Topics

Sensor systems
Phagocytosis
Inflammation
Interferons
Fever

Sensor systems

- Toll – like receptors
- Complement system
  - Classical pathway
  - Alternate pathway
  - Lectin pathway

Figure 15.6 - Toll – like receptors (TLRs)

Figure 15.7 - Complement system

Phagocytosis

- Process of phagocytosis
- Macrophages
- Neutrophils
Macrophages
- Located throughout the body (Kupffer cells, alveolar, etc.)
- Produce cytokines
- Interact with T helper cells – activated macrophages
- Help form granulomas
  - Have Toll-like receptors and are stimulated by microbial substances

Neutrophils
- First to arrive during an immune response
- Involved in inflammation
- Inherently have more killing power than macrophages

Initiation
- Microbial products (LPS, flagellin, DNA) trigger toll-like receptors on macrophages
- Macrophages make cytokines (TNF\(\alpha\))
- TNF\(\alpha\) causes liver to secrete acute phase proteins
- Acute phase proteins facilitate phagocytosis and complement activation
- Complement cascade
  - Triggered by microbial surfaces
  - Activates mast cells to secrete inflammatory cytokines
- Tissue damage

Inflammation
- Initiation
- Inflammatory process
- Outcomes of inflammation

Figure 15.5 – Mononuclear Phagocytes

Figure 15.9 - Process of phagocytosis
Outcomes of inflammation

- Damage to surrounding tissue caused by toxic products of phagocytes
- Release of bacterial endotoxins released as LPS from Gram negative bacteria stimulates inflammation, loss of blood pressure, bloodstream infection = septic shock
- Damage to surrounding tissue
- Eliminate invading pathogen

Interferons

- Glycoproteins
- Control viral infections
Fever

- Hypothalamus controls temperature
- Pyrogens (endogenous or exogenous)
  
  *cytokines that induce fever via hypothalamus*

- High temperature inhibits pathogen growth