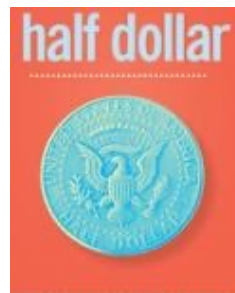


THE HEART OF THE MATTER

Structure and Function of the Heart

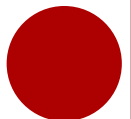
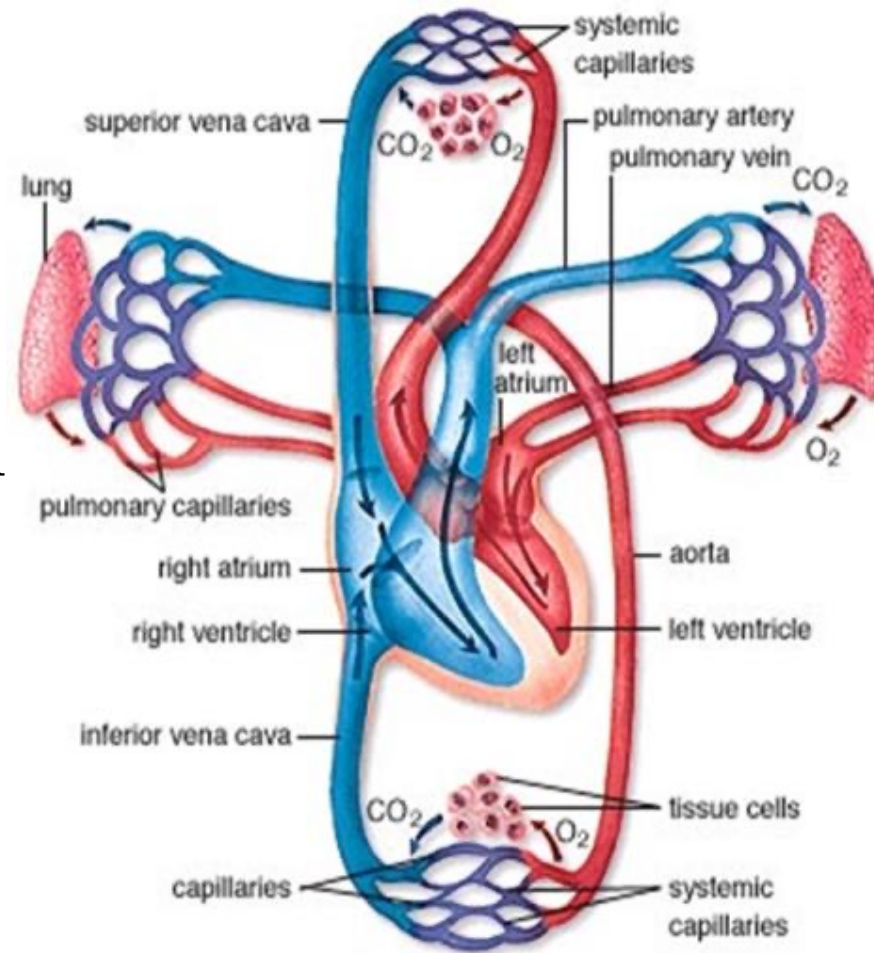
5 INTERESTING FACTS ABOUT THE HEART

- Each day, your heart beats 100,000 times.
- Each minute, your heart pumps 1.5 gallons of blood.
- Heart disease is the #1 cause of death.
- A normal heart valve is about the size of a half dollar coin.
- The largest heart ever recorded belonged to a grey whale.



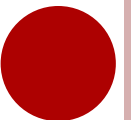
FUNCTIONS OF THE HEART

- Pumps oxygenated and nutrient-rich blood to the body through blood vessels
- Pumps deoxygenated blood, containing wastes, to the lungs, where gas exchange to the outside environment occurs



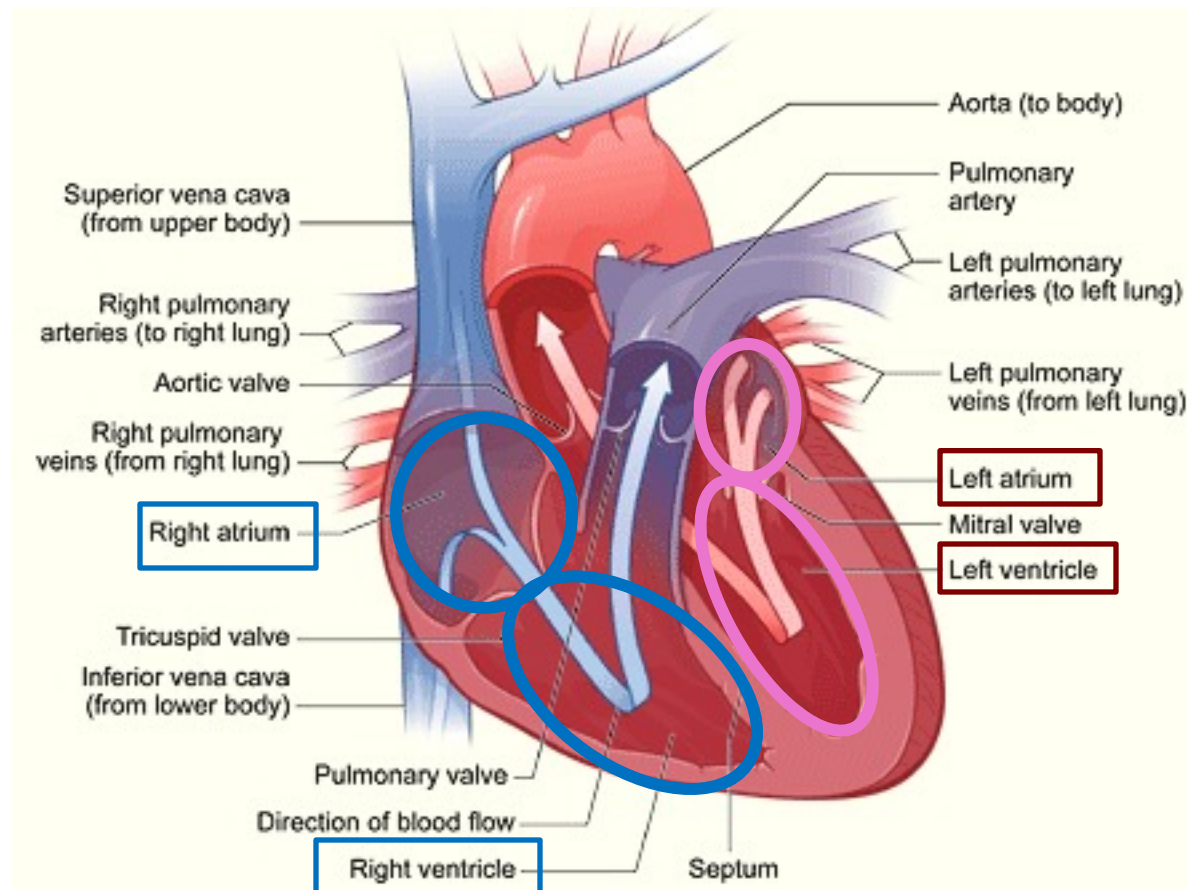
ANATOMY OF THE HEART

- Located under rib cage and in between the lungs
- Size varies depending on age, size, and condition of the heart
- On average, the heart is about the size of that person's clenched fist



FOUR CHAMBERS OF THE HEART

- Right Atrium
- Right Ventricle
- Left Atrium
- Left Ventricle



ATRIA

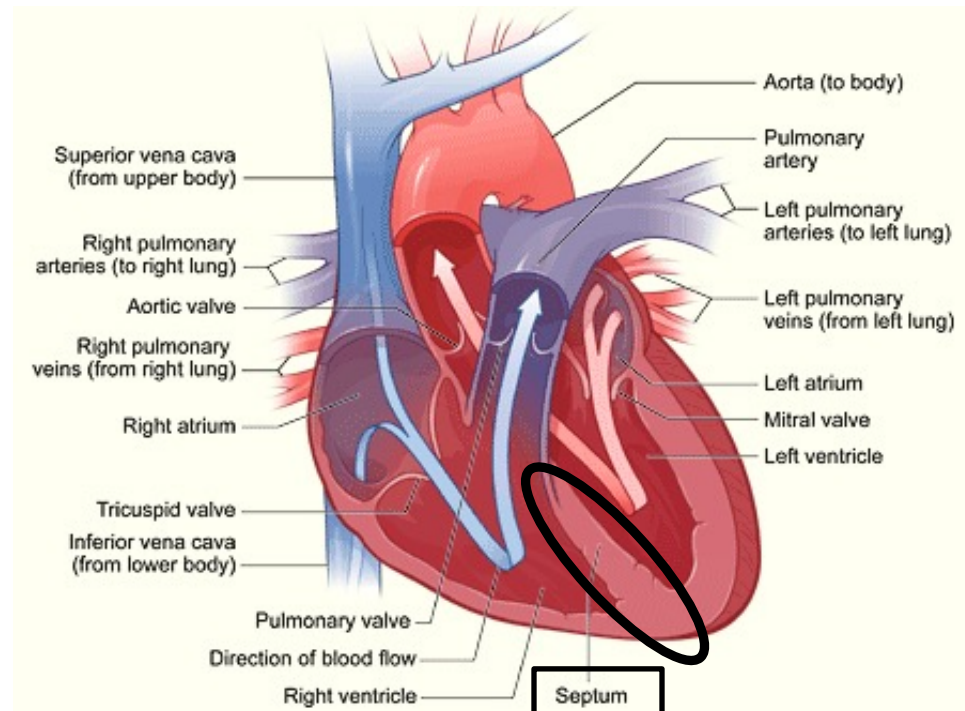
- The upper two chambers of the heart
- Receive and collect blood

