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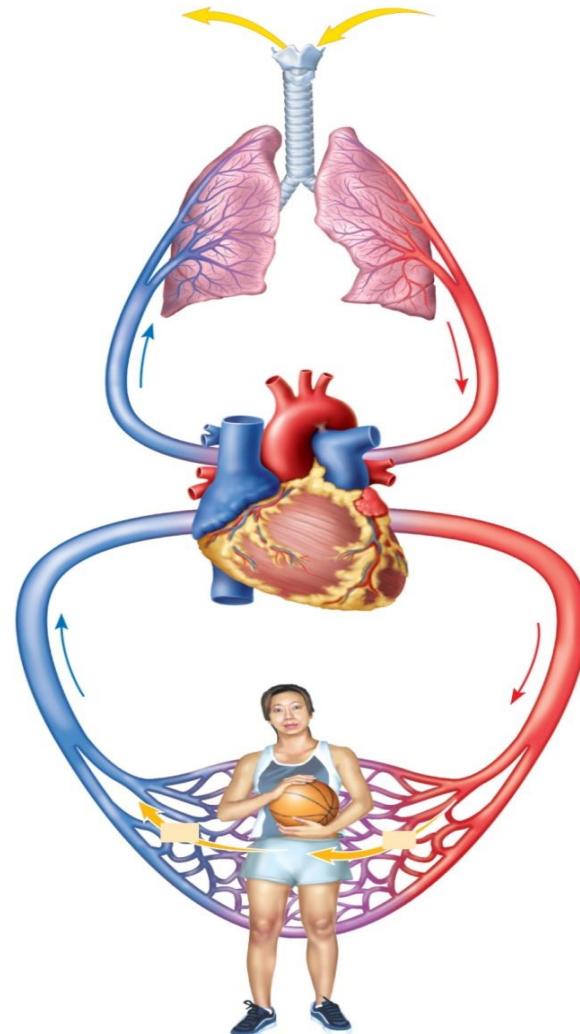
HEART

