Chapter 9

1. Terms to know:
    a. Basophil (like mast cells)- blue/purple on a slide due to the histamine it releases (vasoactive- it acts on vessels)
    b. Eosinophil- red/orange, function?
    c. Neutrophils- most abundant WBC, the "first responders"- phagocytes: swallow debris
    d. Macrophages- "2nd responders," they call over monocytes to enter tissue and differentiate to macrophages
    e. Megakaryocytes- immature form of a thrombocyte
    f. Plasma- secretes antibodies derived from B cell (mature form)
2. Blood Cells
    a. Myeloid- all long bones (sternum, humorus, femur)- bone marrow
        i. Pleuripotent- create stem cells to become whatever they want
    b. Platelets- initiate blood clotting- from plasma/serum WBC's- from thrombocytes
    c. Lymphoid-
        i. B cells- differentiate between plasma and memory cells
        ii. T cells-
        iii. NK cells-
    d. Hemapoietic- formation of blood or blood cells
    e. Dendritic- present antigen
3. Types of Immunity
    a. Innate (natural) born with it
        i. First line of defense
        ii. No previous exposure to agent required, no immunological memory
        iii. Nonspecific response: physical and chemical mechanical barriers, antigen-independent (reacts the same to each antigen)
    b. Adaptive (acquired) remembers and reacts faster for the second exposure
        i. Specific response
        ii. Immunological memory
4. Adaptive Immunity
    a. More evolved than innate immunity
    b. Immune response to specific molecules
    c. Develop immunological memory
    d. Response enhances upon repeated exposure of the same agent
5. Innate Immunity
    a. Celia- moves any foreign substance (nose, bronchials)

b. Trachea- moves up to expel through coughing
c. Mucous- sticky with celia, traps and moves out of the body, pH is neutral to basic
d. Acid pH- stomach and urogenital, corrodes bacteria, "bacterialcidal"

6. Innate Immunity
    a. Physical and Chemical barriers
        i. Intact skin
        ii. Low pH: bactericidal
        iii. Normal skin flora: prevent colonization by pathogens
            1. Loss of normal flora allows resistant organisms and fungi to proliferate
            2. Normal skin flora- the good bacteria works and competes for space over bad bacteria. Antibiotics get rid of ALL bacteria- including the good bacteria. This is why it is a good idea to take probiotics or eat yogurt while taking antibiotics because it replaces the good bacteria back in your body

7. Innate Immunity
    a. Mucous membranes
        i. Respiratory, gastrointestinal and urogenital tracts
        ii. Ciliated epithelial cells: trap and sweep away airborne particles and organisms
        iii. Goblet cells: produce mucus and secrete mucous cells
    b. Natural secretions
        i. Chemical barriers: enzymes in secretions inhibit invasion by organisms
        ii. Tears, saliva, mucus, fatty acids, bile acids
    c. Plasma proteins
        i. Antimicrobial/antiviral
        ii. Acute phase reactants
        iii. Complement cascades and components
        iv. TNF (tumor necrosis factor), IFN (interferon), opsonins (proteins that coat foreign substances and attract WBC to foreign substances and degrade them (chemotaxis movement)
        v. Complement- tiny immune proteins start off as C1 and stimulate because of foreign substances and activate C2, etc.
        vi. Cascade to know:
            1. C7 → form → Membrane Attack Complex
            2. C8
            3. C9

8. Innate Defenses and Inflammation
    a. Three purposes of inflammatory response
        i. Neutralize and destroy invading and harmful agents
        ii. Limit spread of harmful agents to other tissues
        iii. Prepare damaged tissue for repair
    b. Cardinal Signs of Inflammation KNOW ALL CARDINAL SIGNS (IN ENGLISH AND LATIN FORMS)
        i. Rubor (red), dolor (pain), calor (heat), tumor (swelling), functio laesa (loss of function)
        ii. Acts on normal tissue to diffuse all over
        iii. Inflammation= all tissues affected are damaged
        iv. Auto-immune
9. Inflammation
    a. Phases of the inflammatory response
        i. Increased blood flow to site
        ii. Increased vascular permeability
        iii. Leukocyte recruitment and emigration
        iv. Phagocytosis
        v. Chemokines- attract more neutrophils
            1. More macrophages, the more histamine vasodilates vessels
                a. More blood, heat, and redness makes the vessels more permeable which allows fluids to enter the injury site and swell
10. Inflammation
    a. Causes of inflammation:
        i. Endogenous- inside tissues
            1. Tissue ischemia
        ii. Exogenous- outside tissues (chemical agents)
            1. Physical agents: burns, radiation
            2. Chemical agents: acids, corrosives
            3. Microbial: most common, gram negative bacteria endotoxins/LPS, exotoxins
    b. Inflammation can benefit or harm host
11. Types of Inflammation
    a. Acute
        i. Short duration: less than 2 weeks
        ii. Discrete set of events (how it started, how it looked)