• Acetylcholine makes t-type calcium channels less permeable which makes reaching threshold slower and potassium channels more permeable which causes hyperpolarization
  o Affects parasympathetic system
  o Slows heart rate
• Heart beat:
  o 1. Action potential in sinoatrial node spreads through electrically coupled cells of atria
  o 2. Atria contract simultaneously
  o 3. Atrioventricular node is stimulated by depolarization of atria
  o 4. With a slight delay, it generates action potentials that are conducted toward the ventricles via the Bundle of His
    ▪ Consists of modified muscle fibers that don’t contract but conduct action potentials
  o 5. Action potentials are split into each ventricle then spread through the ventricular mass as purkinje fibers
    ▪ Ensures that action potentials spreads rapidly
    ▪ Contract longer because calcium channels stay open
  o 6. Calcium is rapidly cleared from sarcoplasm by pumps to terminate systole
• Red blood cells:
  o Hematocrit is the percent of blood volume made up of red blood cells
  o Packed with hemoglobin
  o Flexible with large surface area
  o Generated by stem cells in bone marrow
  o Spleen has many cavities that are reserves for red blood cells
• Bone marrow also produces platelets
• Walls of arteries have many extracellular collagen and elastin fibers which enables them to withstand high blood pressure generated by the heart
• Elastic tissues are stretched during the systole and absorb some of the energy imparted to the blood by the heart
  o Recoil diastole and returns energy to blood, pushing it forward
• Smooth muscle in arteries constrict or dilate the vessels
  o Diameter changes = resistance to blood flow changes = amount of blood changes
  o Neural and hormonal mechanisms act on these smooth muscles
• Capillaries:
  o Thin and permeable
  o Around most cells so they can get material they need which exchanged from blood to interstitial fluid
  o Blood flows slowly through to allow for maximum exchange
  o Pressure is decreased in capillaries because there are so many that it diffuses throughout them all
  o On arterial side the pressure is higher and squeezes water and solutes into intercellular space between cells and capillary walls
    ▪ Osmotic pressure pulls water back in
      ▪ If blood pressure is above osmotic pressure, fluid leaves capillaries
  o At the venule end, blood pressure falls below osmotic pressure and fluid returns to the capillaries