VENTRICLES

- The lower two chambers of the heart
- Pump blood out of the heart

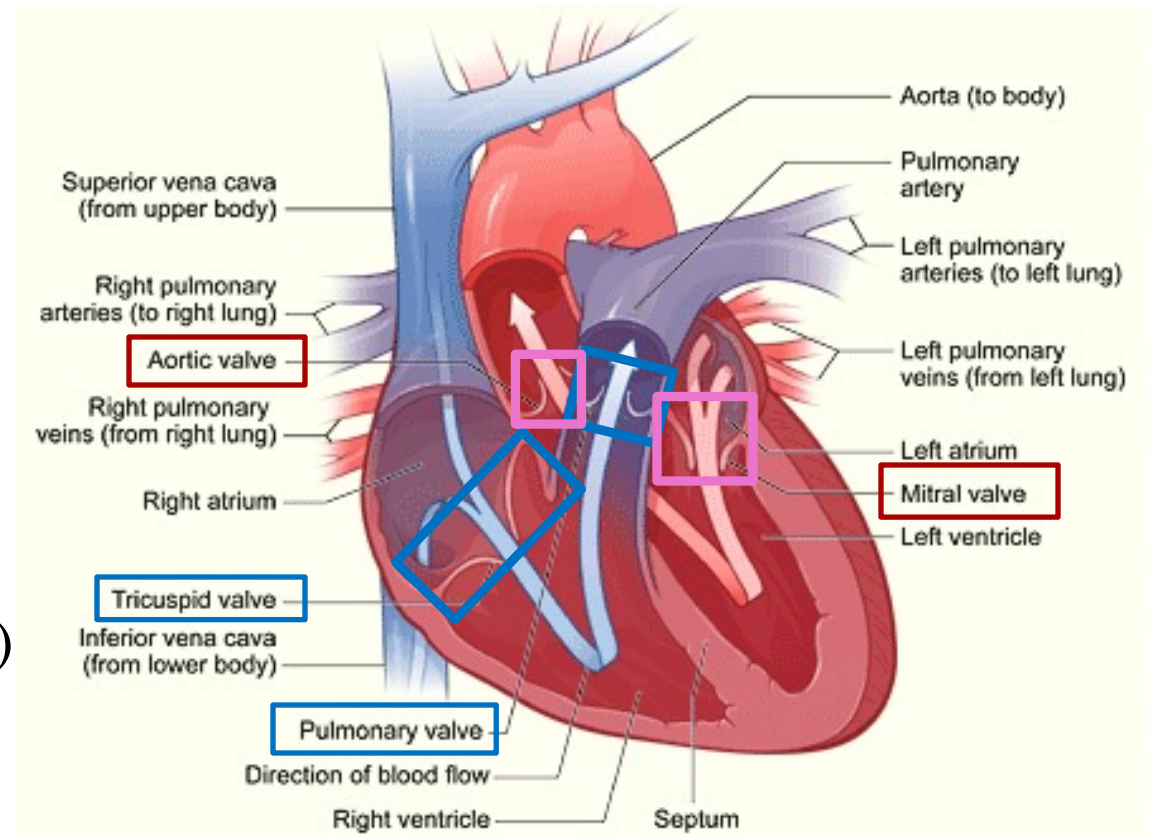
SEPTUM

- Muscle that divides the heart into right and left halves



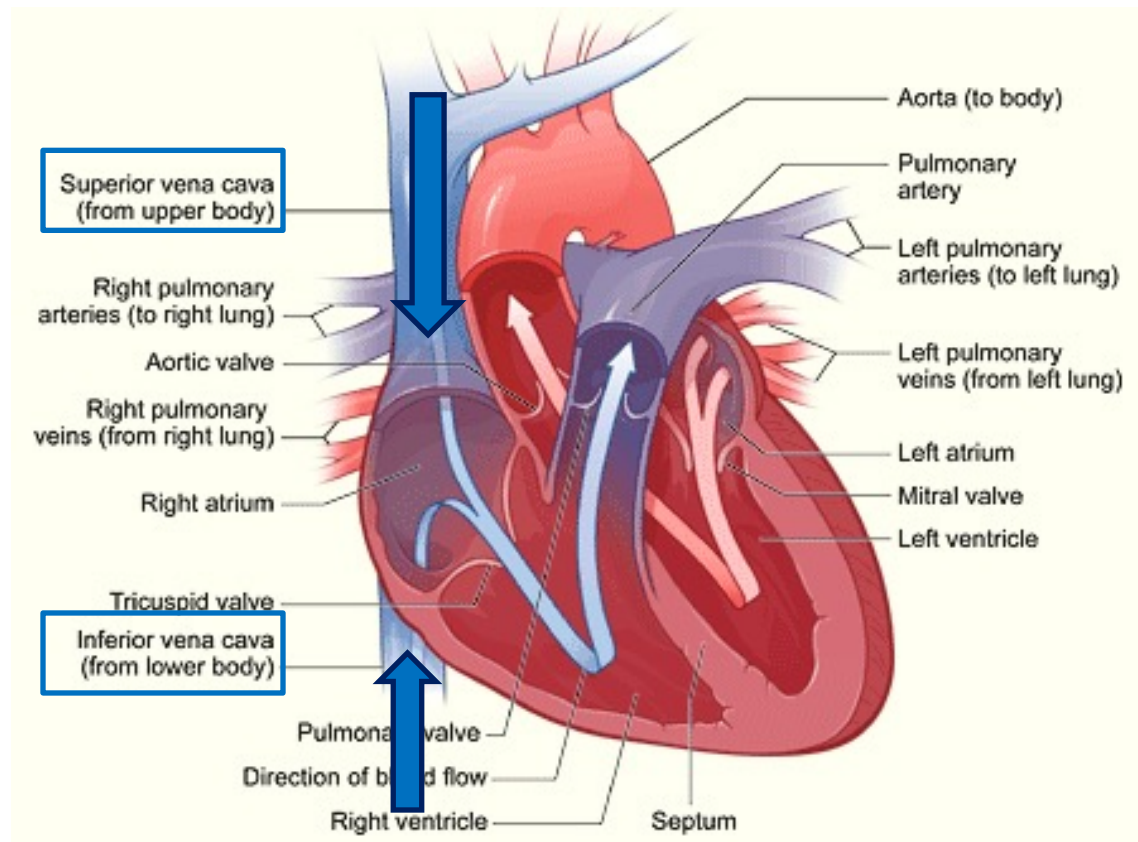
VALVES

- 4 Heart Valves
 - Tricuspid Valve
 - Pulmonary Semilunar Valve
 - Mitral (Bicuspid) Valve
 - Aortic (Semilunar) Valve
- Purpose: prevent backflow of blood, keep blood flowing in one direction



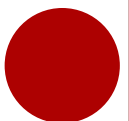
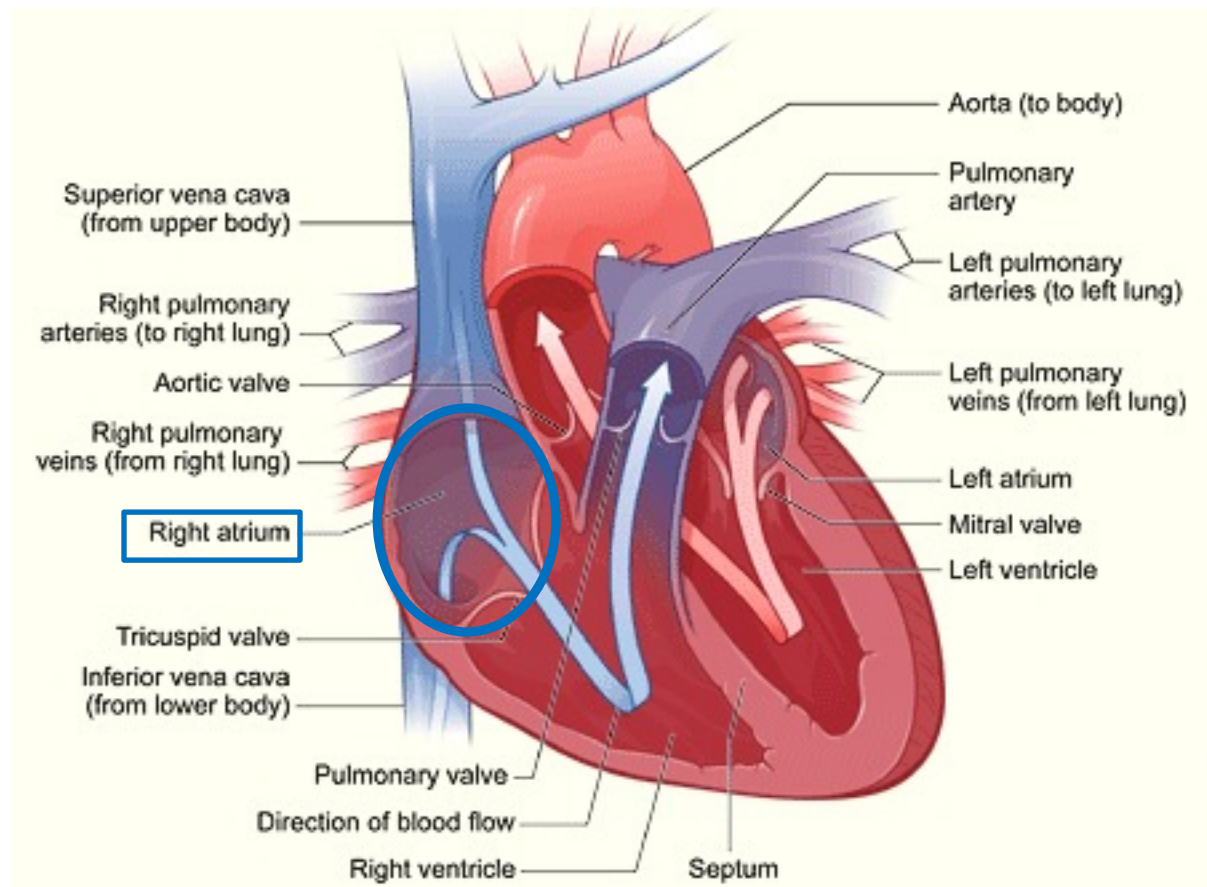
FLOW OF BLOOD

- 1. **Deoxygenated** blood from the upper and lower body flows through the **superior and inferior vena cava**.