Overview

- Thoracic cavity
- Double pump

Divisions

- 2 Major Divisions
 - Pulmonary Circuit
 - Systemic Circuit

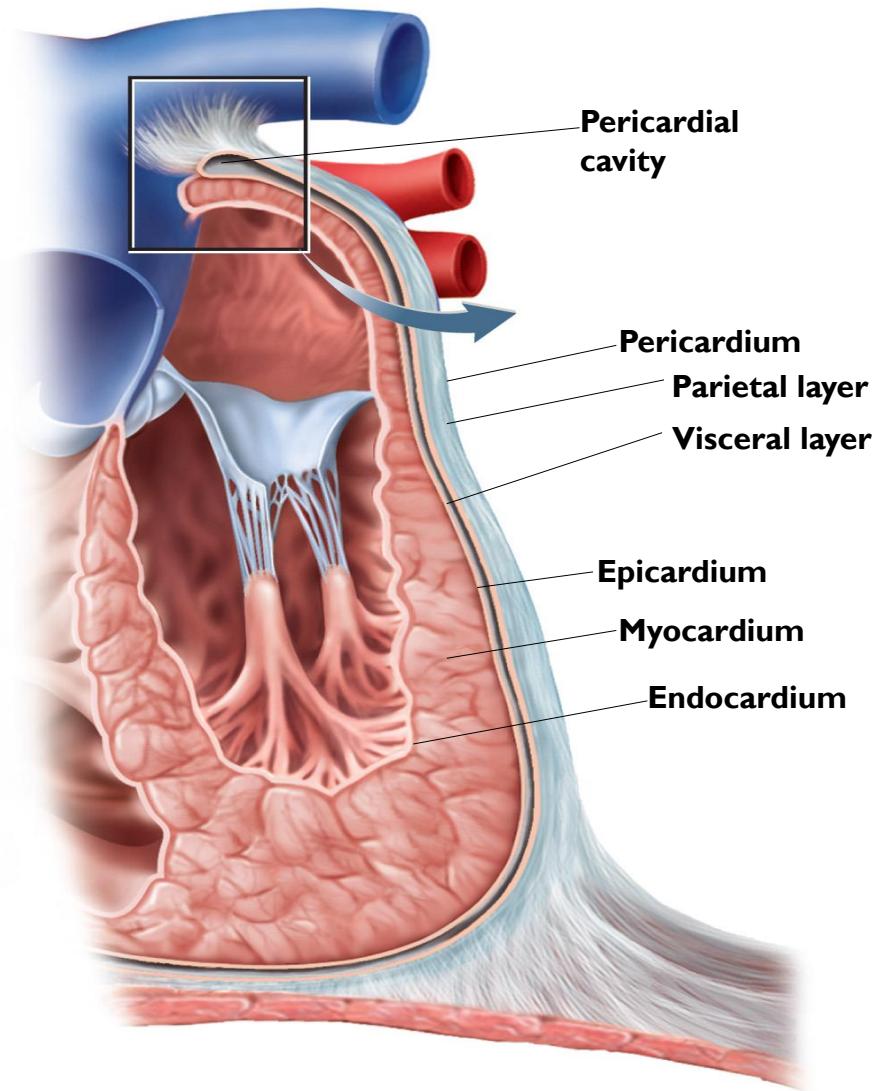


Outer Coverings and Heart Wall

- Coverings
 - Pericardium
 - Parietal Pericardium
 - Visceral Pericardium
 - Pericardial Cavity
- Wall
 - Epicardium
 - Myocardium
 - Endocardium

