Microbiology - Infectious Disease

Development of disease
Spread of infection
Nosocomial infections

Predisposing Factors

- Gender: e.g., higher prevalence of UTI in females
- Genotype
  - People heterozygous for hemoglobin S (sickle cell anemia) may be relatively resistant to malaria
  - People heterozygous for CF genes may be relatively resistant to cholera
- Nutritional status - Host defense is seriously compromised in malnourished persons
- Age
  - Neonates are susceptible to serious infections from undeveloped host defenses
  - Elderly may have weakened defenses
- Therapy - Radiation therapy, antiinflammatory therapy
- Emotional state (*psychoneuroimmunology*)

Stages of Infectious Disease
Reservoirs of Infection

- **Human reservoirs**
  - Most viral infections require human reservoirs
  - Human reservoirs may be *carriers with inapparent infection*

- **Animal reservoirs**
  - Infections transmitted to humans from nonhuman animals are *zoonotic*
  - Examples of zoonoses are rabies, tularemia, and probably Ebola

- **Nonliving reservoirs**
  - Contaminated water is a major reservoir for transmission of gastrointestinal tract infection
  - Some infections are acquired only from the environment

Transmission of Infectious Disease

- **Contact transmission** directly between human hosts
  - *Direct contact transmission*, as in sexually transmitted infection
  - *Indirect contact transmission*
    - Involves *fomites*, inanimate carriers of the infectious agents
    - The common cold is probably spread by indirect contact transmission
    - Needlestick injuries can lead to indirect contact transmission
  - *Droplet transmission* - common route for transmission of respiratory tract infections

Transmission of Infectious Disease (continued)

- **Vehicle transmission**
  - Waterborne transmission, including *fecal-oral route*
  - Foodborne infection
  - Airborne transmission

- **Vector transmission**
  - Transmission, via an arthropod, of infectious agent between hosts
  - Some of the most debilitating human infections are vector-transmitted
Nosocomial Infections

- Infection occurring in a hospitalized patient that was not present on admission; “hospital-acquired” infection
- NOT the same as iatrogenic infection caused by treatment
- Affect 5-10% of hospitalized patients
- Attributable mortality may exceed 25,000 in U.S.
- Increase health care costs in the $10 billion range

Factors influencing incidence of nosocomial infection

- Immunocompromised patients are susceptible hosts
- Wounds, burns and invasive procedures provide portals for entry
- Health care workers may serve as “vectors”