

## Study Guide for Exam 2

March 11, 2010

Bio 205 Study Aid – please note that this aid is NOT inclusive. It has been designed as a supplement to help you as you study for exam #2.

### Chapter 5. Eukaryotic microorganisms

1. You need to know the basic differences between prokaryotic and eukaryotic organisms?
2. You need to know the differences in basic organelles between eukaryotes and prokaryotes (ribosomes, flagellum, etc).
3. You need to be familiar with the endosymbiotic hypothesis.
4. What are the 4 main categories of eukaryotic pathogens discussed in class? How are they different from one another? Do they have any interesting ways to reproduce?
5. Are there any fungal or algal infections that affect humans?
6. Are there specific examples of these eukaryotic diseases that are found in Arizona?
7. What are the main types of protozoan pathogens discussed in class? Why are they interesting?
8. Be familiar with the life cycles of *Giardia* (or *Entamoeba*) and malaria. How humans acquire infection?
9. In *T. cruzi* infection, be familiar on how humans acquire infection.
10. Understand the extent of Malaria as discussed in class. Be familiar with the infective stage and the stage that is taken by the mosquito. Which organs in humans are affected by malaria infection? Be familiar with the term intermediate and definitive hosts.
11. What are the 3 main types of Helminthes? How do most of them cause disease?
12. Be familiar with *Taenia saginata* - beef tapeworm. How humans acquire infection?
13. Be familiar with the life cycle of schistosomes. Is there an intermediate host? How humans acquire infection?
14. Be familiar with hookworms and pinworm infections. Once again, how humans acquire infection?
15. Among the nematodes, we find *W. bancrofti* the causative agent of elephantiasis. How is this organism different from nematodes describe in 14. (Not covered in class!!!)

### Chapter 6: Viruses

1. What are the main components of viruses? How are viruses different from one other organisms described so far?
2. What is a host range? What determines viral specificity?
3. Understand the important properties of viruses and essential definitions that describe viruses (Table 6.1).
4. What is a bacteriophage? Why are they important? What do they infect? Know their 'lifecycles' (growth curve and type) and how they multiply.
5. Know what important terms like virion, prophage and lysogeny mean.
6. Know the general steps in animal virus replication. Is there a difference between naked viruses and enveloped viruses?
7. be familiar with the two types of penetration into cells by animal viruses.
8. What is the Baltimore classification of viruses?
9. Understand how genetically different types of animal viruses replicate. What is special about retroviruses? The central molecule is mRNA, how we get to this?
10. What is the cytopathic effect? Provide examples.

11. How are viruses cultured? How they can be quantified? Why is it more difficult to culture viruses?
12. Understand how viruses can cause cancer. Provide examples of some viruses.
13. Be familiar with prions. How are they different from viruses?

### **Chapter 8. Microbial Metabolism**

1. You need to be familiar with catabolism and anabolism. What do they do?
2. Be familiar with enzymes as they are central to metabolism. You need to know the basic enzyme structure. Be familiar with the role of enzymes in disease.
3. How are enzymes susceptible to temperature, pH, osmotic pressure, etc?
4. You need to be familiar with competitive and non-competitive inhibition.
5. You need to be familiar with enzyme repression and induction.
6. Be familiar with cell energetics. What are exergonic and endergonic reactions?
7. Be familiar with redox reactions. What happens to the electron donor or acceptor? I use the words OIL RIG to make it easier ( OIL – oxidation is loss of electrons; RIG – reduction is gain of electrons).
8. Be familiar with the role of electron carriers during redox reactions.
9. The whole goal of a cell's metabolism is the creation of ATP. Be familiar with the structure of ATP.
10. You need to know the two ways that a cell can make ATP.
11. In aerobic and anaerobic respiration you should understand the role played by glycolysis, TCA, and the electron transport chain.
12. You need to know where these 3 pathways take place in eukaryotes and prokaryotes, what comes in, and what comes out.
13. How is aerobic respiration different from anaerobic respiration?
14. Be familiar with the second way of making ATP by oxidative phosphorylation.
15. You need to be able to account for the 38 ATP made from glucose by aerobic respiration.
16. You need to be familiar with fermentation. What is the definition? What pathways are involved? How many ATP are made? Why is fermentation important?

### **Chapter 9: Microbial Genetics**

1. You need to be familiar with the basic structure of DNA as well as terms such as genome, gene, genotype, phenotype.
2. Be familiar with DNA replication. What is semi-conservative replication? Be familiar with the components in replication (Table 9.1). You need to know the orientation of DNA, 5' and 3'.
3. [Be familiar with plasmid replication.](#)
4. You need to be familiar with transcription. What are the types of RNA? How is RNA different from DNA? What enzyme carries out the bulk of transcription?
5. You need to know translation and be familiar with codon, start codon, stop codon, ribosomes, tRNA, etc. Be familiar with the genetic code and its redundancy.
6. You need to know some difference in transcription and translation between prokaryotes and eukaryotes.
7. You should understand the lactose operon. How is it regulated? What regulates it? What type of regulation is it?
8. Be familiar with inducible and repressible operons and how are they regulated?
9. Be familiar with mutations. What is a wild type or mutant strains?
10. You need to know the difference between spontaneous and inducible mutations.
11. Be familiar with the different types of mutations (silence, missense, frameshift).

12. Be familiar with the Ames test. What is it used for? What information is obtained?
13. Are any mutations more detrimental than other mutations?
14. Be familiar with DNA recombination events.
15. What was the classical experiment by Griffith that established the presence of a “transforming factor”? 2. What is transformation? Why/How does it occur in nature? When can bacteria uptake DNA?
16. What is transduction? How this genetic exchange is mediated?
17. Establish the difference between specialized and generalized transduction.
18. What is conjugation? How is this mechanism mediated?
19. Understand the genotype (outcome) of the recipient during the three conjugation processes.
20. What are the phenotypes of bacteria involved in conjugation?

**GOOD LUCK IN YOUR SECOND EXAM!!!**