- Venules
  - Know the factors that affect physiology of circulation
    - Blood flow: volume of blood flowing through vessel, organ, or entire circulation in given period
      - Measured in ml/min
    - Blood pressure (BP): force per unit area exerted on wall of blood vessel by blood
      - Expressed in mm Hg
    - Resistance (peripheral resistance): opposition to flow
      1. Blood viscosity
        - Increased viscosity equals increased resistance
      2. Total blood vessel length
        - The longer the vessel, the greater the resistance encountered
      3. Blood vessel diameter
        - Has greatest influence on resistance
        - If radius increases, resistance decreases, and vice-versa

- Relationship of flow, pressure and resistance
  - Blood flow (F) is directly proportional to blood pressure gradient (ΔP)
    - If ΔP increases, blood flow speeds up
  - Blood flow is inversely proportional to peripheral resistance (R)
    - If R increases, blood flow decreases, so
      - \[ F = \frac{\Delta P}{R} \]
  - R is more important in influencing local blood flow because it is easily changed by altering blood vessel diameter

- Mean arterial pressure
  - Varies with cardiac cycle
    - Systolic blood pressure (SP) = maximum pressure
      - Due to ejection of blood into aorta
    - Diastolic blood pressure (DP) = minimum pressure
      - Not zero due to elastic recoil
    - The measured BP is shown as SP/DP
      - Example: 110 / 70
    - Pulse pressure (PP) is SP – DP
      - Example: 100 – 70 = 30
    - Mean Arterial Pressure (MAP) = DP + (PP/3)
      - Example: 70 + (30 / 3) = 80 mm Hg
• Fever: Abnormally high body temperature that is systemic response to invading microorganisms
  • Leukocytes and macrophages exposed to foreign substances secrete pyrogens
  • Pyrogens act on body’s thermostat in hypothalamus, raising body temperature

-Be familiar with the types of adaptive immune responses
  • Humoral immunity
    • Antibodies, produced by lymphocytes, circulate freely in body fluids
    • Humoral immunity has extracellular targets
  • Cellular Immunity
    • Lymphocytes act against target cell
    • Cellular immunity has cellular targets
  • Antigens: substances that can mobilize adaptive defenses and provoke an immune response
  • Characteristics of antigens
    • Can be a complete antigen or hapten (incomplete)
      • Complete antigen - foreign proteins, polysaccharides, lipids, and nucleic acids
      • Hapten: binds to body’s own proteins and together gets recognized as foreign substance
    • Contain antigenic determinants: parts of antigen that antibodies or lymphocyte receptors bind to