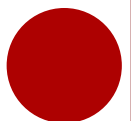
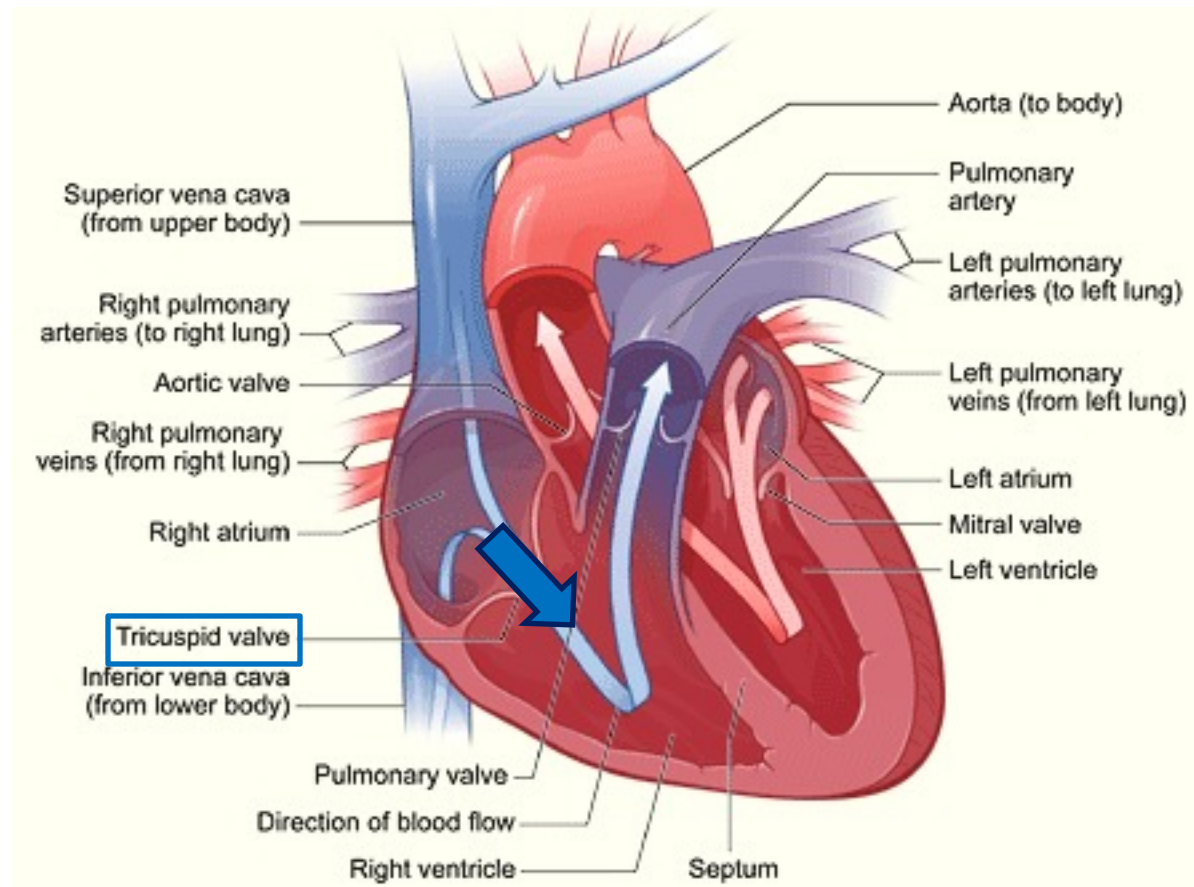
FLOW OF BLOOD

- 2. The superior and inferior vena cava empty blood into the **right atrium**.



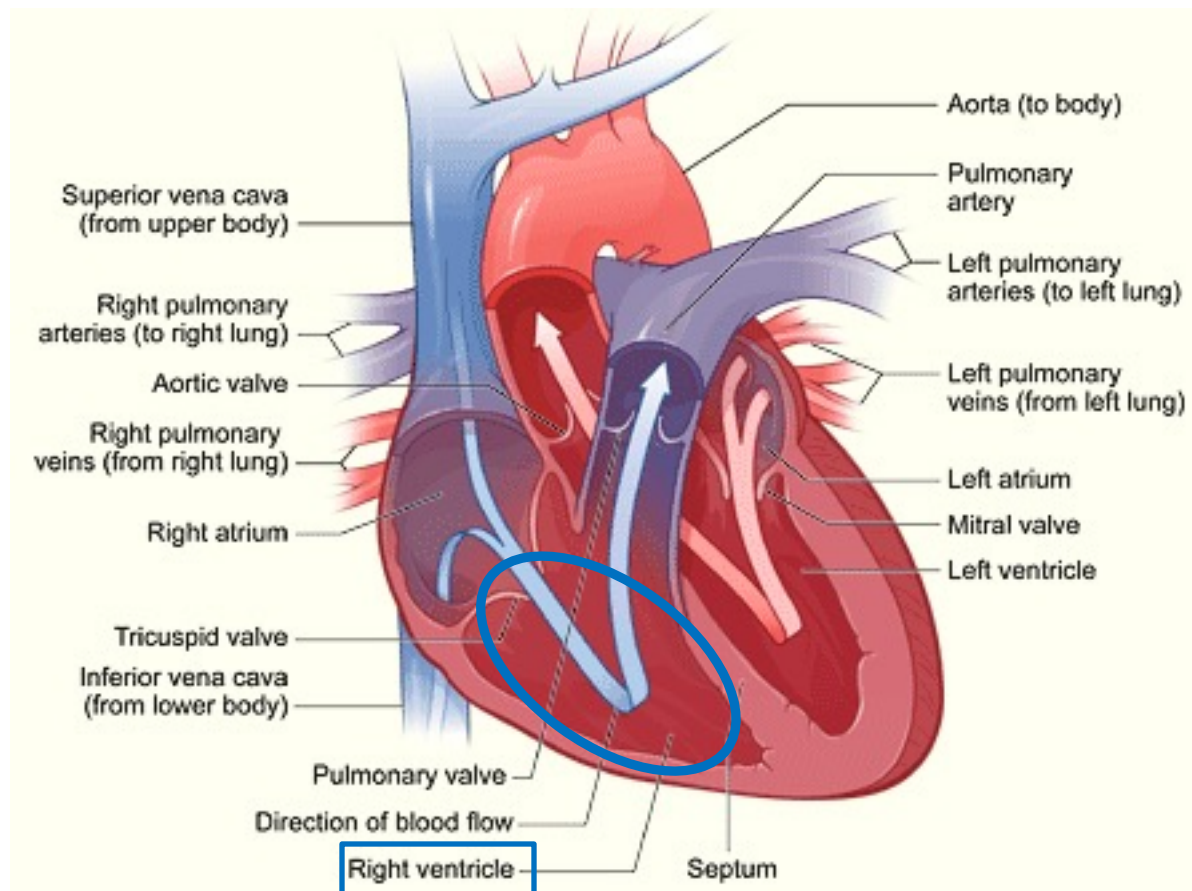
FLOW OF BLOOD

- 3. Blood from the right atrium passes through the **tricuspid valve**.



