

**Microbiology 2730
Study Guide #10
Winter Semester 2008
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LABORATORY SECTION

MEMBRANE FILTRATION

Note: Please see chapter 5 for information concerning membrane filters

1. Membrane filters of the type that you utilized in this laboratory can be used for sterilization purposes. What is the principle behind this type of sterilization?
2. If you were using membrane filters to sterilize gases or fluids, what major group of microbes would pose the greatest challenge? Why?
3. You can also utilize membrane filters to obtain a “count” of microbes/ml of solution. It was noted in class that membrane filters could be used to obtain “counts” where the standard plate count approach cannot be used. What situation, of this type, was noted in class?

PHAGE ASSAY

For textbook information regarding this exercise, please refer to chapter 14. You should also see your class notes for information to aid you in answering these questions.

1. What is a phage?
2. Why can't you determine the number of T4 phages/ml by doing a standard plate count or a direct count?
3. What is a plaque?
4. You should be able to generally describe how you determined the number of T4 phage particles/ml?
5. What does the term, viral titer mean in the context of viral numbers?

ANTIBIOTIC SENSITIVITY – DISK METHOD

See textbook, pages 258-259

1. You should be able to describe how this method is used to determine the sensitivity of a bacterial species to a variety of antibiotics.
2. If an antibiotic is determined to be effective against a particular bacterial species via this type of testing, it may not be possible to use it to treat the patient's infection for several reasons. You should be able to cite 3 separate classes of reasons for this.
3. You were given the example of Prontosil as a material that proved to be ineffective in Petri plate testing but turned out to be effective in living organisms. Why was it effective in living systems and not in a Petri Plate environment?
4. You should be able to distinguish between *In Vivo* testing and *In Vitro* testing

TseTse Fly

1. This fly is the agent which transmits what famous infection?
2. You had a chance in the laboratory to see the causative agent of the above-mentioned disease? This agent belongs to what group of microbes (algae, protozoans, bacteria, etc)?
3. This disease is limited to what continent?
4. The trypanosome associated with this disease affects man and ___ and hence has in the eyes of some, played an important role in both the ecology and political development of this area of the world.

LECTURE SECTION

Chapters 13 and 14.

1. You were introduced to the concept of the temperate or lysogenic phage. In these situations what happens when a phage enters into a bacterial cell?
2. In my comments on temperate phages, you were introduced to the phenomenon of induction. If a temperate phage undergoes induction, what is going to happen inside of the bacterial cell?
3. What occurs during the uncoating step in viral infection

Chapter 15 Innate Defenses

1. Chapter 15 deals with what are called innate defense mechanisms. What kind of defense mechanisms are these?
2. Under the general heading of innate defense, there are numerous specific mechanisms. One of these involves physical defenses. There were two major types noted in class. What were they?
3. Skin is an excellent physical barriers. What two attributes of skin contribute to its defensive ability?
4. A second type of innate mechanism involved chemical barriers. One of the chemical defenses noted in class involved the production of ____ acid by the _____. A second example of chemical defense involved the ____ acid which is found in the ____ of a female who is capable of bearing children.
5. A third example of chemical defense involves the enzyme ____ which is found in several kinds of body secretions. Name one of these that was noted in class. This enzyme is known to attack the ____ that is found in the cell wall of bacterial organisms.
6. Human perspiration was noted as having several kinds of chemicals that have antimicrobial action. What two were noted in class?
7. It was also noted that the human body produces a variety of other antimicrobial chemicals. You were introduced to a group of substances that are peptides and can attack the plasma membranes of invading microbes. These peptides are called _____. Briefly what is a peptide?
8. Moving materials were noted as playing a role in innate defense. You were introduced to 4 such moving materials. What were they?
9. Another type of innate defense mechanism that was noted was that of your normal flora.
 - a. What is meant by this term?
 - b. Where in the human body do you expect to find a normal flora?
 - c. You were introduced to 4 different ways for your normal flora to protect you. What were these ways?
10. A short period of time was spent discussing the so-called Toll Like Receptors that are found in the body. These are a collection of ____ (proteins, lipids, carbohydrates, etc) which react to certain chemicals which are indicative of the presence of specific kinds of microbes in the body. At the present time, there are approximately ____ different Toll Like Receptors known to be found in the body.

11. The trigger of one of these receptors, results in _____ being sent to the appropriate portions of our immune system to alert them to prepared to combat a particular kind of microbe. As a result of this kind of action, some people have dubbed this system, an _____ Warning System for our body's immune system.
12. Another part of the innate response involves the so-called complement system. This is a system of about _____ different protein molecules that can collectively carry out a variety of antimicrobial actions.
13. Some time was spent discussing a class of chemicals known as interferons. These substances are a collection of small _____ (lipid, carbohydrate, or protein) molecules. They are normally produced by cells of the body which have been invaded by _____ and serve as _____ to alter infected cells. These cells once altered can then begin to produce a variety of antiviral agent to help them combat infections, if they occur.
14. Inflammation can serve as part of a defense system. What are the 4 hallmark characteristics of inflammation? Inflammation can help in defending against microbial invasion in several ways. You should be able to cite two of these ways.
15. While it is not pleasant, fevers can play a role in helping our body defend itself against microbial attack. Two means by which fever can play a defensive role were noted in class. What were they?
16. Pyrogens are chemicals which can induce _____ in the body. You were introduced to the so-called endogenous pyrogen. These are materials which are produced by the _____ in response to some kind of trigger. What are exogenous pyrogens?