate immune function, humoral immunity, cellular immunity, the mechanisms by which the effector arms are amplified and regulated to provide an adequate response to pathogens, and, lastly, how diseases can arise from defects in or faulty regulation of the immune system.

Our understanding of immunology is continually expanding. Understanding the fundamental concepts of immunology is essential; with this knowledge, you will fully appreciate new developments in clinical immunology.

The course's initial portion may seem complicated for those who have not previously studied immunology. However, by the end of the course and the small-group series, you will have a

fundamental understanding of the immune system and a foundation to build your career as a physician.

For students planning to focus on Immunology for their future practice, accessing a copy of Janeway's *Immunobiology*, 10th edition, may be helpful; the text is highly readable, but any text in a rapidly expanding discipline like immunology cannot be entirely current. Please note that the reading assignments in Janeway are only designated background reading. Host Defense's flow does NOT mirror the chapter sequence in the text, and you will be tested only on material covered in lectures and small-group problem-solving sessions.

The second book recommended book, *Basic Immunology: Functions and Disorders of the Immune System*, elucidates the basic concept of immunology.

Understanding the small group sessions requires understanding the lecture materials. Although some of the material in the small groups appears new, it is based on the fundamental principles presented in the lectures.

## TEACHING MODES

All lectures – aside from the first introduction lecture – are asynchronous. All small group sessions are mandatory and will be in person.

### NEW THIS YEAR:

1. The first lecture, “ Introduction to the Host Defense, “ is in-person. Attendance is required.
2. There will be additional office hours, bringing the total to 8 sessions. Office hours are scheduled after small group sessions and exam reviews. Please check the time and locations as they vary.
3. There will be mini module videos (5-7), each is less than 15 min long, explaining complex concepts from the course. The goal of these modules is to facilitate the integration of the lecture materials. They are **not** intended to be used as a substitute for lectures.

## EXAMINATIONS

There will be two (2) examinations; the second is cumulative. Each exam will comprise of approximately 50% of your final grade. The examinations will contain 4-5 questions from each lecture and small group sessions. It is anticipated that:

- The first exam, with 15 lectures and three small groups, will have **72-90 questions.**
- The second exam, with nine lectures and six small groups, will have **60-75 questions.** In addition, because it is a comprehensive exam, there are approximately **15-20 questions from the material covered in the first exam.**

Although the recommended text is as current as possible, handout content, content discussed in lectures, small-group content, and your lecture/small-group notes ALWAYS supersede book content. The textbook is never the definitive source for a test answer.

## **EXAMINATION PREPARATION**

Conceptually, Host Defense examination preparation should center on the handouts. PowerPoint Presentations are supplements to the Handouts. The students should focus on the material covered in the handout and the PowerPoint presentation for any given lecture. The lectures should serve to solidify and, more importantly, integrate the knowledge.

For most students, examination preparation should begin with handouts. At the end of each of the two Host Defense sections, a summary of the preceding lectures is provided as a PowerPoint Presentation. Each of these occurs just before the examination. Because these are summaries of previous lectures, only PowerPoint Presentations are provided.

Finally, it is imperative to understand that examinations will cover both the broad topics of Host Defense and the detailed information provided in the handouts and PowerPoint presentations.

## **GRADING METHODOLOGY**

HD is a PASS-FAIL course. Your final semester grade will be based on the absolute percentage scores for the two exams.

Pass grade: a score of greater than or equal to 70%

Fail grade: a score of less than 70%.

Students with an average score beneath 70% must meet with the course director to discuss the remediation process. The remediation exam will be similar to the other examinations for this course. A grade of 70% is required to pass it.

## **SMALL GROUP SESSIONS**

Small group sessions are in person.

Small group sessions are a *mandatory* component of Host Defense.

Master answers for the small group sessions will be posted on the Host Defense Sakai page after the conclusion of the session.

### **How to prepare for small groups:**

These sessions facilitate the translation of Host Defense principles to actual case histories. These sessions also provide new knowledge, review, and integrate critical concepts to understand Host Defense successfully. Students SHOULD READ the cases before class and review the related materials presented in lectures. Small group problem sets are all typically made available at the beginning of the semester.

Each exam will include information from small group cases—four to five questions on the content of each group.

If you require an excused absence from a small group session, the excused absence must be granted from the Office of Student Affairs. Please contact Tina Marino with all requests for excused absences. Dr. Le, Dr. Wainwright, and Jessica are unable to grant excused absences; however, they should be notified in advance if a student is to miss a session.

## RECOMMENDED TEXTBOOKS

*JaneWAY's Immunobiology*, 10th ed.  
Kenneth Murphy  
ISBN: 9780815345053

At the end of each chapter in *JaneWAY's Immunobiology*, there are practice questions provided.

Please note: *JaneWAY's Immunobiology* covers more aspects of immunology than are covered in the HD course.

These practice exam questions are not required or recommended, but can be used for self-study purposes.

### *2. Basic immunology: functions and disorders of the immune system*

Abbas, Abul K., author.; Lichtman, Andrew H., author.; Pillai, Shiv, author.; Baker, David L. illustrator.; 2024.

**Both books are available online through the Loyola Library.**

## Sakai/LUMEN

The current course information and schedule will be updated as necessary. Please check the Host Defense Sakai page often and be sure to read all announcements.

## IMMUNOLOGY WEBSITES FOR THOSE WITHOUT A PRIOR IMMUNOLOGY BACKGROUND

These are not assigned but do provide an excellent introduction to immunological concepts relevant to Host Defense. See links below.

[Introduction to Immunology](#)

[Overview of the Immune System](#)

[Antibody Structure](#)

## Summary of essential information for HD:

1. HD is structured with pre-recorded lectures delivered in asynchronous mode. ***The recorded lectures will be available on the dates indicated in the syllabus.***
2. Small group sessions are in person. Attendance is **mandatory**; excused absences are required

by the Office of Student Affairs if you are to miss a session.

3. HD only has two exams. The second exam is comprehensive.

4. Exam questions are based on the content of both lectures and small groups.

5. In order to pass the course, you must have an average of 70% between the two exams.

If your average score is less than 70%, a remediation is required. However, you are only eligible to take the remediation exam if your average is between 60 and 70% in the course.

6. A score of 70% is needed to pass the remediation exam and earn a pass for the course.