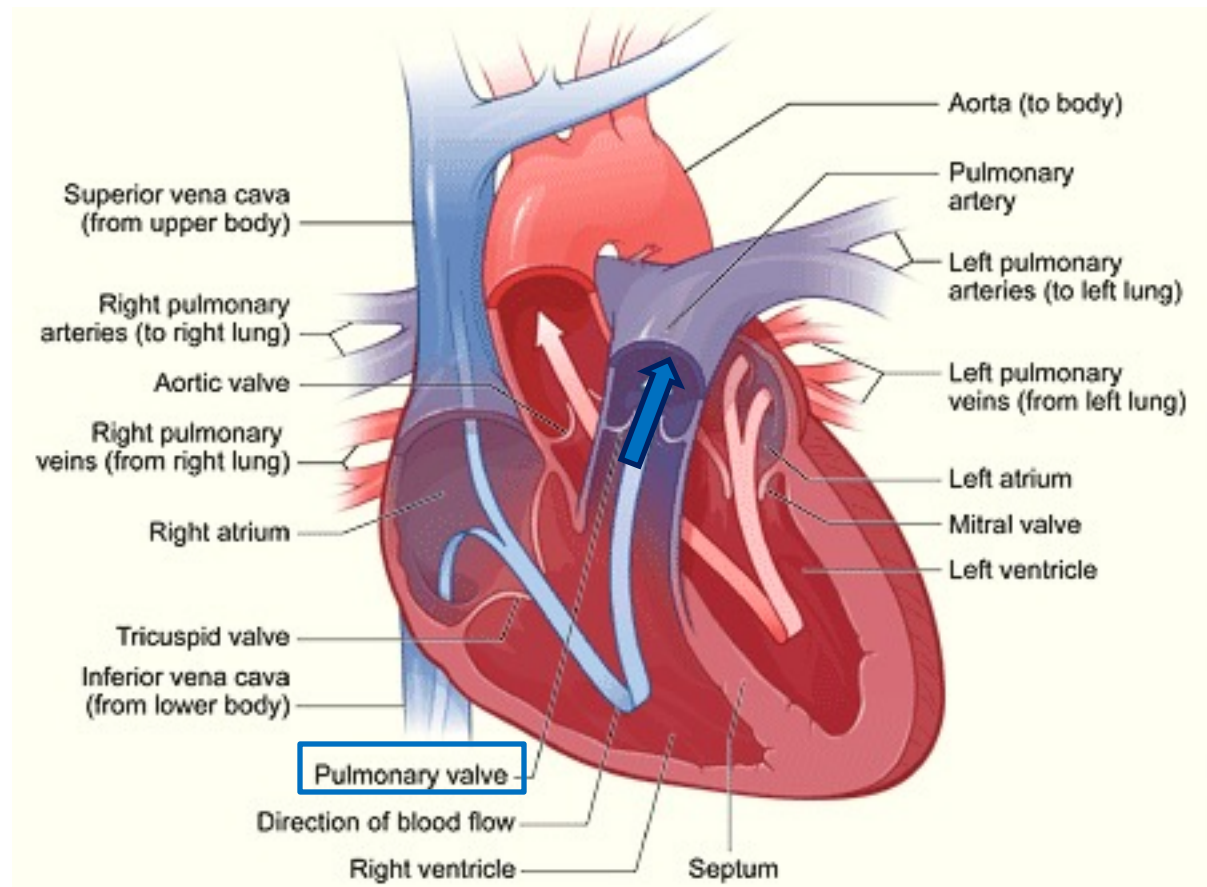
FLOW OF BLOOD

- 4. Blood passes through the tricuspid valve into the **right ventricle**.



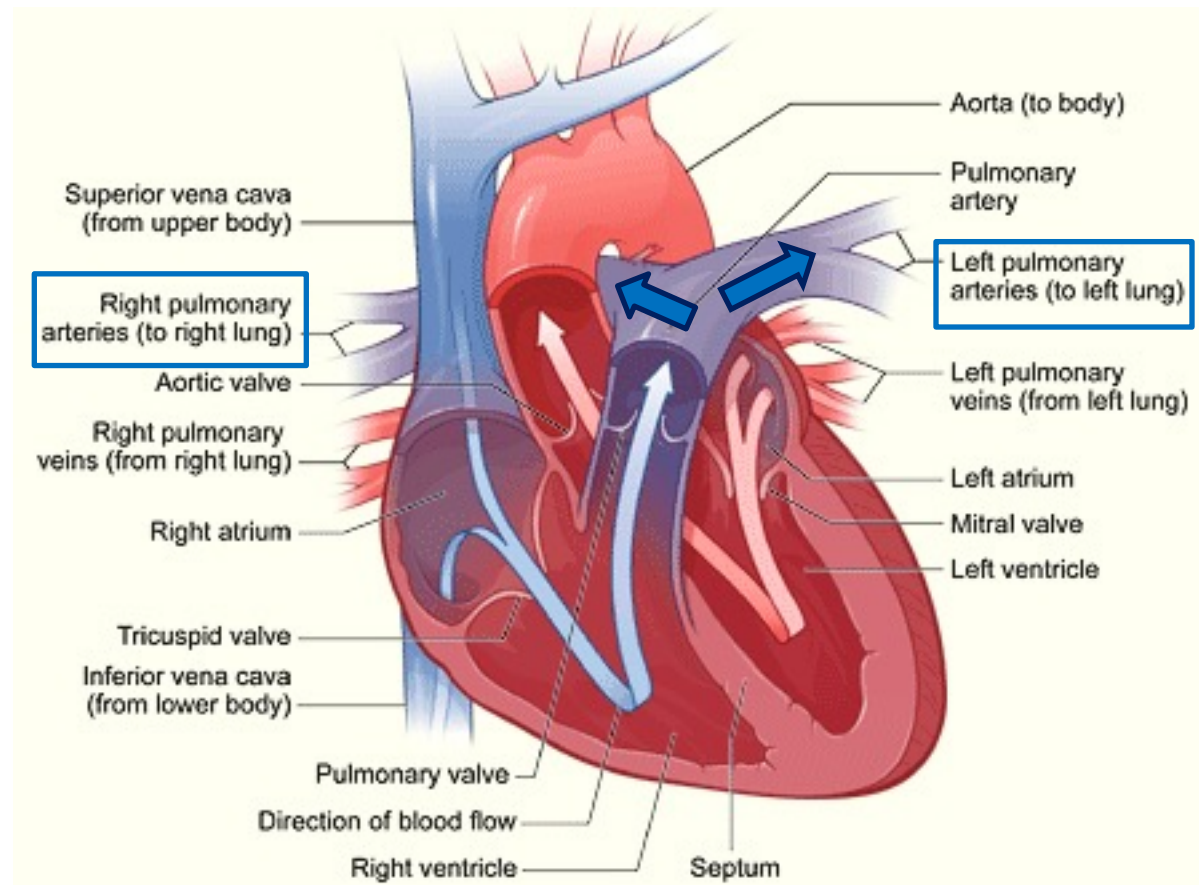
FLOW OF BLOOD

- 5. Blood from the right ventricle passes through the **pulmonary semilunar valve**.



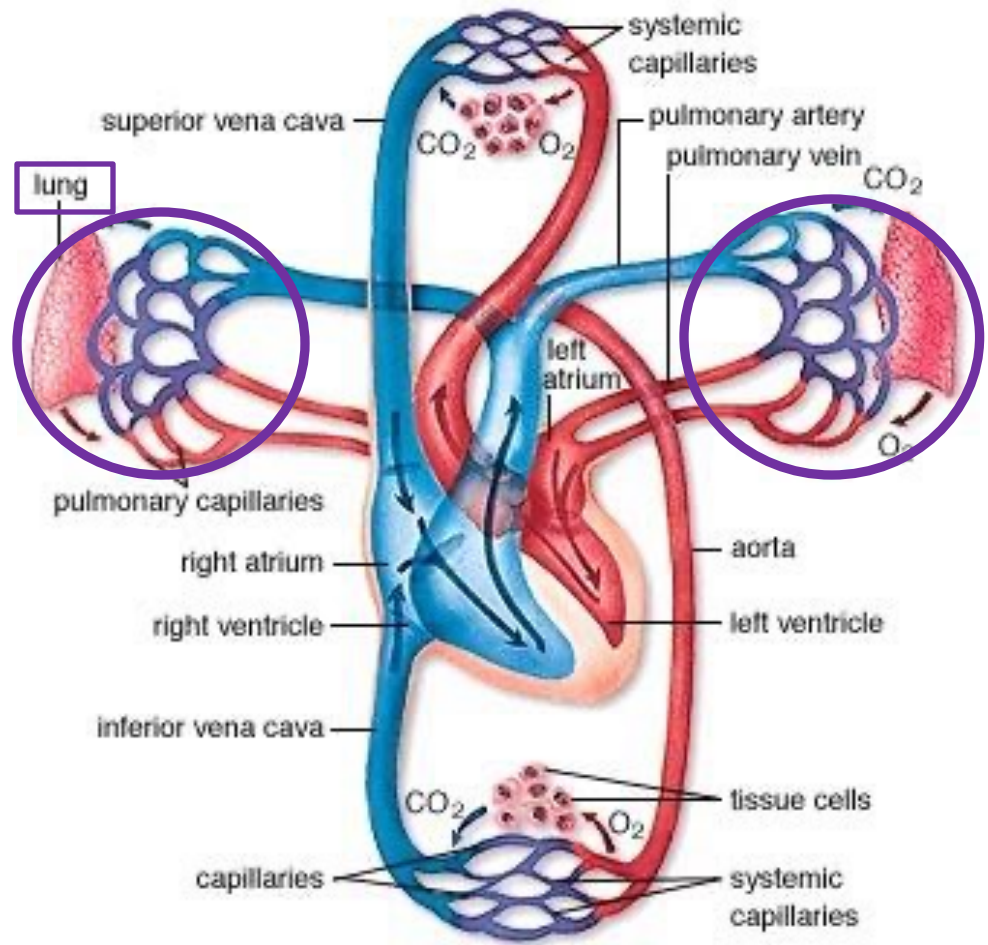
FLOW OF BLOOD

- 6. Blood flows through the pulmonary semilunar valve into the **right and left pulmonary arteries**.



