

BIOS 312 Lecture Test 3 - Review

Chapter 9: Viruses

- General organization and structure, virion, RNA or DNA genome; ds, ss; capsid, capsomere, envelope
- Bacteriophage
- Quantification of viruses, plaque assay
- How to grow animal viruses in cell culture, embryonic chicken eggs, animal tissue culture
- One-step growth curve
- Steps in virus multiplication: attachment, penetration, replication of DNA or RNA, synthesis of proteins, maturation and assembly, release
- Lytic and temperate phages
- Eukaryotic viruses and cancer
- Retroviruses
- Host cell protection: restriction endonucleases
- Viroids
- Prions

Chapter 11: Microbial Evolution and Systematics

- Age of Earth, age of microorganisms
- Taxonomy of microorganisms now and then
- 16S rDNA sequencing, dendrograms
- 3 domains of life
- Major differences between Bacteria, Archaea, Eukarya
 - Cell wall
 - Lipids
 - RNA polymerase
 - Protein synthesis

Chapter 12: Prokaryotic Diversity: Bacteria

- Proteobacteria
- Photosynthetic Bacteria: Purple sulfur and non-sulfur bacteria
- Ammonium-oxidizing bacteria: *Nitrosomonas*
- Nitrite-oxidizers: *Nitrobacter*
- Sulfur and iron-oxidizing bacteria: *Thiobacillus*
- Hydrogen-oxidizing bacteria: *Alcaligenes*
- Methane-utilizing bacteria: methylotrophs
- *Pseudomonas*, oxidase?, KDPG pathway, siderophores
- Enteric Bacteria, oxidase?, *E. coli*, *Salmonella*, *Shigella*, *Proteus*; *Enterobacter*, *Klebsiella*, *Serratia*
- *Vibrio fischerii*, bioluminescence
- Stalked bacteria: *Caulobacter*
- Fruiting body formation: *Myxococcus*

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Chapter 13: Archaea

- Halophiles: *Halobacterium*., light-driven proton pump, bacteriorhodopsin, retinal
- Methanogens, anaerobic, habitats, gain energy by methanogenesis, substrates, rare co-enzymes
- Hyperthermophiles; special adaptations to high temperatures (proteins, lipids, DNA)

Chapter 17: Photosynthesis

- oxygenic, anoxygenic
- purple, green, sulfur, non-sulfur bacteria
- cyanobacteria (can also fix N₂, heterocysts)
- light reactions
 - Photosystem I: cyclic phosphorylation
 - Photosystem II: oxygen
 - Pigments: chlorophyll, bacteriochlorophyll, carotenoids, phycobillins
- Dark reactions: CO₂ fixation
- Calvin cycle, rubisco

Chapter 21: Human-Microbe Interactions

- Parasites, pathogens, infection, disease, virulence, LD₅₀
- Normal microbiota: Where? Where not? Function?
- Skin, mouth, biofilms, dental caries
- Intestine, role of normal biota, antibiotics problem
- Upper respiratory tract
- Urogenital tract
- Portals of entry
- Adhesion, invasion, colonization
- Virulence factors: siderophores, enzymes, hemolysins
- Endo – Exotoxins
- A-B Toxins: diphtheria, botulism, tetanus toxin
- Endotoxin: *Limulus* assay

Chapter 22: Non-specific immunity

- 3 Lines of defense: physical barriers, chemical barriers, specific immunity
- Formed elements in blood
- Phagocytosis
- Inflammation
- Fever
- Complement system