HOST DEFENSE INTRODUCTION

Immunology is a relatively new science, even though observations of immune phenomena are ancient. It has long been known that individuals who recovered from infectious disease often acquired complete, long-lasting immunity to the disease. Often, during severe epidemics, survivors of previous epidemics were the only individuals available to nurse the sick without risk to themselves – the recent Ebola outbreak an obvious example.

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, but it was not until the 1930's that antibodies were shown to be proteins, and only in the late 1960's were certain lymphocytes shown to produce specific antibodies. The regulatory interactions of lymphocyte subsets and how lymphocyte subsets are involved in autoimmune diseases have only been shown in the last decade.

Research in immunology has made rapid and dramatic advance. At the molecular level, immunological investigations have provided insight into structural and functional effector mechanisms of immunity and their relationship to genetically encoded DNA sequence. At the cellular level, the immune response has been demonstrated to be is governed and regulated by functionally distinct subsets of cells. At the genetic level, the realization that there can be a broad spectrum of immune response to a given stimulus has provided for an understanding of how a disease can differ from patient to patient. At the system level, provocative insights on unique ways that bacterial flora and the environment can shape the immune system have led to a major rethinking of the cause 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 in a manner that benefits humans. This area of clinical medicine is still in its infancy but there are several highly effective immunologic therapies already available to practicing physicians. We anticipate that you will take away from this course a fundamental knowledge of immunology. Our purpose is to provide not only the basic cellular and molecular insight necessary to understanding the immune system but also to provide the foundation upon which to build your career as a physician.

Understanding immunology requires a departure from the "read and memorize" approach to knowledge acquisition. Immunity, like the practice of medicine, is not a collection of absolutes; but rather requires an understanding of 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, you should spend time thinking about the cellular interactions and processes that constitute an optimal immune response in order to gain an understanding of immunology. We anticipate that you find immunology rewarding now and throughout your career.
GOALS OF THE HOST DEFENSE COURSE

At the completion of Host Defense, you will be able to describe the immunologic strategies employed to mount an effective immune response and to counter and avert infectious challenge. You will be able to describe the cellular and molecular components of the immune system, how they function in normal and pathologic conditions and identify the means by which a clinician can exploit this knowledge to benefit the patient.

HOST DEFENSE GENERAL INFORMATION

"How should I study for immunology?" This is a commonly asked question and one that must be addressed by the individual student. A combination of lecture and small group attendance, lecture handouts and classroom notes supplemented with text and contemporary journal articles is the best approach for most students. The lecture handouts provide a summation of the critical concepts that a medical student must know. These concepts then provide the foundation for solving the clinical vignettes in the Small Group Problem Solving sessions.

The course is divided into five basic areas: innate immune function, humoral immunity, cellular immunity, the ways that 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 a constantly expanding universe. It is essential to clearly understand the fundamental concepts of immunology so that new developments in clinical immunology can be fully appreciated. For those of you who have not previously studied immunology, the initial portion of the course may seem complex. But as the course progresses and by the end of the lecture and small group series, you will find that you have obtained not only a basic cellular and molecular understanding of the immune system but that you also have a foundation upon which to build your career as a physician.

Finally, it may be useful for some students to have access to a copy of Janeway’s, *Immunobiology, 9th edition*. The text is highly readable but any text in a rapidly expanding discipline like immunology cannot be completely up to date. Please note that the reading assignments in Janeway are designated as background reading only. The flow of Host Defense does NOT mirror the text chapter sequences and you will be tested on material given in lectures and small group problem solving sessions only.

A complete understanding of the Small Group Problem Solving Sessions require reading of the relevant medical journal articles that are posted on the Host Defense website. These medical journal articles are relevant to concepts presented in lecture and in small group sessions. It is highly recommended that you use them as your source of primary immunology knowledge. This is what you will be doing the rest of your life, no matter what field of Medicine you enter.
EXAMINATIONS

There will be two (2) examinations. Testing is cumulative. Each will comprise approximately 50% of your final grade. The examinations will contain 4-5 questions from each lecture and Small Group Problem Solving Session. Although the recommended text is as current as possible, content discussed in lectures, small groups and your lecture/small group notes ALWAYS supersede book content. The text is never the final source for a test answer.

GRADING METHODOLOGY

Your final semester grade will be based on absolute percent scores as follows:

- **Honors:** a score greater than or equal to 90%.
- **High Pass:** a score greater than or equal to 80% and less than 90%.
- **Pass:** a score greater than or equal to 70% and less than 80%.
- **Fail:** a score less than 70%.

Note: Scores within 0.5 percentage points of a grade cut-off will be rounded up to the higher grade. Those students failing to meet the minimum requirements for the course are required to meet with the course director at the completion of the course to discuss the remediation process.

SMALL GROUP SESSIONS

Small group sessions are a mandatory component of Host Defense. Attendance sheets (available during the small group exercise) need to be signed by each student for each small group session. Completed attendance sheets will be kept on file. If a small group session is missed, an excused absence from Student Affairs is necessary. Please check LUMEN for your small group assignments and schedule. Master answers for the small group session will be posted on the Host Defense home page at the conclusion of the Small Group Problem Solving Session.

RECOMMENDED TEXTBOOK

*Janeway’s Immunobiology, 9th ed.*
Kenneth Murphy
ISBN: 9780815345053

If anyone desires the use of practice exam questions, they can be found at the end of each chapter in Janeway’s Immunobiology, ninth edition.
Note: the chapters in Janeway’s Immunobiology cover more aspects of immunology than are necessary for a critical medical understanding of Host Defense.
These practice exam questions are not required nor recommended, but can be used by those who desire to use practice exam questions.

**LUMEN**

Current course information and schedule will be updated as necessary. Please be in the habit of checking the Host Defense website often.

**IMMUNOLOGY WEBSITES FOR THOSE WITHOUT A PRIOR IMMUNOLOGY BACKGROUND**

These are not assigned but do provide excellent introduction to immunological concepts relevant to Host Defense. They are found on the Host Defense Website.

[Introduction to Immunology](#)

[Overview of the Immune System](#)

[Antibody Structure](#)