Fig. 19.3a

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Heart Structure

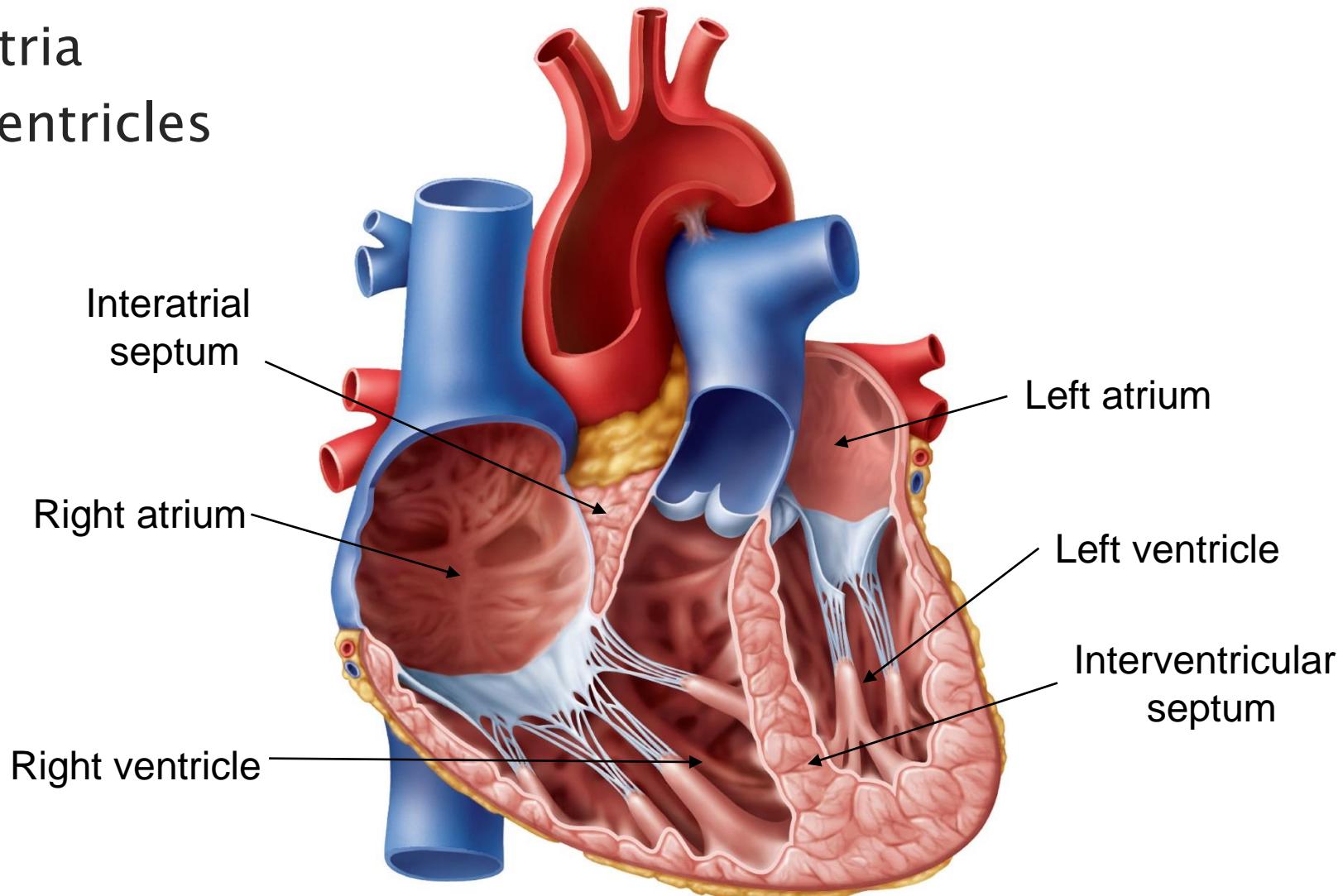


- Chambers
- Valves
- Blood vessels

Chambers

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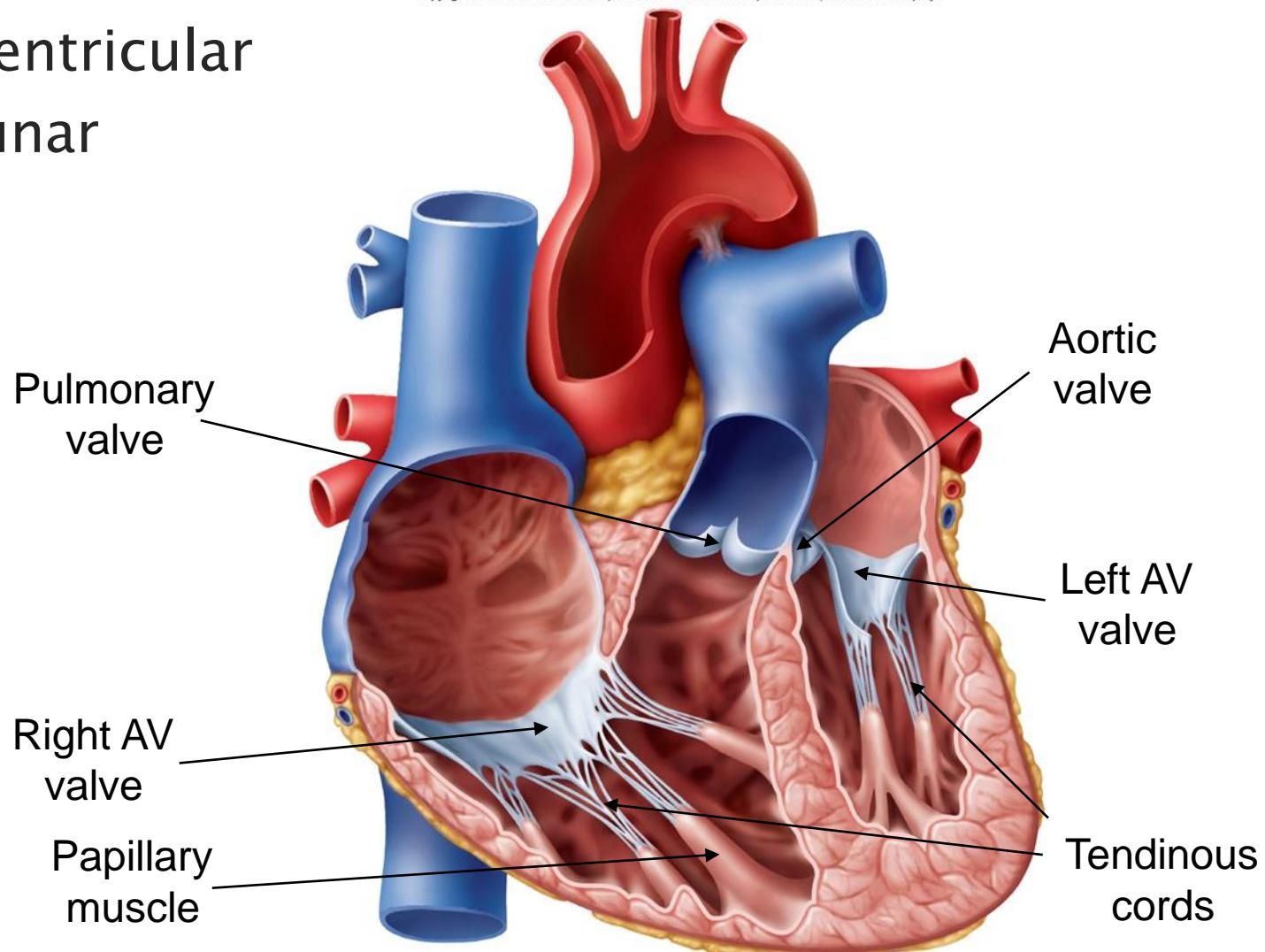
- Atria
- Ventricles



