Definitions
• sterilization
• disinfection
• sanitation
• antisepsis
• degerming

Definitions
suffix “-cide”
suffix “-static”

Pattern of Microbial Death

Log10 # of survivors

hearth
no heat

Minutes
Effectiveness of antimicrobial agents

- Population size (e.g., concentration)
- Population composition

Effectiveness of antimicrobial agents

- Concentration: 10%, 70%, 3%

Effectiveness of antimicrobial agents

- Exposure time
- Temperature
- pH
Effectiveness of antimicrobial agents

Biofilms & Other Organic Materials

Mechanisms of Action: Reactions Affecting Membranes

Surfactants: Soaps & Detergents
Mechanisms of Action:
Protein Denaturation

Active protein vs. denatured protein.

Heavy Metals

http://www.p2ad.org/mercury.html
Oxidizing Agents

- Ozone
- Per acetic acid
- Peroxides

Halogens

- Methyl bromide
- Iodine
- 5% hypochlorite

Aldehydes

- Glutaraldehyde
- Formaldehyde
Alcohols

Phenolics

http://www.keysan.com/ksuch28b.htm

Antimicrobial therapy

• synthetics
  www.geocities.com/.../Lab/168
  9/christmas/chemcarols.htm

• antibiotics
  www.bgr.de/b412/bioleaching.htm
Selective toxicity

1909, Ehrlich’s “magic bullet”
Salvarsan to treat syphilis

Drugs from molds

Drugs from Actinomycetes
Drugs from *Bacillus* spp.

Antibiotics: Modes of Action

- Disruption of cytoplasmic membrane
- Inhibition of protein synthesis
- Inhibition of DNA or RNA synthesis
- Inhibition of cell wall synthesis
- Inhibition of a general metabolic pathway

Cell wall antibiotics

- Penicillin
- Cephalosporin

*Penicillium*

*Cephalosporium acremonium*
Normal cell wall synthesis

Inhibition of cell wall synthesis

Disruption of Cell Membrane Function
Protein synthesis inhibitors

- Aminoglycosides
- Tetracycline
- Chloramphenicol
- Macrolide

Anti-metabolites

- Para-aminobenzoic acid (PABA)
- Sulfanilamide (SFA)
- Folic acid

Alcamo (2000) Fundamentals of Microbiology, 6th Ed. Fig. 23.3
Antiviral agents

- interferon
- nucleoside analogs
- drugs to prevent attachment
- others
Prevention of virus attachment

Development of resistance

Superinfection
How to combat drug resistance?

- Maintain high concentration of drug in body
- Combination/Synergistic drugs
- Limit use
- New drugs!