Chapters 22 and 23

Innate immunity and inflammation
- Cells and organs
- Innate response
- Signals (chemokines, cytokines)
- Inflammation
- Adaptive immune response

Why do we have an immune system?
- Vertebrates and mammals have the most developed immune system, with both arms active

Cells of the immune system
- Differentiation starts from bone marrow cells
- Today we’ll be talking about polymorphonuclear leukocytes and macrophages

The immune system can also be called the Lymphatic system
- Similar to the circulatory system in that there are vessels that can carry things throughout your body
- Lymph nodes

An overview of the immune response

Cell characteristics
- We’re mainly going to be talking about neutrophils
- There are PMN and Monocytes – both are phagocytic

PRRs – pathogen recognition receptors
- Toll-like receptors (TLRs) in mammals

Monocytes and Neutrophils perform phagocytosis, gobbling up the microbe and then creating a very acidic environment inside the phagolysosome to kill it
- Respiratory burst

Chemokines and cytokines
- Chemokines are potent chemoattractants
  - CXC, CC, and C
- Cytokines are activator molecules
  - A lot of these are acute phase response, which can lead to septic shock
- Typically produced by leukocytes

- When all these cells are attracted to the site of infection what results is inflammation
  - This is visually noticeable (redness, swelling, heat, pain), so it’s been described by physicians for thousands of years, going back to ancient Greece
  - Lymph nodes, spleen, thymus, mucosal tissues
  - Accumulation at the extravascular tissues
  - Increased blood flow
  - Increased permeability
  - Emigration of leukocytes from the microcirculation and their accumulation at the site of injury
  - Leukocyte extravasation

- Healing
  - Resolution
  - Pus formation
  - Healing with fibrosis – tissue that is no longer functional
  - Chronic inflammation – tissue that is no longer functional

- Adaptive Immunity
  - Trying to specifically target the pathogen, rather than risking damaging other cells with a generalized, nonspecific reaction
  - Specificity for the antigen
  - Memory – if exposed a second time, it can kick in immediately
  - Tolerance – ability to discriminate self antigens from non-self antigens
  - Antibody-mediated immunity
  - Cell-mediated immunity