

**Microbiology 2400  
Study Guide #15  
Winter Semester 2008  
E. Hoffman**

## **LABORATORY SECTION**

### **METABOLIC TESTS—GENERAL INFORMATION**

1. Your laboratory manual introduced you to 3 additional methods that can be employed in addition to metabolic tests to aid in the identification of microorganisms. What were those methods?
2. You should be able to generally describe how “phages” can be employed to identify bacterial organisms.
3. In the general discussion of the bacterial identification approaches, the terms genomics and proteonomics were mentioned. These two terms refer to the use of \_\_\_ or \_\_\_ in the study of some aspect of living organisms.

### **INDOLE TEST**

1. What medium was used to run the indole test?
2. What does a positive and negative indole test look like?
3. The indole test is based on the ability to some bacterial organisms to attack the amino acid \_\_\_ and convert it into indole.

### **THE HYDROGEN SULFIDE TEST**

1. What medium did you utilize when conducting the hydrogen sulfide test?
2. What does a positive and negative hydrogen sulfide test look like?

### **SUGAR FERMENTATIONS**

1. You should be able to describe the following results when sugar broths are inoculated with bacterial organisms:
  - a. A no change reaction

- b. An acid reaction
  - c. An acid and gas reaction
2. The principle “gas” that is formed by carbohydrate fermenting bacteria is \_\_\_\_.
  3. What is a Durham tube? What is its function in the sugar broths?

### **CITRATE TEST**

1. A “citrate positive organism” means that it has the ability to grow, using only \_\_\_\_ as its source of carbon atoms.
2. What does a positive citrate test look like? A negative citrate test?
3. Simmon’s Citrate Agar is the only example that you will use this semester of a defined medium. What is meant by this term?

### **STARCH HYDROLYSIS**

**See information provided in introductory material in laboratory manual**

1. What is the reagent used to determine if starch hydrolysis has occurred?
2. What does a positive and negative test for starch hydrolysis look like?
3. You should be able to describe the origin of the above-mentioned colors
4. What happens to starch when it is hydrolyzed?

### **CATALASE TEST**

**See information provided in introductory material in laboratory manual**

1. What does a positive and negative Catalase test look like?
2. What chemical reaction is controlled by the enzyme Catalase?
3. The bubbles that are seen in a positive test are really bubbles of \_\_\_\_.
4. The ability to produce the enzyme Catalase is really quite widespread among bacteria. You were introduced to two genera which are noted for their inability to produce this enzyme. What were they?

### UREASE TEST

See information provided in introductory material in laboratory manual

1. What does a positive and negative Urease test look like on the medium that you used in the laboratory?
2. The color changes seen in this medium are the result of changes in the \_\_\_ of the medium.
3. What is the chemical reaction controlled by the enzyme Urease?

### Chapter 8 Transformation

1. You should be able to describe the experimental work of Avery, et. al. in regards to transformation. You should be able to describe their logic in contending that DNA was in fact the genetic information of *Streptococcus pneumoniae*.

### Conjugation

1. It was noted in class that this exchange mechanism comes in 2 subtypes. One involved the so-called F<sup>+</sup> and F<sup>-</sup> mating.
  - a. What does the term, “F” factor, stand for?
  - b. “F” factors belong to a class of objects found in bacterial cells that are known as \_\_\_
  - c. In terms of F factors, what is the expected result of a F<sup>+</sup>, F<sup>-</sup> mating?
  - d. In the conjugation process, what structure serves to link the cells together?
2. You were also introduced to the so-called Hfr, F<sup>-</sup> mating.
  - a. Where is the “F” factor located in a Hfr cell
  - b. The term, Hfr, stands for \_\_\_.
  - c. In many cases, a Hfr strain will donate many more genes to the receiver cell than a F<sup>+</sup> donor. Why?
4. Plasmids are of great interest to those individuals who are concerned in one way or another with protecting human health. Cite 2 reasons for this.

