### Bio 293 Microbiology

## CHAPTER 11 Control of Microbial Growth (summary & study guide)

#### Points of focus

- Summarize the major categories of microbial control and its purposes.
  - Purpose of microbial control:
    - Methods of microbial control: sterilization, disinfection, decontamination, sanitization, pasteurization, antisepsis, degerming
- 2. Evaluate the relative resistance of different groups of infectious agents.
  - Most resistant: endospores, then cysts and sexual fungal spores, then some bacterial species such as Mycobacterium and pseudomonas.
  - Least resistant: vegetative cells of many bacteria and fungi
- 3. Define and differentiate among the major terms for microbial control, citing examples of each.
  - Microbicidal (kill) and micro-biostasis (stop growth).
- Characterize the parameters of microbial death and describe several factors that influence the rate of death.
  - Death: permanent loss of reproductive capacity
- 5. Summarize what factors influence the effectiveness of an antimicrobial agent.
  - Factors: # of microorganisms, nature of microbial population (biofilm is more resistant), impurity, pH, temperature, concentration and dosage, solvents, and organic matters, etc.
- Identify the targets of antimicrobial control agents and explain what effects these agents have.
  - DNA->mutations (e.g. radiation). Protein denaturation and precipitation (e.g. alcohol). Membrane disintegration (e.g. alcohol and detergents). Cell wall.
- List the major types of physical agents used in controlling microbes.
  - Filtration, radiation (ionizing and non-ionizing), heat, cold.
- Describe the basic effects of temperature on microbes.
  - Denature and destabilize proteins and disintegrate membrane.
- Define moist and dry heat and explain their modes of action and relative effectiveness.
  - Moist heat (with humidity and pressure-closed chamber) is most effective that dry heat. Moist hear
    coagulate and denature proteins. Dry heat denature protein at low temp but burn/oxidize at higher
    temps.
- 10. Differentiate between thermal death point and thermal death time and provide examples of their uses.
  - thermal death point (TDP): lowest temp needed to kill microorganisms in 10 min.
    - thermal death time (TDT); shortest time needed to kill microorganisms at a given temperature
- Describe several moist heat methods and their chief applications for sterilization and disinfection.
  - Autoclaving: heat, moisture, pressure (pressure cooker!).
- 12. Describe some methods using dry heat and its chief applications.
  - Dry oven and incineration
- 13. Explain how cold temperatures and desiccation are used in microbial control.
  - Microbial physiology slows at lower temperatures. Desiccation dehydrates cells and prevent ice crystal formation. Temps below -70C are preserving microorganismal cells.
- 14. Define radiation and assess the use of irradiation as a method of microbial control.

# **Microbial Growth Study Guide**

**JL Elias** 

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