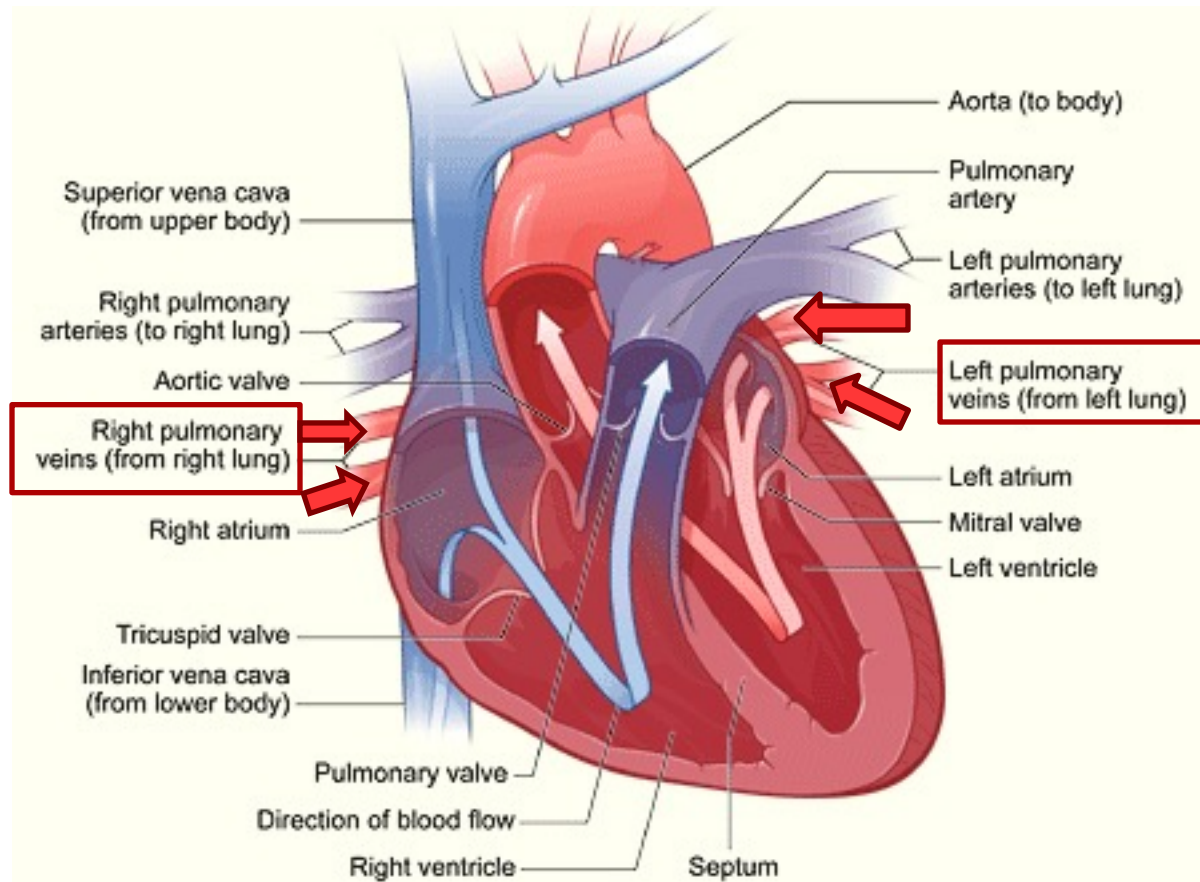
FLOW OF BLOOD

- 7. Pulmonary arteries take blood to the **lungs** for gas exchange.
- In the lung capillaries, blood picks up oxygen and transfers carbon dioxide to the lungs for exhalation.
- Blood becomes **oxygenated**.



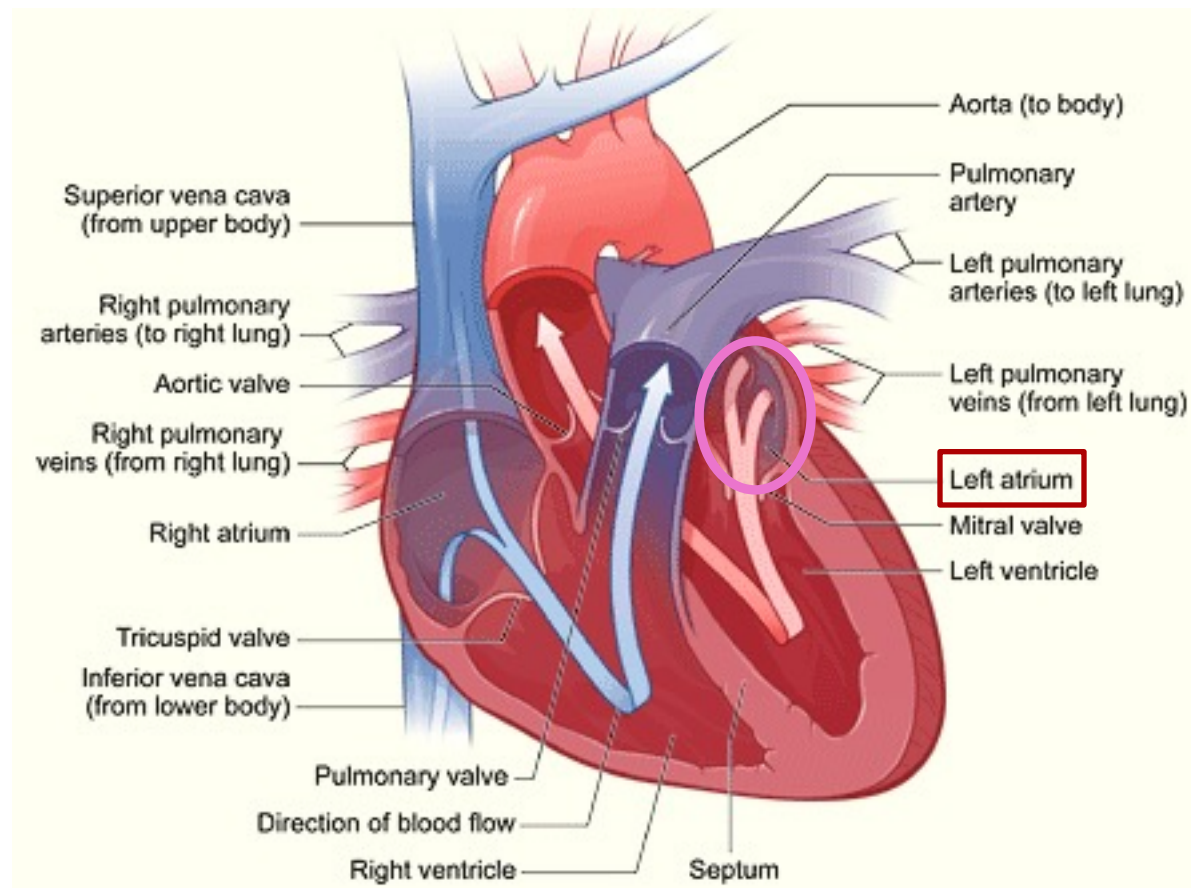
FLOW OF BLOOD

- 8. **Right and left pulmonary veins** bring the blood back to the heart.



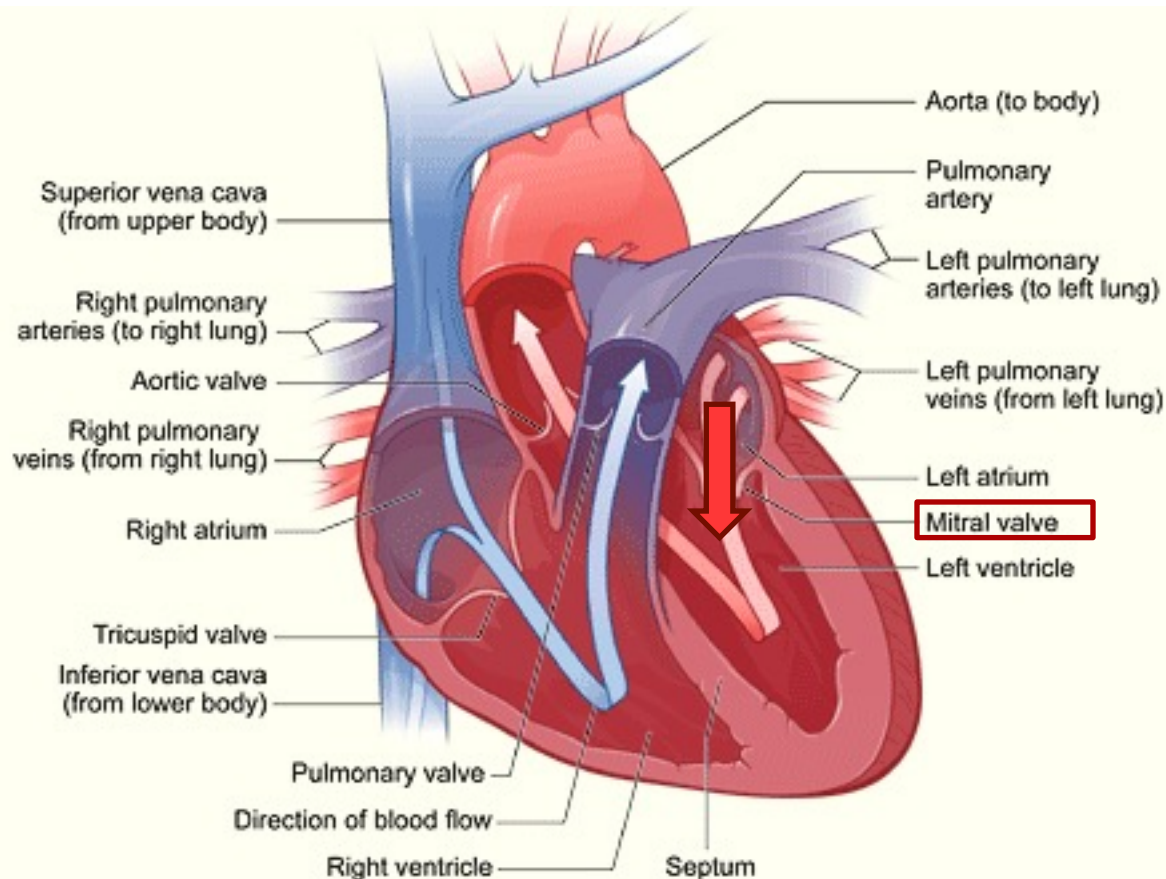
FLOW OF BLOOD

- 9. Pulmonary veins empty blood into the **left atrium**.