### Transduction

1. The phenomenon of transduction came to light in the early 1950s from the studies of Zinder and Lederberg. These individuals conducted their work using members of the genus, *Salmonella*. What observation indicated to them that the method of gene exchange between these bacteria was different from that involving transformation or conjugation? (**Students: Omit this question.**)
2. The process of transduction comes in two general forms. One of these processes is actually called generalized transduction. In this form, the genetic trait that is moving between bacterial cells is conveyed from the donor cell to the receiver cell by a \_\_\_\_\_. The host cell in this situation is not destroyed by the incoming nucleic acid for what reason?
3. You were also introduced to the process of specialized transduction. In this process, the incoming viral nucleic acid does not destroy the cell. What happens to prevent this from happening?
4. What is meant by the term, lysogenic phage?
5. What occurs as a result of induction (in the context of transduction)? You were introduced to two classes of inducers. What were they?

**Chapter 15 is the principle chapter for this material. However, there are small parts of chapter 14 that will be useful as well.**

1. A few minutes was spent in class distinguishing between a microbial infection and a microbial disease. You should be able to describe the difference between the two.
2. You were introduced to 5 different means by which microbial organisms can gain access to the body. What were those mechanisms?
3. Syphilis was used to illustrate which of the above mechanisms? (Question #2)
4. You were introduced to a condition known as “farmer’s lung”. In the example cited in class what type of microbe was involved? Why was it thought that the microbe was present? This infection illustrates which of the above-mentioned mechanisms? (Question #2)
5. A very ancient disease is that known as “wool sorter’s disease”. In today’s world this condition would be called \_\_\_\_\_.
6. Cholera is another ancient problem for the human species. The microbe responsible for this condition normally gains entry to the body by \_\_\_\_\_.

7. Some time was spent discussing vectors and their role in the transmission of disease? What were the two classes of vectors mentioned in class? Cite an example of each class of vector?
8. A complicating factor for public health officials who deal with vector borne disease is a phenomenon known as Transovarian passage. What occur as a result of this phenomenon?
9. You were also introduced to the notion of the reservoir host. In this regard, your attention was called to the situation involving bubonic plague. When discussing bubonic plague and man what two living organisms are always mentioned (in addition to the bacterium which actually causes the disease)? It was noted that a complicating factor in attempting to control this disease are the reservoir hosts for this bacterium. Generally speaking, what kinds of animals serve as “reservoir hosts” for this bacterium?
10. As another example of the concept of the reservoir host, your attention was called to the situation of man and the West Nile virus. Besides infecting man, this virus infects \_\_\_ and can be brought from these animals to us by the action of \_\_\_.
11. In dealing with parasitic organisms, the term intermediate host was mentioned. To illustrate the idea of this type of host, you were introduced to the schistosome parasite. This organism is really a type of \_\_\_ worm, which can inhabit several areas of the body, depending upon the species. What areas of the body play host to the human schistosome? How does man acquire this parasite? How do the eggs of the parasite exit the human body? What is the intermediate host for this parasite? What is meant by the term, intermediate host, in connection with parasitic organisms?
12. Historically, although man has been able to acquire many different parasites in North America, schistosomiasis has not been one of those conditions. Why?
13. Historically, the approach taken to control the parasite of schistosomiasis has been directed at \_\_\_\_. In recent time, the control methods have changed to \_\_\_\_\_. Why?
14. It was noted in class, that in the case of the SARS (Severe Acute Respiratory Syndrome), it now appears that the reservoir for the virus is not the masked palm civet as originally thought but rather a \_\_\_\_\_. How is it thought that the masked palm civet acquires the virus?
15. For many years, the reservoir host for the Ebola virus was not known. Today, it appears that the natural host for the virus may very well be various species of \_\_\_\_\_.
16. In discussing “wounds,” as a means for the entry of microbes into the body, I grouped them into two major classes. What were these?