**Exam 3 Study Guide**

Please note, this is a highlight of the most important aspects of this unit and reminders of commonly missed concepts. Please do not study only the material on this sheet. The PowerPoints, audio clips, discussion forums and videos are the online lecture components and have the material required for this exam. After learning this unit, you should be able to:

**Chapter 9: Microbial Growth:**

* Recognize physical and chemical requirements for microbial growth and that growth is in terms of numbers of microbes and not cell size
* Define the five categories of organisms based on temperature characteristics
  + You do not need to know the temperature ranges; however, know the written information for each category (i.e. “cold-loving microbes)
* Understand that the size of a container of leftovers matters in terms of limiting microbial growth and discuss the reason(s) why
* Review the effects of osmotic pressure and solvent concentration of microbial cells. Understand pH as it relates to the growth of microbes
* List the biochemical uses of the six elements/molecules discussed in the lecture
* Define and differentiate the five varieties of aerobes and anaerobes both in writing and by using diagrams as in the lecture
* Explain the advantages of biofilms for bacteria and the potential concerns for humans. (Hint: the discussion forum video is helpful here)
* Briefly understand the components and types of culture media
* Define capnophiles
* List and describe the four Biosafety levels as they were discussed in the lecture
* Define the term colony and describe the streak plate method
* Discuss binary fission and budding
* Discuss conjugation
* Define and discuss the concept of generation time
* Be very familiar with the phases of growth. Describe them in words and be able to identify them on a graph as in the lecture
* Discuss the concept of spectrophotometry

**Chapters 13 and 14: Control of Growth**

* Define and differentiate the varying terms of Microbial Control
* Discuss the rate of microbial death and how this concept relates to the use of some chemical cleaner instructions
* Describe the actions of microbial control
* Discuss why some microbes are more challenging to limit the growth of than others
* Define the terms endospores and prions
* Define TDP, TDT, DRT (see lecture slide for definitions, please do not Google)
* Discuss the process of moist heat sterilization, especially autoclaving
* Describe the process of Pasteurization and how it eliminates pathogens, decreases spoilage microbes and does not alter the structure/taste of food products
* Describe various physical methods of microbial control
* Discuss radiation as a control of growth and define thymine dimers
* Describe and explain the concept of disk diffusion method
* Briefly define the types of disinfectants discussed in lecture. Explain why the plasma membrane is often the target of attack by disinfectants
* Discuss the various components of chemical food preservatives and their purposes
* Describe the concept of antibiotic resistance and discuss its concern in healthcare settings. (hint: the discussion forum video will be helpful here)
* Discuss antibacterial mechanisms

**Chapters 10 and 11: Microbial Genetics**

* Understand the basics of Mendelian Genetics:
  + Describe his experiment and findings
  + Define the following terms: genes, dominant and recessive alleles, homozygous and heterozygous
  + Understand and calculate the probability of a genetic outcome using a Punnett square for a given scenario
* Define the terminology of heredity
* Describe the prokaryotic chromosome and location. Compare these to that of an eukaryote
* Know the flow of genetic information (central dogma) in order and distinguish transcription from translation
* Describe and discuss the following regarding DNA:
  + Structure, complementary base pairing due to Hydrogen bonds
  + Discuss DNA replication as being semi-conservative
  + Describe the process of DNA synthesis and define the terms: leading strand, lagging strand and Okazaki fragments
  + Discuss the function of enzymes: DNA ligase, DNA polymerase and Helicase as they relate to DNA synthesis (replication)
* Discuss the following in regards to transcription in eukaryotes:
  + Location
  + Introns versus exons
  + Resulting mRNA
* Discuss translation:
  + Define codons
  + Know the start codon and three stop codons
  + Be able to use a given chart to determine the resulting amino acid sequence based on a DNA or mRNA sequence supplied during the exam
  + Discuss what is meant by codons being redundant but not ambiguous
* Briefly describe the process of translation mentioning the EPA sites in a ribosome
* Discuss why translation can begin before transcription has ended in prokaryotes but not in eukaryotes (hint: which one has a nucleus?)
* Describe examples of base substitution and frame shift mutations and discuss why all mutations do not necessarily result in negative effects on the host
* Briefly discuss thymine dimers and describe how this can be repaired using nucleotide excision repair
* Define the process of conjugation and discuss Griiffith’s experiment
* Understand the process of transduction by a bacteriophage