Introduction to Antimicrobials
General Terms

- Chemotherapy
- Antibiotic – substance produced by a microbe that may harm another microbes
- Antimicrobial – any agent that harms a Microbe
- Anti-infective – any agent that reduces or eliminates infection
Selective Toxicity

• Ability of an antibiotic to destroy target cells without damaging host cells

• Differences between microbes and host
  – Prokaryotic vs Eukaryotic
  – Cell wall
  – Inhibition of microbial enzymes
  – Disruption of bacterial protein synthesis
Antibiotic classifications

• Narrow vs. Broad Spectrum
• Susceptible organisms
  – Antibacterials
  – Antifungal
  – Antiviral
• Classification by mechanism
• Distinction: Bacteriocidal vs. Bacteriostatic
Resistance

• Relative resistance vs. True Resistance
  – MIC: Minimum inhibitory concentration

• Mechanisms
  – Drug enzymes
  – Cease uptake of drug
  – Change in bacterial receptors
  – Synthesize drug antagonists

• Acquisition
  – Spontaneous mutation – single resistance
  – Conjugation – multiple drug resistance
Factors that Influence Resistance

• Use of broad vs. narrow spectrum
• Suprainfection
• CDC Twelve step program highlights
  – Immunize
  – IV’s out
  – ID consult
  – Contamination vs. infection
  – Colonization vs infection
  – Say no to vanco
  – Stop when infection is gone
  – Isolate the pathogen
  – Break the chain – wash your freaking hands
Selection of Antibiotics

• Considerations
  – Identification of microbe
  – Drug sensitivity of microbe
  – Host factors
• Site of infection
• Immune status
• Empiric therapy
Host Factors

• Host defense (immune system, skin)
• Site of infection
  – BBB, vascularity, heart valves, abscess
• Age
• Pregnancy & Lactation
• Previous Allergic Reaction
• Genetic
Therapy

• Dosage 4-8 x higher than MIC
• Duration of therapy – relapse & resistance
• Combinations
  – Additive
  – Potentiative (synergistic)
  – Antagonistic: bateriocidal + bacteriostatic
Prophylaxis

• Surgery
• Bacterial endocarditis
• Neutropenia
• Other
• Attempted Tx of untreatedable infection
  – “Concerned mother syndrome”
  – “Physician wants to appear to be doing something syndrome”
• Tx of fever of unknown origin
• Dosage too low
• Tx in absence of adequate bacteriologic information
• Omission of surgical drainage
Monitoring Antibiotic Therapy

- Fever
- Resolution of S/S
- Serum drug levels
- Cultures