

Microbiology 2400
Study Guide #16
Winter Semester 2008
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LECTURE SECTION

1. It was noted in class that there are several different approaches that microbes can use to damage the host that they have invaded. What were those 4 different approaches?
2. To illustrate one of the approaches, you were introduced to the term, siderophores. These are protein molecules, produced by some bacteria that have the ability to bind to ___ and thus aid the microbe in acquiring this mineral.
3. The 1918 flu virus was used to illustrate which of the methods noted in question #1
4. You were introduced to several exoenzymes to illustrate what damage method noted in question #1?
 - a. What are exoenzymes?
 - b. What general type of action is carried out by the following exoenzymes, coagulase, streptokinase, and hyaluronidase?
5. Some time was spent discussing endotoxins and exotoxins.
 - a. Which of the two classes of toxins is the more potent?
 - b. Which of the toxin classes is almost always associated with Gram negative bacteria.?
 - c. Which of the toxin classes is associated with the production of very specific symptoms in man?
 - d. Endotoxins are ___ in terms of their chemical makeup
 - e. Exotoxins are usually ___ in terms of their chemical makeup
6. Some time was spend discussing factors that can play a role in determining the success of a microbial invasion of a target host. One of those factors was the site ___ of the original invasion.
7. Another factor in determining the success of a microbial invasion is the ___ of microbes that are present in the initial invasion.
8. A variety of factors concerning the status of the host were noted in class as playing a role in the success of the initial invasion. Cite 4 of these factors.
9. Generally speaking, what segments of the population (based on age) are the most susceptible to microbial invasion?

10. Several reasons were noted for finding compromised immune systems in people today. What were 3 such reasons mentioned in class?
11. Immune systems that have dealt with the microbe before are better at controlling it on the second time around. Generally speaking, why?
12. It was noted in class, that the possession of a well-formed capsule could greatly aid the ability of the microbe to survive in the human body. Cite 3 reasons for this.
13. Your attention was also called to the ability to some bacterial organisms to produce biofilms. You were introduced to 3 different means by which biofilms can protect to the microbes that live within them. What were they?
14. Your attention was also called to *Yersinia pestis*, the bacterium that is the causative agent of bubonic plague. This bacterium has the interesting ability to secrete a protein, which can induce a cell, which has phagocytized it, to _____. This bacterium can also secrete chemical substances that can interfere with fusion of _____ which phagocytic vesicles.
15. Fimbriae are proteinous projections from bacterial cells, which aid in the _____ of the bacteria to cells of the target organism. In addition to fimbriae, another closely related class of projections also aids the above-mentioned ability of some bacteria.
16. The 1918 flu virus was used to illustrate the ability of some microbes to _____ stimulate the host _____ system that can lead to difficulty for the host.
17. The ability of a bacterial species to move about the host from its initial entry point is spoken of as its _____. One of the prime mechanisms that aid this ability of a microbe is its ability to produce exoenzymes. See question #20
18. Another mechanism that some bacteria employ to survive in the body is to produce chemical substances, which can shut down the functioning of the body's _____ receptors, and thus impair the immune response of the body.
19. Invasiveness is also aided by certain motility factors associated with bacterial cells.
 - a. One of these factors mentioned in class were the whip-like appendages or _____ possessed by many bacterial cells.
 - b. Another motility factor was illustrated by *Listeria monocytogenes*. This bacterium can readily _____ cells and just as easily pass out of them. If these bacteria gain access to the circulatory system, it is possible they will enter into _____ cells and hence be carried all over the body. While this particular bacterium causes only minor problems in many cases, it can cause several major problems. What were the problems noted in class?

