Overview

• Thoracic cavity
• Double pump
Divisions

• 2 Major Divisions
  – Pulmonary Circuit
  – Systemic Circuit
Outer Coverings and Heart Wall

- **Coverings**
  - Pericardium
    - Parietal Pericardium
    - Visceral Pericardium
  - Pericardial Cavity

- **Wall**
  - Epicardium
  - Myocardium
  - Endocardium
Heart Structure

• Chambers
• Valves
• Blood vessels
Chambers

- Atria
- Ventricles

Interatrial septum
Left atrium
Right atrium
Left ventricle
Right ventricle
Interventricular septum
Valves

- Atrioventricular
- Semilunar

- Pulmonary valve
- Left AV valve
- Right AV valve
- Papillary muscle
- Tendinous cords
- Aortic valve
Major Blood Vessels

- Vena Cavae
- Pulmonary
- Aorta

- Right pulmonary artery
- Superior vena cava
- Right pulmonary veins
- Inferior vena cava
- Aorta
- Left pulmonary artery
- Left pulmonary veins
- Pulmonary trunk
Flow of Blood Through the Heart

Blood enters right atrium from superior and inferior venae cavae.

Blood in right atrium flows through right AV valve into right ventricle.

Contraction of right ventricle forces pulmonary valve open.

Blood flows through pulmonary valve into pulmonary trunk.

Blood is distributed by right and left pulmonary arteries to the lungs, where it unloads CO$_2$ and loads O$_2$.

Blood returns from lungs via pulmonary veins to left atrium.

Blood in left atrium flows through left AV valve into left ventricle.

Contraction of left ventricle (simultaneous with step 3) forces aortic valve open.

Blood flows through aortic valve into ascending aorta.

Blood in aorta is distributed to every organ in the body, where it unloads O$_2$ and loads CO$_2$.

Blood returns to heart via venae cavae.
Cardiac Muscle Tissue

Cardiocytes
- Striated, involuntary, branched
- Contain actin and myosin
- Abundant mitochondria for aerobic respiration
- Intercalated discs
Cardiac Conduction System

- Sinoatrial Node (SA node)
- Atrioventricular Node (AV node)
- AV Bundle
- Bundle Branches
- Purkinje Fibers
Cardiac Conduction System

1. SA node fires.
2. Excitation spreads through atrial myocardium.
3. AV node fires.
4. Excitation spreads down AV bundle.
5. Purkinje fibers distribute excitation through ventricular myocardium.

Sinoatrial node (pacemaker)
Atrioventricular node
Atrioventricular bundle
Purkinje fibers
Purkinje fibers distribute excitation through ventricular myocardium.
EKG (Electrocardiogram/ECG)

- P Wave
- QRS Wave
- T Wave
1. Atria begin depolarizing.

2. Atrial depolarization complete.

3. Ventricular depolarization begins at apex and progresses superiorly as atria repolarize.

4. Ventricular depolarization complete.

5. Ventricular repolarization begins at apex and progresses superiorly.

6. Ventricular repolarization complete; heart is ready for the next cycle.