CHAPTER 1. Overview of the immune system.
1. Be familiar with different scientists and their contributions to the field of immunology (only those covered in class): small pox, Pasteur, Lady Montagu, Jenner, etc.
2. Be familiar with the historical contributions that allowed the discovery of humoral and cellular immunities. Be familiar with the term toxin, toxoid, etc.
3. Be able to differentiate between innate and acquired immunity.
4. Be able to explain or elaborate on the mechanisms of action of the following nonspecific defense mechanisms: unbroken skin, mucous membranes, one way flow of fluid, localized chemical environment (i.e. on the skin or in the stomach), peristaltic action of the intestine, desquamation of the surface cells on certain tissue, self cleaning properties of mucous membranes, nasal hair, and normal flora (note that this single question covers a large amount of material). Are any of these defense mechanisms inducible or are they entirely constitutive?
5. Be familiar with examples from physiological barriers.
6. The phagocytic system is said to be our second line of defense against pathogens. Be familiar with the different steps in the process of phagocytosis. Be familiar with the different types of macrophages (fixed or wandering).
7. Describe the general physiological events present during an inflammatory response.
8. Describe in conceptual terms the protective effects of the inflammatory response. What is the outcome?
9. Be familiar with the characteristics of acquired or specific immunity.
10. In general terms, what is the role of B and T lymphocytes in the humoral immune response? What is a plasma cell? Why do we need the intervention of CD4 T helper cells in an antibody response (what happens when T helper cells are not involved in an antibody response)?
11. In the presentation of antigen to initiate an immune response, what is the feature of the antigen that selects whether CD4 helper or CD8 cytotoxic cells are activated?
12. What is the role MHC in T cell activation? Be familiar with MHC molecules.
13. What is an APC? Why they are important during acquired or specific immunity? What cells do MHC interact with?
14. Be prepared to describe the process by which an antibody immune response is initiated up through the production of plasma cells releasing antibody. What are the functions of the antibodies produced to infection?
15. What are epitopes? How epitopes are recognized by B or T cells?
16. What are the cell membrane molecules involved in antigen recognition by T and B cells?
17. Make sure you understand what is the MHC complex? What role it plays during antigen presentation?
18. What do we mean by the clonal selection theory in the process of generating an immune response. Explain this event.
19. What is the role of MHC-I and MHC-II in antigen recognition by T cells? What cells they interact with? What antigens they interact with? etc.
20. Be familiar with T cell populations. How can we tell them apart? What are their functions?
21. Explain the differences between the "primary" and the "secondary" (or anamnestic) immune responses. What aspects of the secondary immune response are particularly important when we give booster shots of a vaccine? Why do we usually believe that when we can mount a secondary immune response to a pathogen, we are immune to that pathogen?
22. Explain the role of memory "B" cells and CD4 lymphocytes in the secondary immune response. Do we make a secondary cell-mediated immune response?
23. Explain what happens when the immune system goes dysfunctional. What happens in AIDS or DiGeorge syndrome?
CHAPTER 2. Cells of the immune system
1. Be able to describe the origin of the leukocytes, lymphocytes, and RBCs found in the blood. 
   What are the lineages?
2. What is the HSC? What progenitors are produced from these cells? What are stromal cells? 
   What is the role of stromal cells during T and B cell development?
3. Describe apoptosis, be familiar with at least 1 gene promoting or preventing apoptosis, and the 
   difference between apoptosis and necrosis. Why is apoptosis important in hematopoiesis?
4. Among the lymphoid cells, be able to describe unique surface markers (CD molecules) for B, T 
   and NK cells. Be familiar with at least 3 of them.
5. How can NK cells achieve ADCC? What are the NK1-T cells?
6. Be able to provide example of fixed and wandering macrophages.
7. Provide the function(s) of macrophages.
8. Be able to identify granulocytes and provide their main biological function.
9. How are basophils different from mast cells?
10. Be able to provide the role of dendritic cells and know at least two of them.
11. Be able to provide the main differences between primary and secondary lymphoid organs.
12. Be able to identify the location of immune cells in the spleen and lymph nodes.
13. Know about the lymphatic system. Why is it important? How the lymphatic system and lymph 
    nodes come together?
14. What is the main role played by the spleen?
15. Provide one example of a MALT. What type of cell is involved in antigen uptake in the 
    intestines? Why are follicles in the Peyer’s patches always activated? What antibody is produced 
    in mucosal sites?

CHAPTER 3. Innate Immunity.
1. Once again be familiar with innate immune defenses and how they protect us from infection.
2. Be familiar with at least two-three differences between innate and specific immunity.
3. Be familiar with the inflammatory response. Provide at least 5 steps. How are blood cells 
   recruited to sites of tissue injury?
4. Among the anti-microbial peptides be familiar with the mode of action of defensins and 
   interferons.
5. In the acute phase response, be familiar with C-reactive proteins and mannose-binding lectin. 
   How these proteins contribute to immunity?
6. Be familiar with NOD receptors and Toll-like receptors. The Toll-like receptors is a big area of 
   research and it makes for lots of exam questions.
7. Be familiar with the Toll-like receptors family, their structure, localization, and most of all their 
   target antigens.
8. How neutrophils control pathogens? What roles do phox, reactive oxygen species, and reactive 
   nitrogen species play during the process of phagocytosis? What are oxygen-independent (or 
   non-oxidative) mechanisms?
9. How is nitric oxide generated during phagocytosis? What happens when nitric oxide is not 
   produced during infection?
10. Be familiar with the contribution by NK cells during acute infection.
11. What is the role of dendritic cells in linking innate and adaptive immunity?