

- Acetylcholine makes t-type calcium channels less permeable which makes reaching threshold slower and potassium channels more permeable which causes hyperpolarization
 - Affects parasympathetic system
 - Slows heart rate
- Heart beat:
 - 1. Action potential in sinoatrial node spreads through electrically coupled cells of atria
 - 2. Atria contract simultaneously
 - 3. Atrioventricular node is stimulated by depolarization of atria
 - 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
 - 5. Action potentials are split into each ventricle then spread through the ventricular mass as Purkinje fibers
 - Ensures that action potentials spread rapidly
 - Contract longer because calcium channels stay open
 - 6. Calcium is rapidly cleared from sarcoplasm by pumps to terminate systole
- Red blood cells:
 - Hematocrit is the percent of blood volume made up of red blood cells
 - Packed with hemoglobin
 - Flexible with large surface area
 - Generated by stem cells in bone marrow
 - Spleen has many capsules 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
 - Recoil diastole and returns energy to blood, pushing it forward
- Smooth muscle in arteries constrict or dilate the vessels
 - Diameter changes = resistance to blood flow changes = amount of blood changes
 - Neural and hormonal mechanisms act on these smooth muscles
- Capillaries:
 - Thin and permeable
 - Around most cells so they can get material they need which exchanged from blood to interstitial fluid
 - Blood flows slowly through to allow for maximum exchange
 - Pressure is decreased in capillaries because there are so many that it diffuses throughout them all
 - 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
 - At the venule end, blood pressure falls below osmotic pressure and fluid returns to the capillaries