Valves

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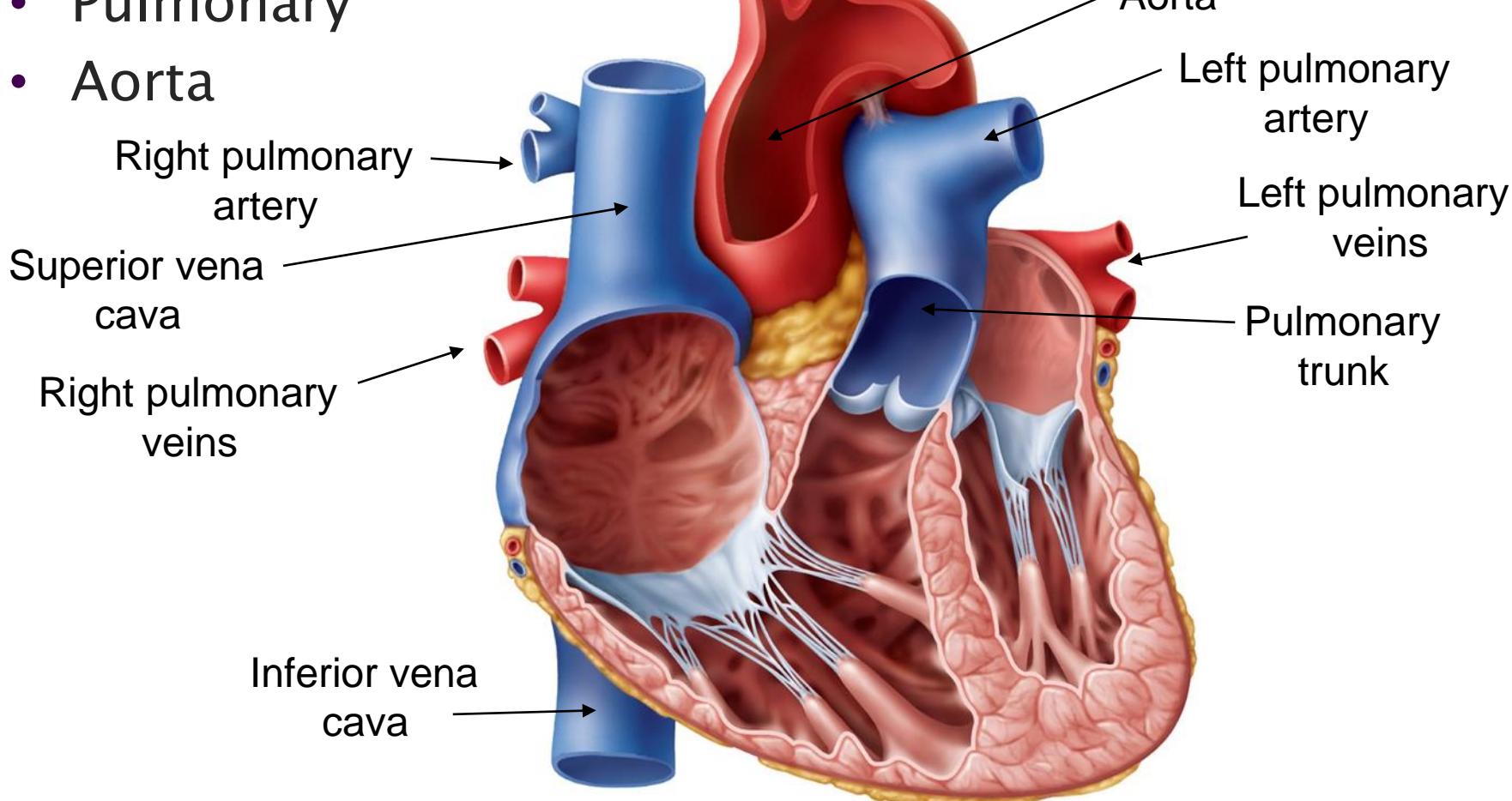
- Atrioventricular
- Semilunar



