Objectives

- Discuss the importance of homeostasis
- Discuss the concepts of pathophysiology
- Briefly review normal physiology

Homeostasis

- The body’s attempt to maintain balance or equilibrium
  - fluids
  - chemicals
  - energy
Homeostasis

- The process of shock occurs due to the body's attempt to maintain homeostasis
- Severe bleeding can cause loss of blood volume
  - The body attempts to maintain blood flow to vital organs (pale, clammy skin)
  - Low blood pressure occurs due to decreased blood volume
  - Increased heart rate (tachycardia) occurs to maintain blood flow to vital organs

Pathophysiology

- The physiology of disease
- Cellular mechanics of disease & their consequences

Pathophysiology

- Disease/injury damages one or more:
  - cell structures
  - impairment of tissues
  - impairment of organ function
  - effects the associated systems
Pathophysiology

- Cell damage initiates a response to try to:
  - limit the disease process
  - initiate cell repair
  - restore homeostasis

Pathophysiology

- When damaged, cells either adapt or die
- Cell adaptation
  - Atrophy –
  - Hypertrophy –
  - Hyperplasia –
  - Metaplasia –
  - Dysplasia –

Pathophysiology

- All cells respond to injury/disease with inflammation (infection)
  - local
  - systemic
Acute Inflammation

- Damaged cells release histamine, bradykinin, & prostaglandin
  - These chemicals cause local vasodilation and increased cellular permeability
  - Increase blood flow to the area & allows proteins and plasma to seep into the interstitial fluids
  - The proteins interact with fibrin to form platelet plug & clot at damaged site

Acute Inflammation

- The chemicals released earlier now attract leukocytes from the blood
  - Phagocytes
  - Engulf & digest cellular debris
  - The proteins interact with fibrin to form platelet plug & clot at damaged site

Acute Inflammation

- The excess interstitial fluid causes an increase in tissue pressure relative to capillary pressure
  - Vasoconstriction
  - Ischemia to normal, healthy cells
  - Leads to increased cell damage (secondary hypoxic injury)
**Acute Inflammation**

- These processes produce the classic signs & symptoms of inflammation
  - redness
  - pain
  - warmth
  - swelling
- Acute phase lasts approx. 48-72 hours

**Chronic Inflammation**

- Very destructive to cells
- Usually have greater production of scar tissue
- Symptoms are similar but with less intensity

**Infection**

- The body’s response to invading microorganisms
- More systemic than typical inflammatory response
- Leukocytes activate the medulla to cause fever
- Once the microorganism has been eliminated the fever breaks
Infection

- See book for s & s of fever (pg. 23)

Tissues’ Response to Cellular Damage

- Bone
- Connective tissue, epithelium, endothelium
- Muscle & nerve

See Book

Questions?