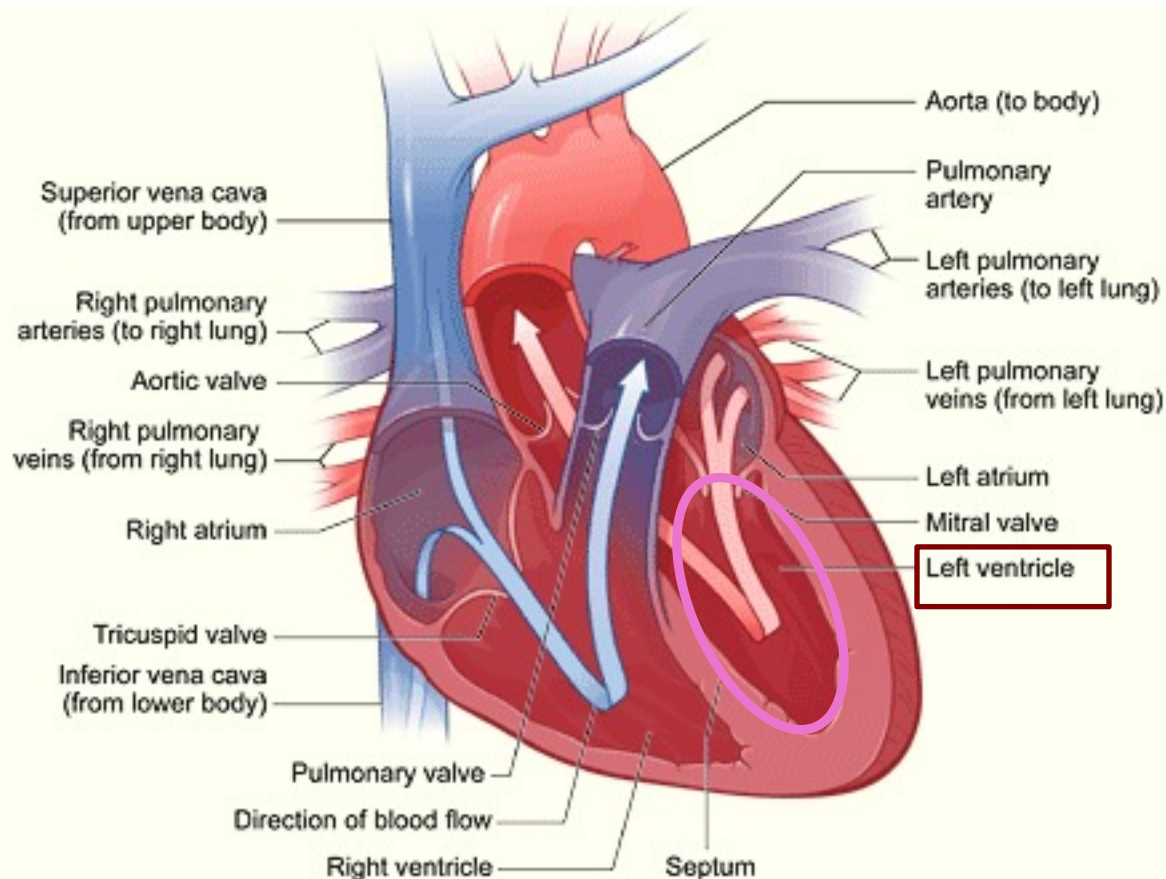
FLOW OF BLOOD

- 10. The blood from the left atrium flows through the **mitral (or bicuspid) valve**.



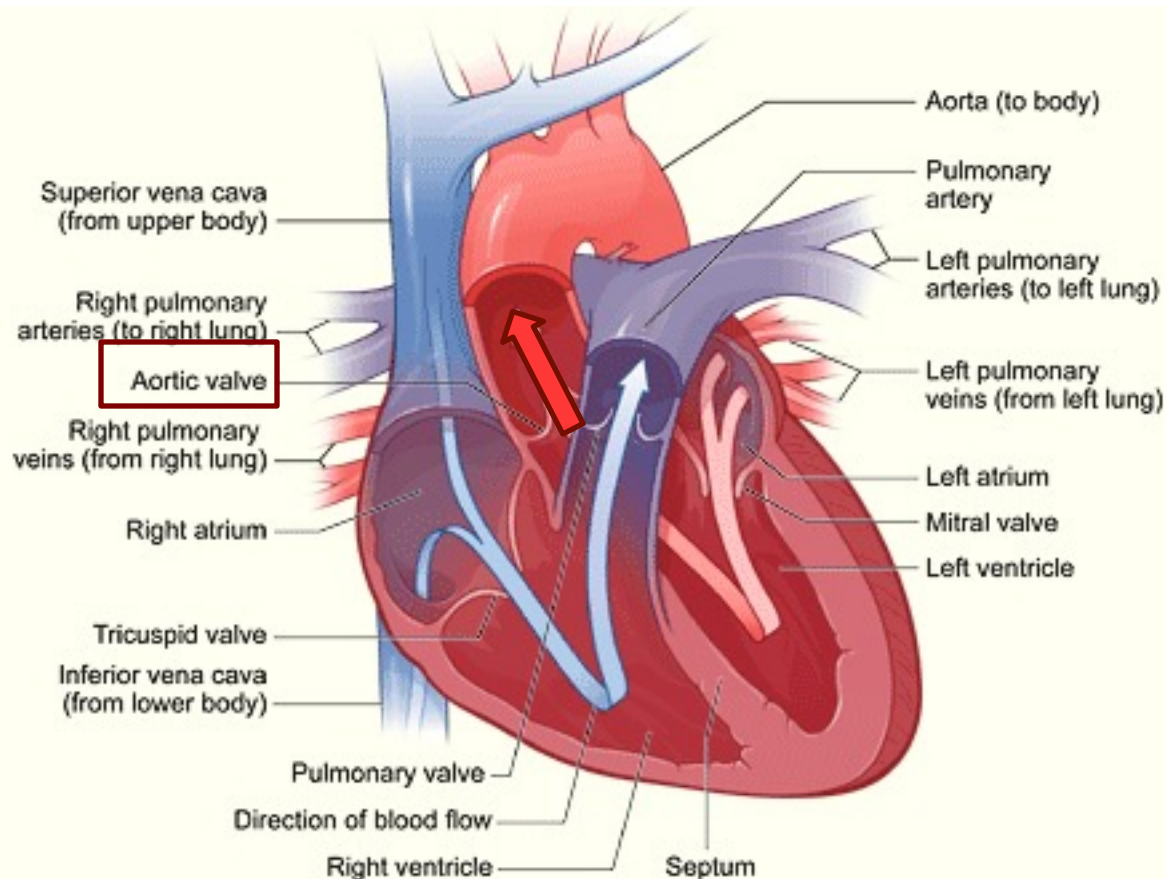
FLOW OF BLOOD

- 11. After passing through the mitral valve, blood enters the **left ventricle**.



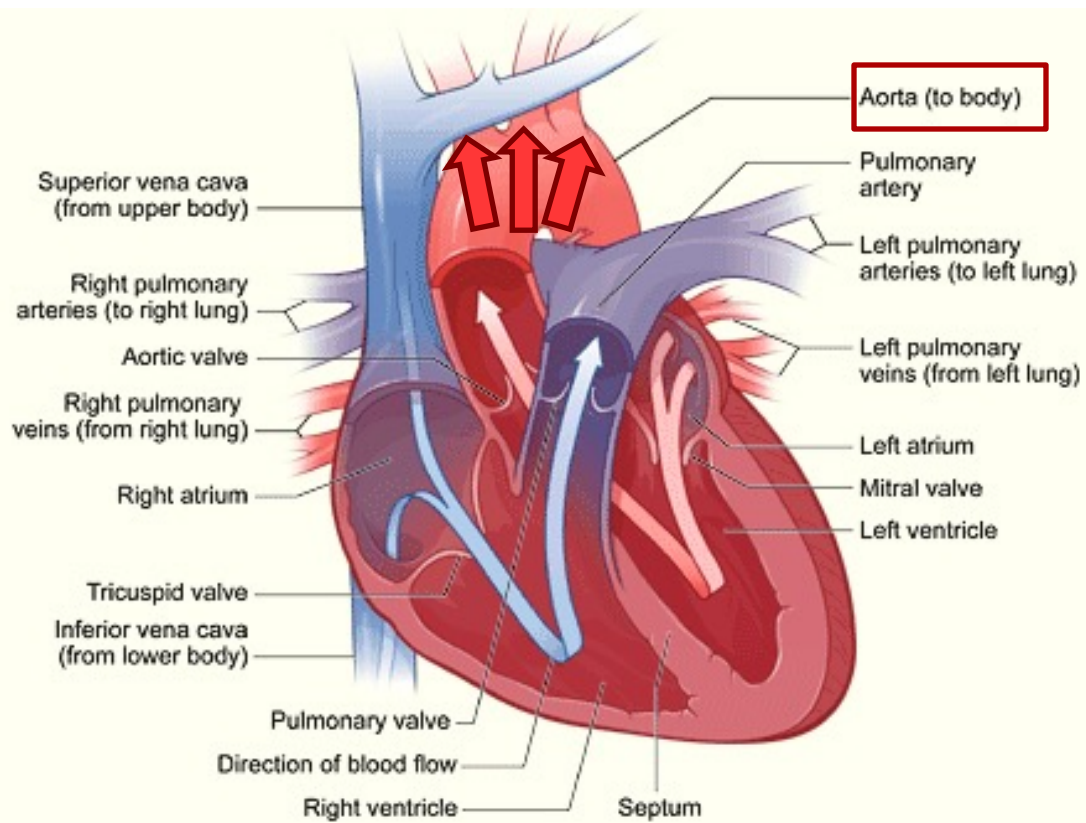
FLOW OF BLOOD

- 12. Blood from the left ventricle passes through the **aortic semilunar valve**.



