Chapter 2
Mechanisms of Disease

Causes of Disease

• Hereditary
• Trauma
• Inflammation/Infection
• Hyperplasias/Neoplasms
• Nutritional Imbalance
• Impaired Immunity

Hereditary

• Error in individual's genetic or chromosomal makeup
• Congenital - disease present at birth
• Classifications of hereditary diseases
  – Single gene abnormality
  – Abnormality of several genes
  – Abnormality of a chromosome

Trauma

• Caused by physical injury or external force
• Type of traumatic disease varies with:
  – Age
  – Race
  – Residence

Trauma

• Classifications in order of prevalence:
  – Motor vehicle accidents
  – Falls
  – Drowning
  – Burns ingested or inhaled objects
Trauma

- Classification in order of prevalence:
  - Poisoning
  - Penetrating injuries
  - Physical abuse

Inflammation/Infection

- Inflammation - protective immune response triggered by injury or irritant
- Infection - invasion of microorganisms into tissues causing cell or tissue injury

Hyperplasias/Neoplasms

- Hyperplasias - overgrowth in response to some type of stimulus
- Neoplasms - commonly called tumors
- Oncology - study of cancer

Hyperplasias/Neoplasms (continues)

- Neoplasms classified as:
  - Benign - limited growth
  - Encapsulated - enclosed in a capsule
  - Malignant - uncontrollable growth

Hyperplasias/Neoplasms

- Cancer - malignant tumor
- Metastasize - moves and spreads
- Metastatic - moves from site of origin to secondary site in body

Nutritional Imbalance

- Most nutritional diseases are related to over or under consumption
- Cachexia - ill, thin, wasted appearance
- Alternatives:
  - Parenteral - administered by injection
  - Enteral - nutrition through small intestine
Impaired Immunity

- Body’s first line of defense is skin, mucous membranes, tears, and secretions
- Protective qualities of immune system:
  - Leukocytes kill foreign invaders
  - Body reacts to antigens by producing antibodies

Antigens - substances that cause harm and set off a specific response
- Antibodies - also called immune bodies
  - Proteins that render the antigen harmless

Impaired Immunity

- Common ways immune system fails:
  - Allergy
  - Autoimmunity
  - Immunodeficiency

Aging

- Degeneration
  - Disease related to age
  - Tissue degeneration changes functional activity to lower or lesser level
  - Body’s ability to repair and replace itself slows down with aging process

Cellular Injury

- Causes of cellular injury and death:
  - Hypoxia - not enough oxygen
  - Anoxia - no oxygen
  - Drug or bacterial toxins
  - Viruses

Cellular Adaptation

- Types of adaptation:
  - Atrophy - decrease in cell size
  - Hypertrophy - increase in cell size
  - Hyperplasia - increase in cell number
  - Metaplasia - cell changes to another type
Cellular Adaptation

- Types of adaptation:
  - Dysplasia - alteration in size, shape, and organization of cell
  - Neoplasia - development of new type of cell with uncontrolled growth pattern

Cell and Tissue Death

- Necrosis - cellular death
- Ischemia - decreased blood flow
- Infarct - area of dead cells
- Gangrene - saprophytic bacteria involved in necrotic tissue

Organism Death

- Morbidity - state of being diseased
- Criteria for brain death:
  - Lack of response to stimuli
  - Loss of all reflexes
  - Absence of respirations
  - Lack of brain activity on EEG