

Miramar College
Biology 205 General Microbiology
Lab Midterm Exam II Study Guide

The following questions are meant to guide your studying, and are not meant to replace carefully studying your lab manual, lab notebook and any handouts you have received in lab. Do not assume that something will not be on the exam simply because it does not appear on this study guide. Remember to bring a calculator!

Determination of a Bacteriophage Titer

- What is a bacteriophage? What does it infect?
- What receptor does a bacteriophage use to infect its host cell?
- Be able to set up a series of bacteriophage dilutions to get a plate at a given dilution (e.g., 10^{-7} plate). Why do these dilutions need to have *E. coli* added to them prior to plating? Include the volume of each culture transfer, the volume of water in which they are diluted, and the amount of each dilution plated.
- From these dilutions, calculate original PFUs/ml. What is the statistically significant range of PFUs on a plate? What is a plaque?
- Understand why it is necessary to dilute the bacteriophage culture prior to spread plating and counting.

Physiological & Biochemical Tests for Minor & Major unknowns

- For all of the tests performed in lab, be able to identify: the media used, the chemical being tested, a positive and negative result, the microbial enzyme(s) involved, and products being produced. **You WILL see several of these media out and you will need to determine "what's happening."** For example, if you are shown a Lactose Durham Tube that is cloudy, yellow and has marked gas in the inverted vial: the organism has the enzyme lactase and has fermented lactose, producing both acid & gas, this is visible because the pH indicator Phenol Red has turned yellow, which happens in acidic media. The *Media Use Descriptions* at the end of the Lab Manual will be very useful for this purpose.
- Be familiar with the use of dichotomous keys to determine the genus to which a bacterial unknown belongs.

Bacterial Examination of Water: Qualitative Tests & Handout

- Understand what is being measured by MPN and Colilert® reagents.
- Why are ONPG and MUG both included in the Colilert Test Kit?
- Differentiate between a presumptive water quality test and confirmed test.
- Why are *E. coli* considered an indicator organism?
- Determine MPN using an MPN table, when shown the results of an MPN series inoculation.

Lab Handout: Simulated Epidemic

- Define dead pathogen, attenuated, toxoid, and subunit immunizations. Define herd immunity.
- Understand how herd immunity and host susceptibility affect flu prognosis.

Staphylococci: Isolation & Identification

- Know introductory material, including the use of Mannitol Salt Agar and *m-Staph* medium.
- Know the tests that were available to you in class that help to differentiate between staphylococcal species, and which tests were done to isolate a *Staphylococcus* species.
- Recognize an unknown *Staphylococcus* as *S. aureus*, *S. epidermidis*, and *S. saprophyticus* based on their mannitol fermentation, Novobiocin susceptibility, coagulase production, and α -toxin production.
- Recognize staphylococcal bacteria on a Gram stain.
- Understand how each of the tests performed in lab is used to determine an unknown *Staphylococcus* species, use *SSE Media Use Descriptions* in the Lab Manual.

Streptococci: Isolation & Identification

- Know introductory material, including the use of Blood Agar and Brain-Heart Infusion Agar.
- Differentiate between γ -hemolysis, α -hemolysis, and β -hemolysis and know which media is used to determine this property.
- Recognize streptococcal bacteria on a Gram stain.
- Understand how to determine a streptococcal species using the table in the SSE handout.
- Understand how each of the tests performed in lab is used to determine an unknown *Streptococcus/Enterococcus* species, use *SSE Media Use Descriptions* in the Lab Manual.

Gram-Negative Enteric Pathogens

- Define enteric.
- Know introductory material, including the use of MacConkey Agar and Eosin Methylene Blue Agar.
- Know the tests routinely used to differentiate normal flora from pathogens, and the pathogens used in this lab.
- Recognize enteric bacteria on a Gram stain.
- Understand how each of the tests performed in lab is used to determine an unknown Enteric species, use *SSE Media Use Descriptions* in the Lab Manual.

ELISA

- What is an ELISA? Why are antigens and antibodies central to the ELISA?
- What are the basic steps of an ELISA, how is an indirect ELISA different from a direct ELISA?
- Why is proper washing between steps of an ELISA so important?
- Recognize positive and negative ELISA results. Why is the ELISA such a sensitive/specific serological test?