Major Blood Vessels

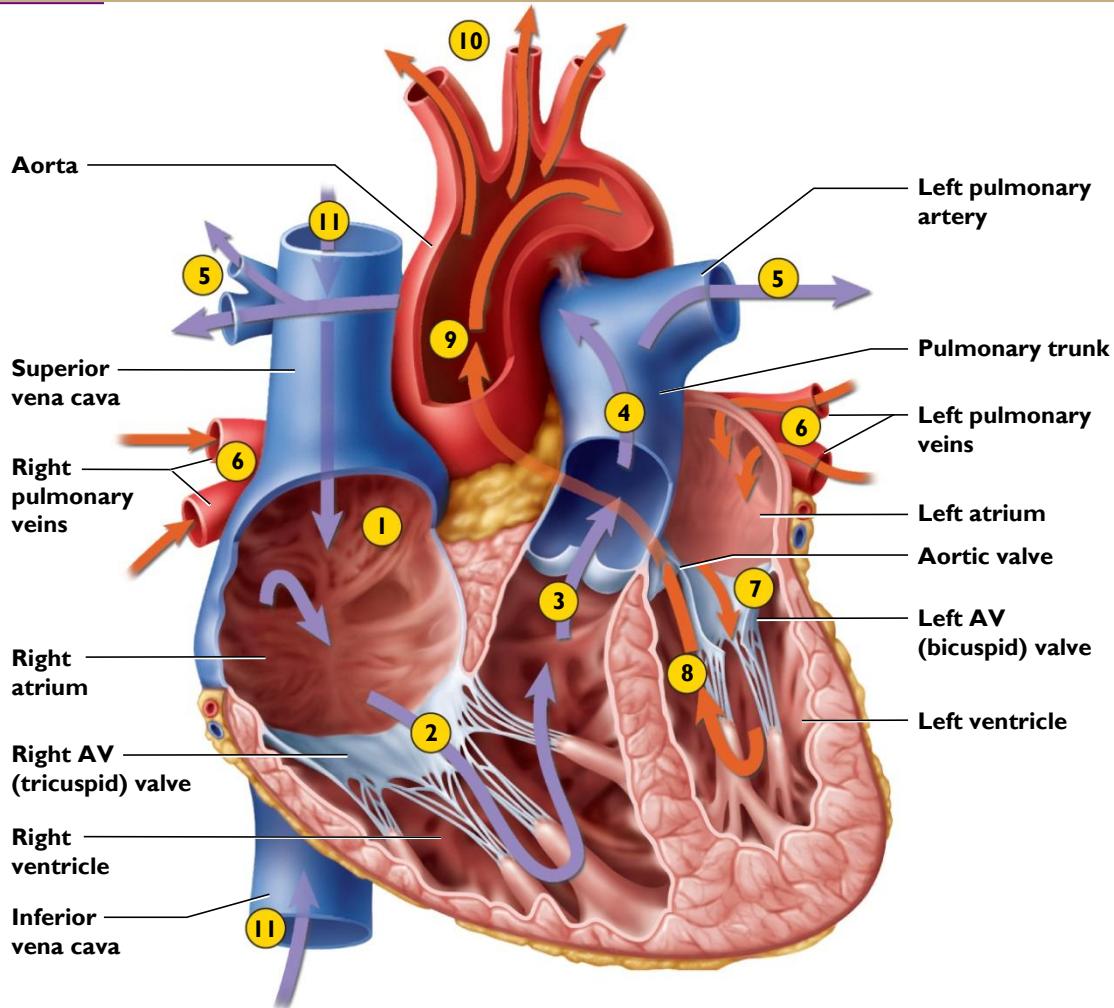
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- Vena Cavae
- Pulmonary
- Aorta