FLOW OF BLOOD

- 13. After passing through the aortic semilunar valve, the blood enters the **aorta** and is then pumped to the rest of the body.



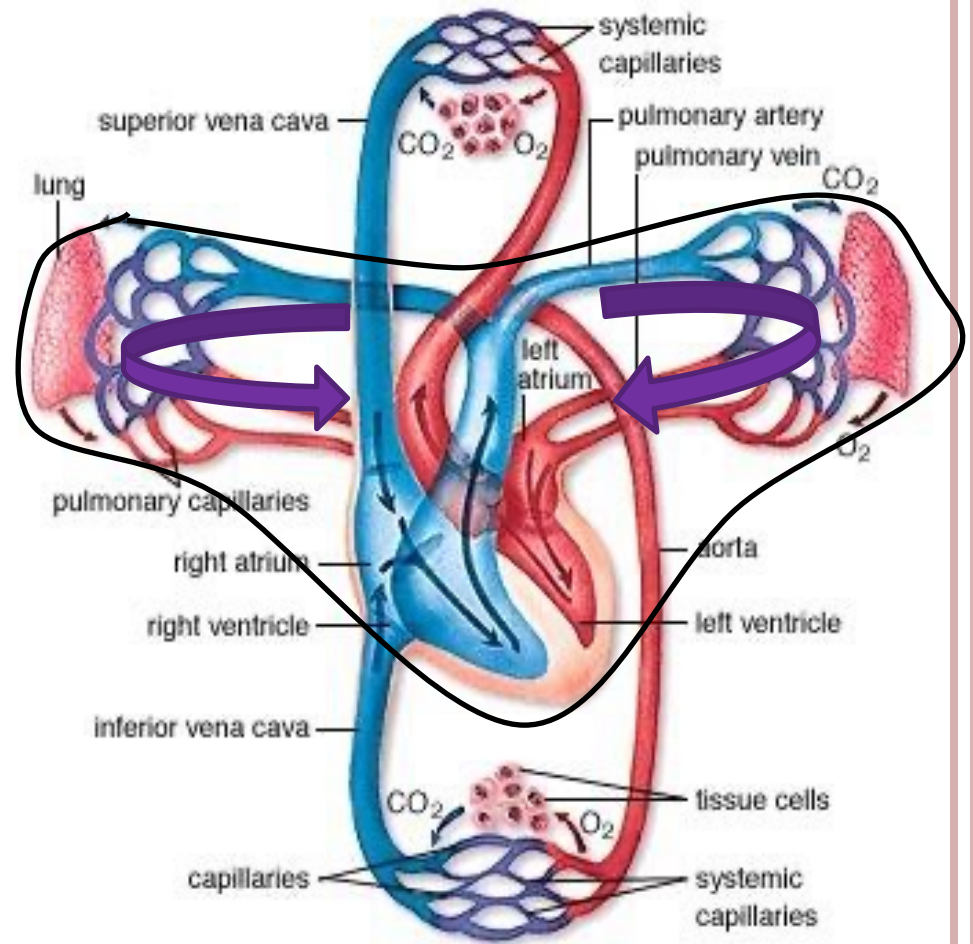
FLOW OF BLOOD IN ACTION

[YouTube Video - How a Normal Heart Pumps Blood](#)



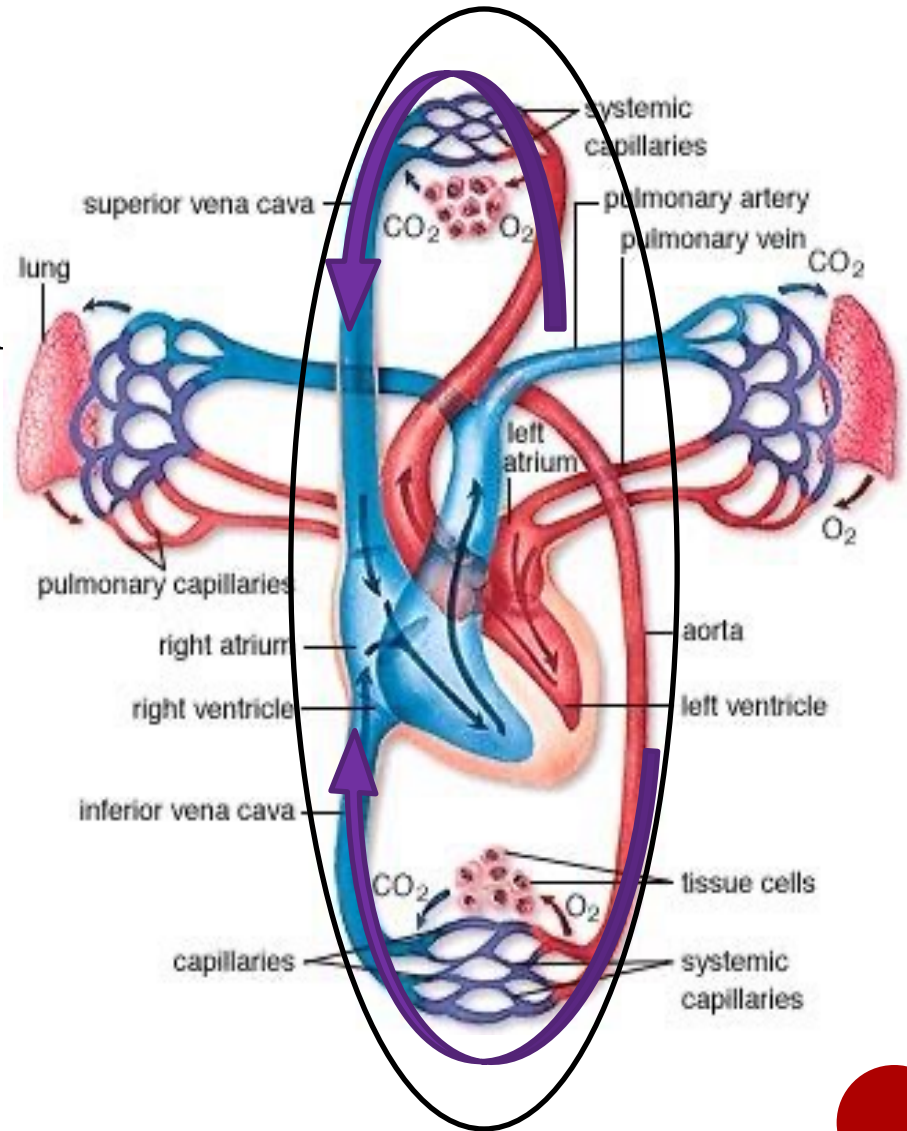
CIRCULATION

- **Pulmonary circuit:**
movement of blood from
the heart to the lungs
and back to the heart



CIRCULATION

- **Systemic circulation:** movement of blood from the body to the heart and back to the body
- Why do you think the left side of the heart is larger than the right?
- Answer: Because the left side has to pump blood further!



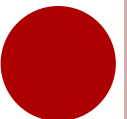
CONTRACTION

○ Systole - contract

- Atrial Systole: when the atria contract and pump blood into the ventricles
- Ventricular Systole: when the ventricles contract and pump blood out of the heart to the lungs or body

○ Diastole - relax

- When the atria and ventricles relax and start to fill with blood



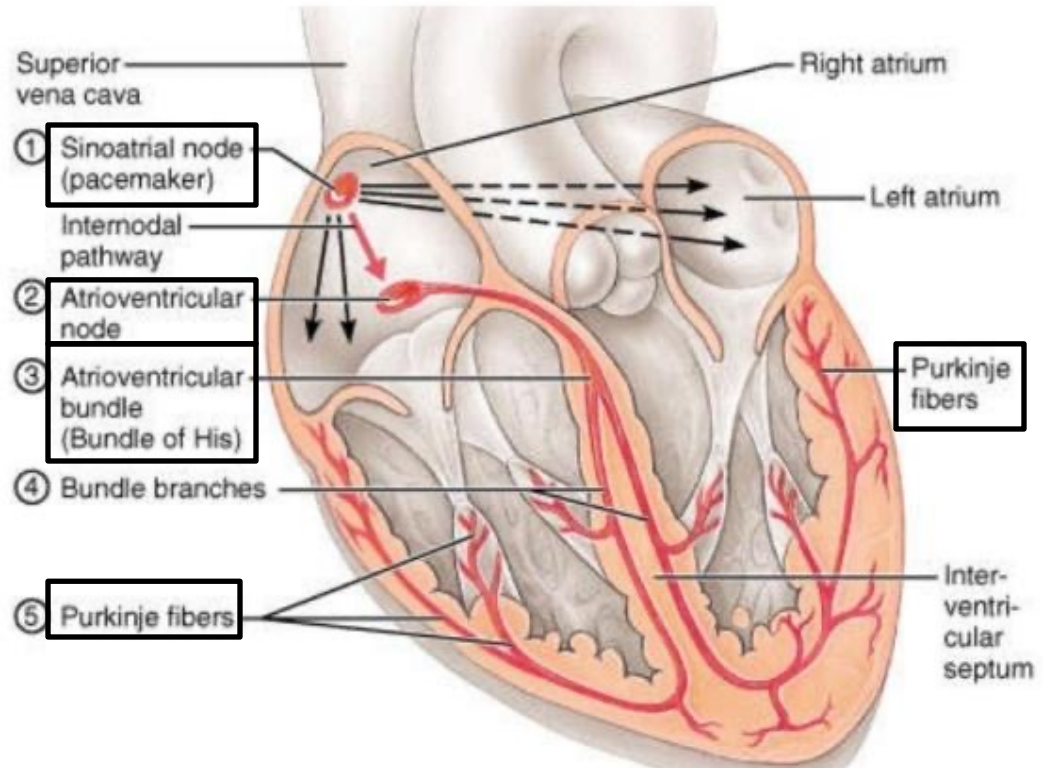
DID YOU KNOW?