Chapters 16 and 17

1. You were introduced to a variety of nonspecific host defense systems. What is meant by the term, nonspecific defense?
2. What is meant by the term, normal flora?
3. What are the major sites for normal flora in the human body?
4. What were the 3 general means by which your normal flora confers protection from invading microbes?
5. You were introduced to 3 specific chemical barriers? There were the ____ found in the _____. The ____ acid of the ____ area in the female and the _____. an enzyme that destroys ____ that is found in human ____.
6. Mechanical barriers also play a significant role in nonspecific defense. Unbroken skin is very difficult from most microbial forms of life to _____. Another reason that skin forms an effective barrier is the constant ____ of skin cells by the body.
7. Moving fluids can also form mechanical barriers that make it difficult for microbes to penetrate into the body. Cite 2 examples of such moving fluids in the human body.
8. Phagocytic cells are also a very important nonspecific defense mechanism.
 - a. Who is the individual that I identified as being the “father of phagocytosis”?
 - b. What were the two organisms that he based in view of the role of phagocytes in microbial defense on?
 - c. What are the two principle groups of phagocytes in the circulating blood.
9. What is the process of diapedesis?
10. Phagocytic cells are also chemotaxic in nature. What does this imply about them?
11. You were introduced to 3 different approaches that phagocytic cells use to destroy the microbes that have been taken up. What were those approaches?
12. The cells of the reticuloendothelial system are also phagocytic in nature. These cells are of two general types. There are those which _____ about in the tissues of the body and those that are anchored in certain areas of the body. Areas of the body, which are rich in phagocytic cells, are the _____, _____, _____, and _____.
13. For the answer to this question see your textbook. The inflammation response can be considered an example of the nonspecific defense. What are the four components of inflammation?

19. A discussion of specific immunity centered on antibodies. These molecules are very large, ___ molecules (lipids, etc). They are quite _____ in their action and fall into a group of blood proteins known as the _____. Currently, the immunologists recognize the existence of some ___ major classes of antibody.
20. What is an antigen?
21. What is meant by the term, antibody titer?
22. What is the anamnestic response?
23. What are the major differences between a primary and secondary response on the part of the immune system?
24. You were briefly introduced to the sequence of events, which lead to the production of antibody. What are the two classes of lymphocytes that are involved in the production of antibody molecules? Which of the classes actually produce these molecules? When these cells are actually producing antibody, they are mature and are referred to as ___ cells. APC cells are those, which initially take up antigens and then ___ them to the other cells of the immune system, which actually see to the production of antibody molecules.
25. What are memory cells in the context of antibody production?
26. You were introduced to several actions on the part of antibody molecules. Describe the following actions:
- Lysis
 - Opsonization
 - Agglutination
 - Precipitation
 - Neutralization
 - In connection with some of the above actions, you were introduced to a group of substances known collectively as complement. These molecules are a type of _____. While, they carry out their action in connection with antibody molecules, they are capable of ___ actions in the defense of the body.
27. Part of the specific immune defense involves what is known as cell mediated immunity. This concept involves certain cells of the immune system which work to ___ cells which harbor infectious agents. You were introduced to the so-called natural killer cells which are a form of lymphocyte and which direct their action against cells, which harbor invading _____. In addition to the so-called natural killer cells, there is another family of cytotoxic cells known as _____ which carry out their action in conjunction with ___ molecules.

28. In the discussion of disease prevention, you were introduced to two forms of hygiene. What were these forms?
29. You were introduced to 4 forms of community hygiene. What were these? A man by the name Snow was connected to which of these forms?
30. If we look at water treatment in the City of Detroit, two different chemical agents are used to destroy harmful microbes in the water supply. What are they? What is the role of Alum in water treatment?
31. Both active and passive immunity can be utilized to prevent disease. Briefly describe each. Which form is the preferred form of immunity by the medical profession?
32. Another way to prevent disease is the prophylactic use of antibiotics. What is meant by this approach?
33. You were introduced to 4 general means to deal with an ongoing infection. What were they?
34. In the discussion of disease treatment you were introduced to the following individuals. What did each of these people do?
 - a. Paul Ehrlich
 - b. Gerhard Domagk
 - c. Alexander Fleming
35. Probiotics refers to what concept?
36. You were introduced to 4 characteristics of the ideal antibiotic. What were they?

The following questions have their answers in Chapter 14

1. Consult your textbook (chapter 14) for the definitions to the following terms:
 - a. Nosocomial infection
 - b. A carrier
 - c. A communicable disease
 - d. A contagious disease
 - e. A notifiable disease. Which of the following is such a disease? Chicken pox, Influenza, Measles, viral pneumonia