Flow of Blood Through the Heart

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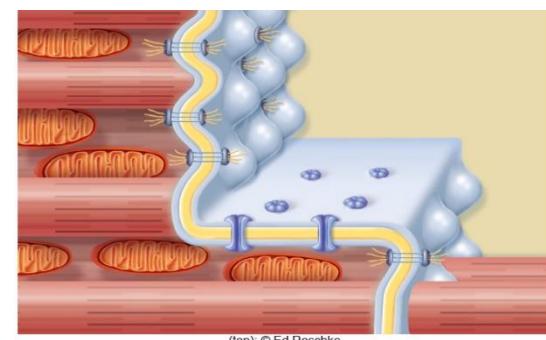
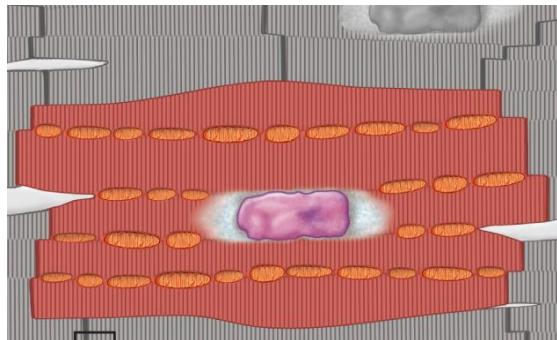
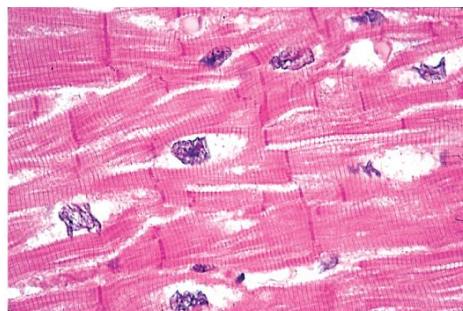
- 1 Blood enters right atrium from superior and inferior venae cavae.
- 2 Blood in right atrium flows through right AV valve into right ventricle.
- 3 Contraction of right ventricle forces pulmonary valve open.
- 4 Blood flows through pulmonary valve into pulmonary trunk.
- 5 Blood is distributed by right and left pulmonary arteries to the lungs, where it unloads CO₂ and loads O₂.
- 6 Blood returns from lungs via pulmonary veins to left atrium.
- 7 Blood in left atrium flows through left AV valve into left ventricle.
- 8 Contraction of left ventricle (simultaneous with step 3) forces aortic valve open.
- 9 Blood flows through aortic valve into ascending aorta.
- 10 Blood in aorta is distributed to every organ in the body, where it unloads O₂ and loads CO₂.
- 11 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

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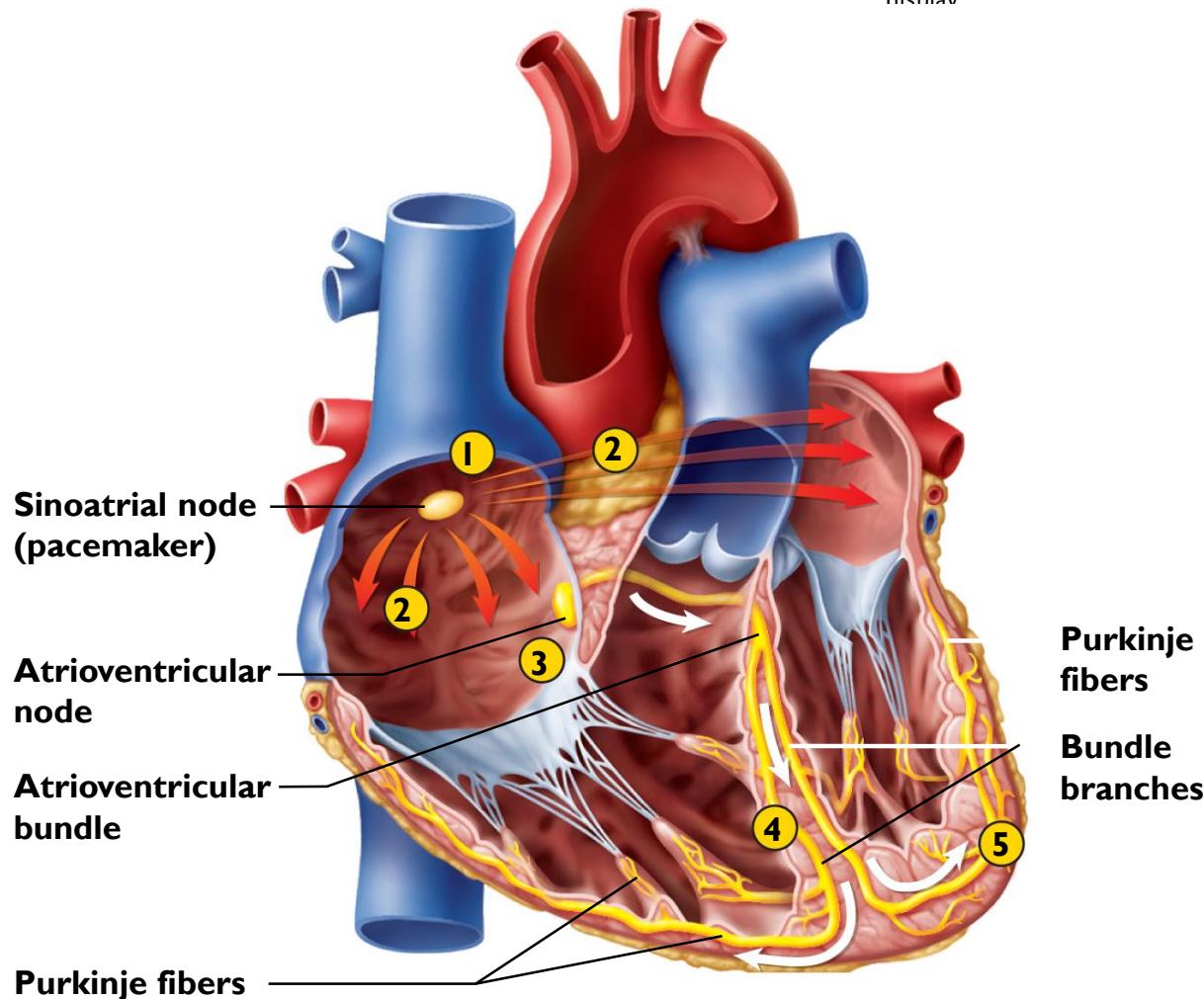
(top): © Ed Reschke