- Did you know that even outside of the body, the heart will continue to beat?
- Why do you think this is?
- This characteristic is called myogenic control.
- Each heart beat is caused by an electrical signal from within heart muscle itself.



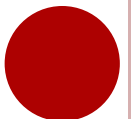
ELECTRICAL SYSTEM

- AKA the Cardiac Conduction System
- Consists of three parts:
 - 1. Sinoatrial (SA) node
 - 2. Atrioventricular (AV) node
 - 3. Bundle of His and Purkinje fibers

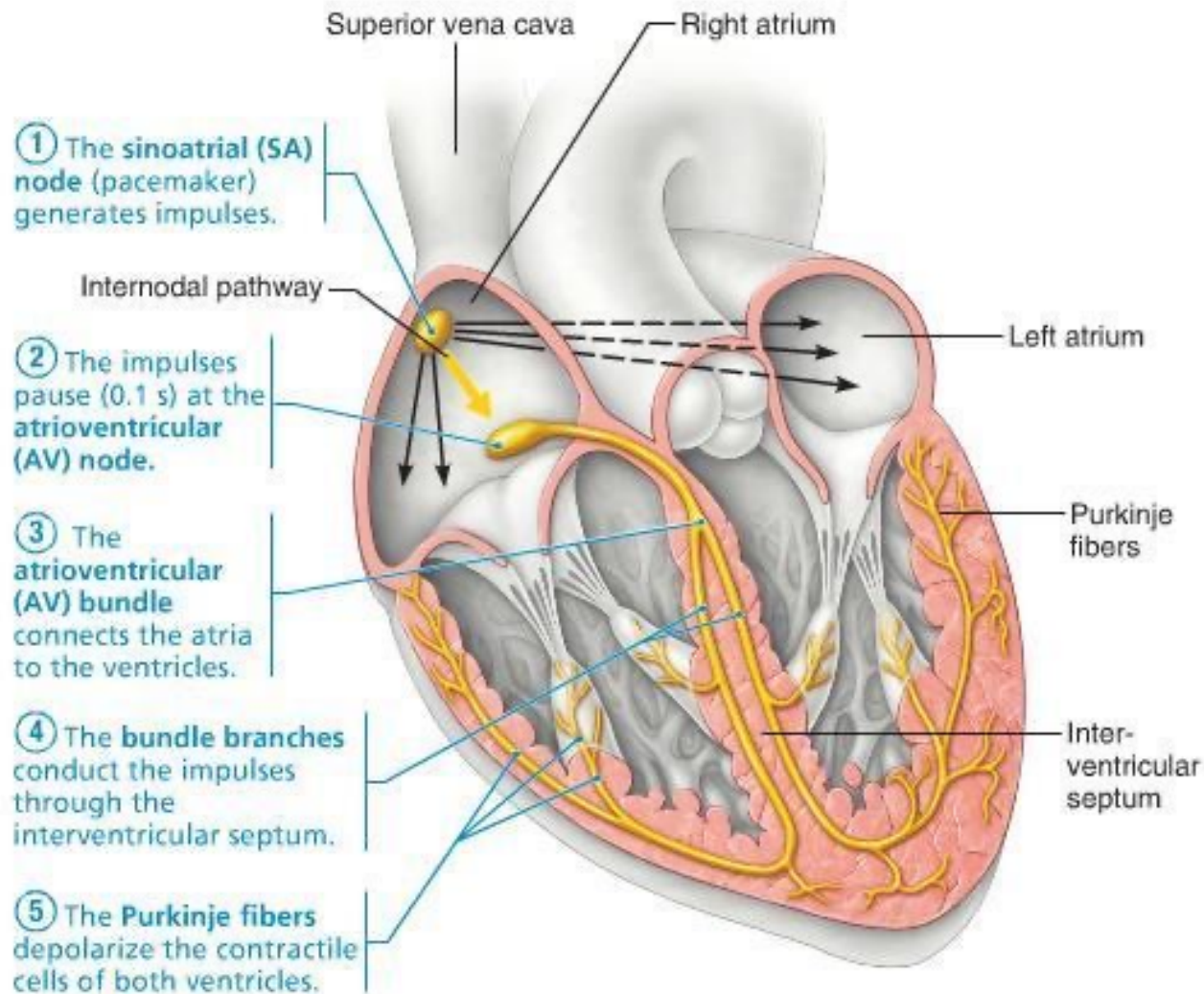


ELECTRICAL SYSTEM

- 1. Electrical signal starts at the **SA node** as blood fills the right atrium.
 - This signal causes the atrium to contract.
 - The SA node sets the pace of the heart, so it is also called the *pacemaker*.
- 2. Signal arrives at the **AV node** as blood fills the ventricles.
- 3. Signal moves along the **Bundle of His** and along the walls of the ventricles.
 - The Bundle of His divides into right and left branches and then to **Purkinje fibers**.
 - The ventricles contract.
- 4. Signal passes and ventricles relax.



ELECTRICAL SYSTEM



ELECTRICAL SYSTEM IN ACTION

YouTube Video - Electrical
Conduction in Heart



EXAMPLES OF HEART DISEASES/CONDITIONS

○ Congestive Heart Failure

- The heart is too weak or stiff to pump blood effectively.

○ Myocardial Infarction (Heart attack!)

- The coronary artery is blocked so blood cannot supply the heart with oxygen, and heart muscle dies.

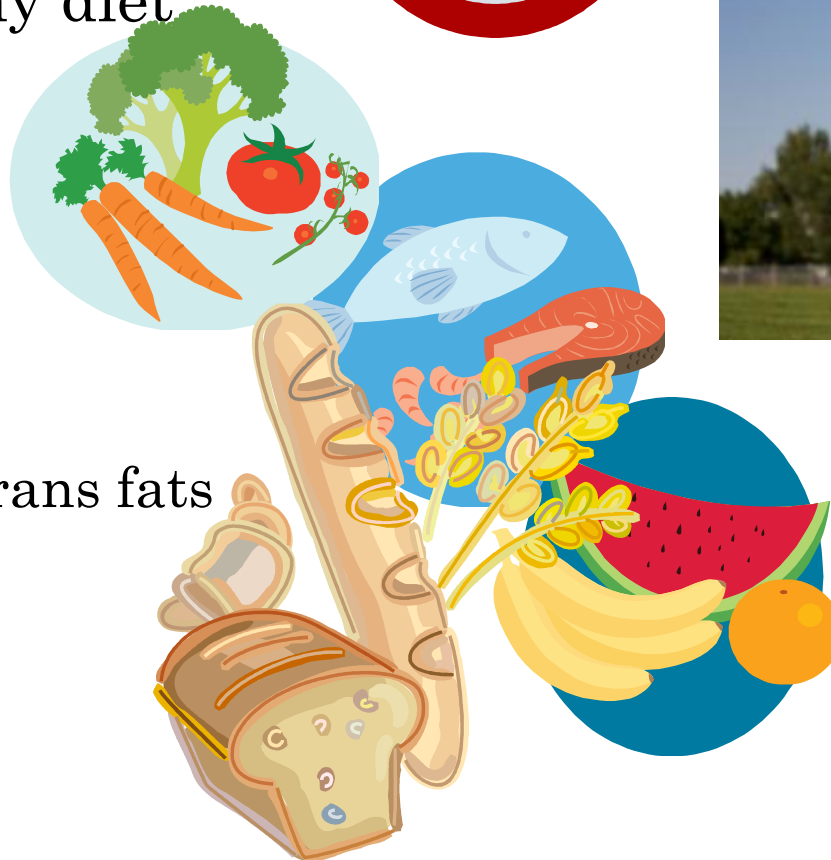
○ Atrial Fibrillation

- Abnormal electrical impulses in the atrium cause irregular heart beat.



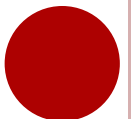
WAYS TO PREVENT HEART DISEASE

- Don't smoke or use tobacco
- Exercise 30 minutes a day
- Eat a heart healthy diet
 - Fruits
 - Vegetables
 - Whole grains
 - Nuts
 - Fish
 - No saturated or trans fats



REFERENCES

- <http://www.nhlbi.nih.gov/health/health-topics/topics/hhw/>
- <http://www.webmd.com/heart/picture-of-the-heart>
- <http://www.mayoclinic.org/diseases-conditions/heart-disease/in-depth/heart-disease-prevention/art-20046502>
- <http://health.clevelandclinic.org/2013/07/19-amazing-facts-about-your-heart-infographic/>



3-2-1

- On a piece of notebook paper, write...
 - 3 things you learned about the heart
 - 2 things you have questions about
 - 1 thing you wish for me to know

