

**Microbiology 2730  
Study Guide #8  
Winter Semester 2008  
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## **LABORATORY SECTION**

### **BACTERIAL GROWTH AND TEMPERATURE**

**You should read the introductory material presented in your laboratory manual**

**Textbook reference for this set of questions is chapter 4**

1. Bacterial organisms can be grouped into 3 different classes on the basis of their optimal growth temperatures. What are those classes? Define each on the basis of optimal growth temperatures.
2. What are the 3 cardinal temperatures shown by each bacterial species? Define each of these temperatures.
3. When you say a bacterial culture is growing, what does this imply about the culture?
4. Cite 1 explanation for the existence of thermophilic bacteria.
5. Cite 1 explanation for the existence of psychrophilic bacteria.
6. What are thermotolerant bacteria?
7. Cite 2 natural environments where you would expect to find psychrophilic bacteria. In what industry would you expect psychrophilic bacteria to play a significant role?
8. Cite 2 natural environments where you would expect to find thermophilic bacteria.
9. Bacterial organisms that are capable of growing in and causing “problems” in the human body would be placed into which of the above- mentioned classes?

## HEAT RESISTENCE OF BACTERIA

**You should read the introductory material presented in your laboratory manual**

**For textbook references, you will have to consult the index of your textbook and your class notes concerning this exercise.**

1. What were expected results of this exercise, in terms of the survivability of *E. coli*, and *B. cereus*? Why would you expect this result?

## LECTURE SECTION

### Chapter 5

**Note: information concerning enzymes can be found in chapter 6, page 139**

1. You were introduced to the work of Paul Ehrlich.
  - a. What human disease was he studying?
  - b. He is the man who developed the idea of a “magic bullet” These were chemicals which could be used to \_\_\_\_ infections and at the same time would \_\_\_\_.
  - c. He actually produced one of these magic bullets but it did take \_\_\_\_ to get to this goal.
  
2. Some time was spent discussing the work of Gerhard Domagk
  - a. This individual was studying what medically important bacterial genus?
  - b. As the studies progressed, a compound by the name of prontosil was shown to be effective when it was \_\_\_\_ and ineffective when it was tested under what conditions?
  - c. As was noted in class, a French husband and wife team worked out the explanation of the above-mentioned unusual results. What was the explanation?
  - d. Sulfanilamide (sulfa) has a shape very similar to what material needed by Streptococci? This material is needed in order for these bacteria to make \_\_\_\_\_. This substance is needed for the bacteria to produce \_\_\_\_\_.
  - e. Why couldn't the Streptococci in Hildagard's body make use of the folic acid she had in her tissue fluids?
  - f. You were introduced to the competitive inhibition of enzymes? What, in general does this term mean?
  - g. As part of my discussion of competitive inhibition, you were introduced to the idea of the Lock and Key Theory. This idea holds that enzymes identify their substrates by the ability of the substrate to \_\_\_\_ closely together with the enzyme.

### Chapters 13 and 14.

3. During my comments on viruses, it was noted that apparently the first viral disease known to be studied was that of \_\_\_\_ and the person who conducted this study was \_\_\_\_.
4. The above-mentioned study begun in 1879 and by the early 1900s, several other conditions that had similar properties were discovered. What diseases were associated with the following individuals?
  - a. Loeffler and Frosch
  - b. W. Reed
  - c. Twort and d'Herelle (note, in this case, what kinds of organisms were affected by the viruses and what special name was given to these infecting agents?)
5. In the discussion of the work of Mayer, it was noted that he produced several "experimental findings" concerning Tobacco Mosaic Disease. What were those findings?
6. What is the origin of the word, virus?
7. By the time of the early 1900s, two views of the nature of the virus had been developed. One of the views held that viruses are really \_\_\_\_ microbes, which have very unusual \_\_\_\_ needs. The other view (Berijerinck) contended that viruses are quite different than other life forms. This view can be summed up in the famous Latin phrase coined by Berijerinck, which was \_\_\_\_\_. According to this view, viruses are \_\_\_\_\_.
8. Viruses presented two "problems" to investigators such as Mayer, if they attempted to follow Koch's Postulates. What were those two problems?
9. Your attention was drawn to Wendell Stanley (1935). This individual worked with the \_\_\_\_\_ (name of disease) and was able to get the causative agent (a virus) to form large aggregations that took the form of \_\_\_\_\_. His chemical analysis of these revealed that they were constructed of \_\_\_\_\_. This view of their chemistry soon changed and by 1937, it was realized that viruses are really constructed from two types of chemical substances. What are they?
10. You should be able to draw a very generalized diagram of a nonenveloped virus labeling its coat and core. What is the chemical nature of these structures?
11. You should be able to draw a very generalized diagram on an enveloped virus labeling the core, coat, and envelope.
12. In discussing viral reproduction, one of the models used was that of the T<sub>4</sub> Phage and E. coli. During this presentation, the process of viral reproduction was broken into 8 separate steps. What were those steps? Briefly describe what happens in each.

13. In discussing the entry of a virus into a cell, two methods of penetration were noted. What terms did I use for each method? What is the basic difference between the two methods?

14. It was noted that the assembly of a virus could take one of two forms. What were those forms?

15. There were two general means mentioned for the exit of viruses from a cell. What were those two forms?