Cardiac Conduction System

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

Cardiac Conduction System

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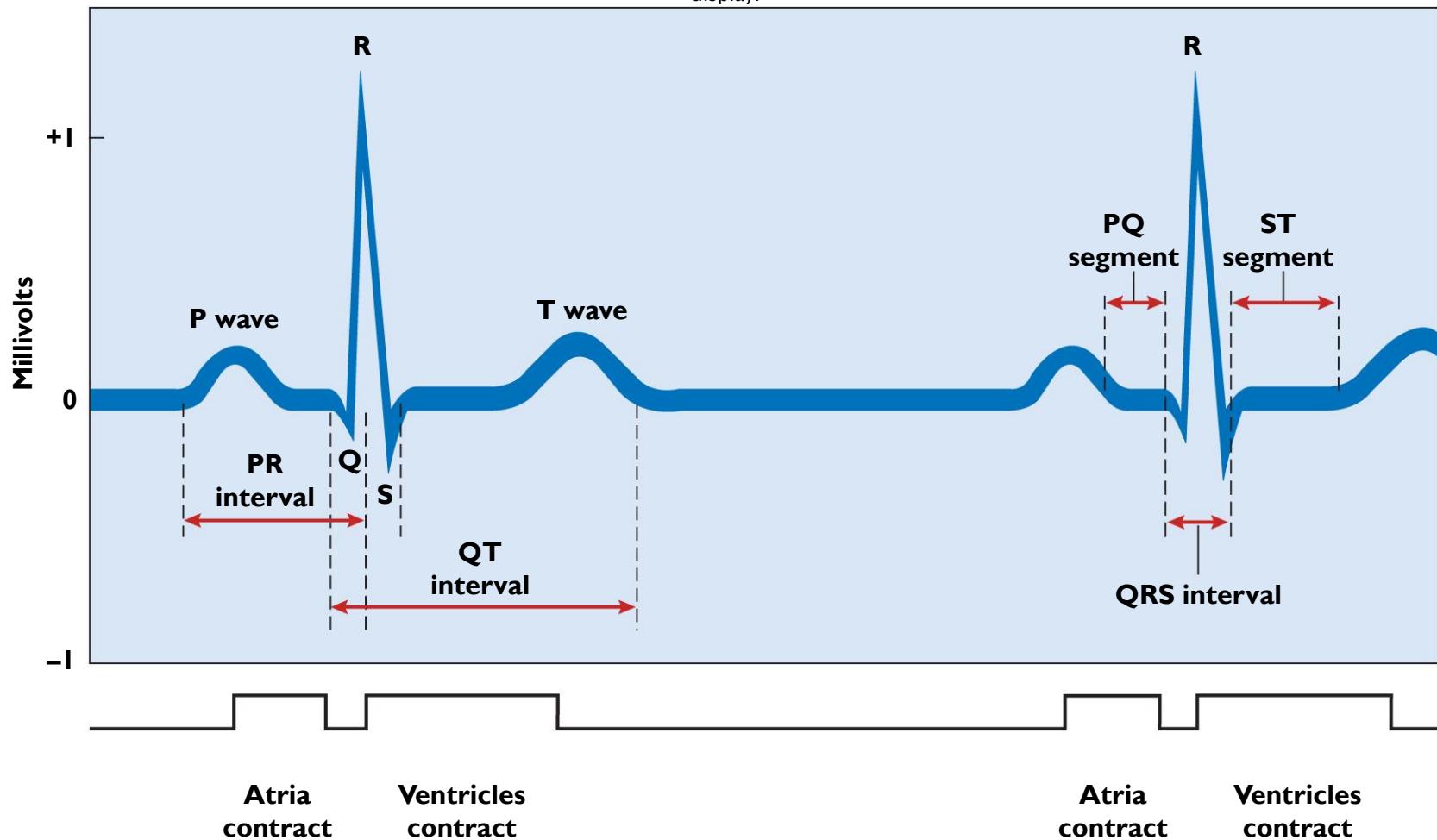
- 1 SA node fires.
- 2 Excitation spreads through atrial myocardium.
- 3 AV node fires.
- 4 Excitation spreads down AV bundle.
- 5 Purkinje fibers distribute excitation through ventricular myocardium.

EKG (Electrocardiogram/ECG)

- P Wave
- QRS Wave
- T Wave

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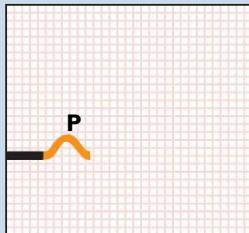
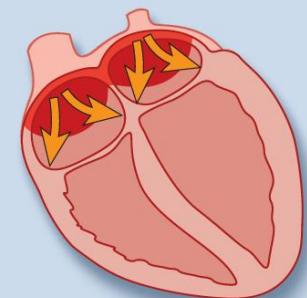
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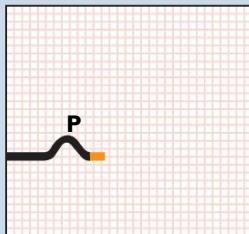
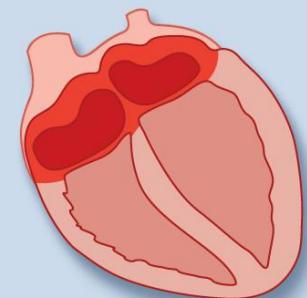
Stages of Cardiac Depolarization

Key

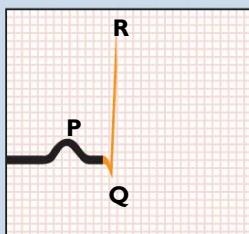
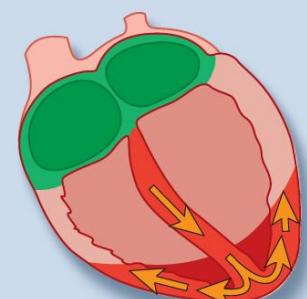
- Wave of depolarization
- Wave of repolarization



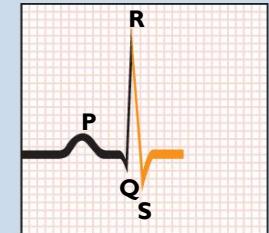
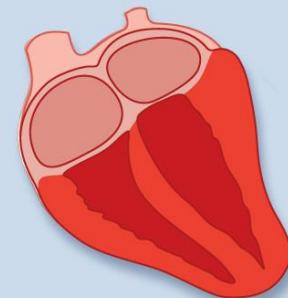
1 Atria begin depolarizing.



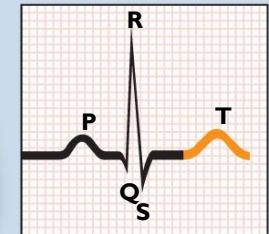
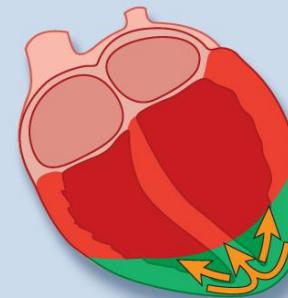
2 Atrial depolarization complete.



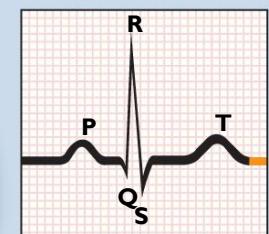
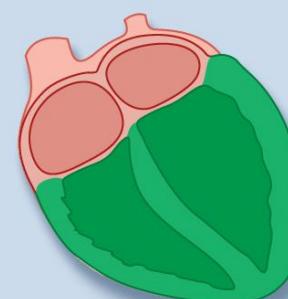
3 Ventricular depolarization begins at apex and progresses superiorly as atria repolarize.



4 Ventricular depolarization complete.



5 Ventricular repolarization begins at apex and progresses superiorly.



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