

# CIRCULATORY SYSTEM

Review –

When we breathe in, where does the oxygen go?

- The blood!
- We're now going to look at how the blood circulates in the body and what it's made up of.

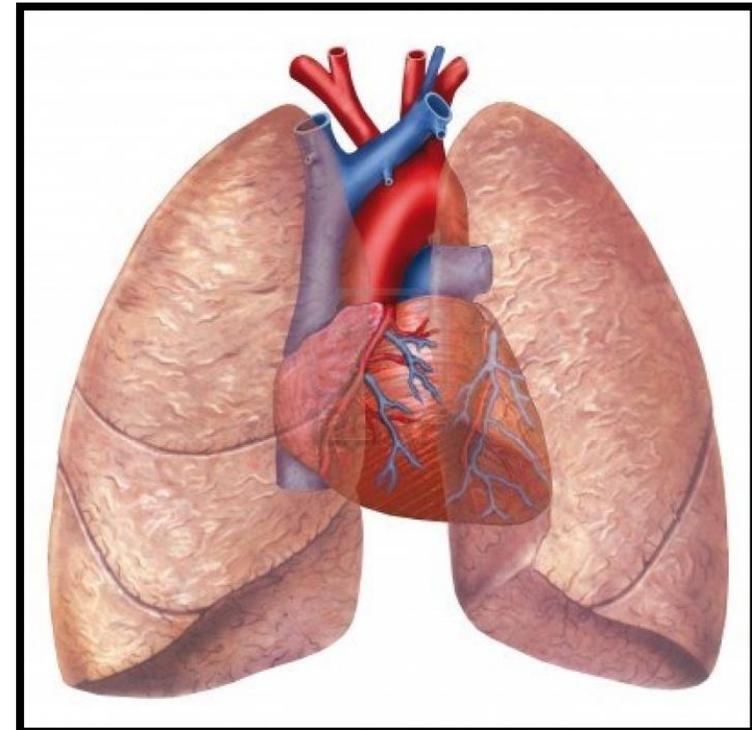
# Starting at the HEART of the problem

- In order for blood to get to all the places it needs to in the body it needs to be pumped
- This pumping is done by the heart!

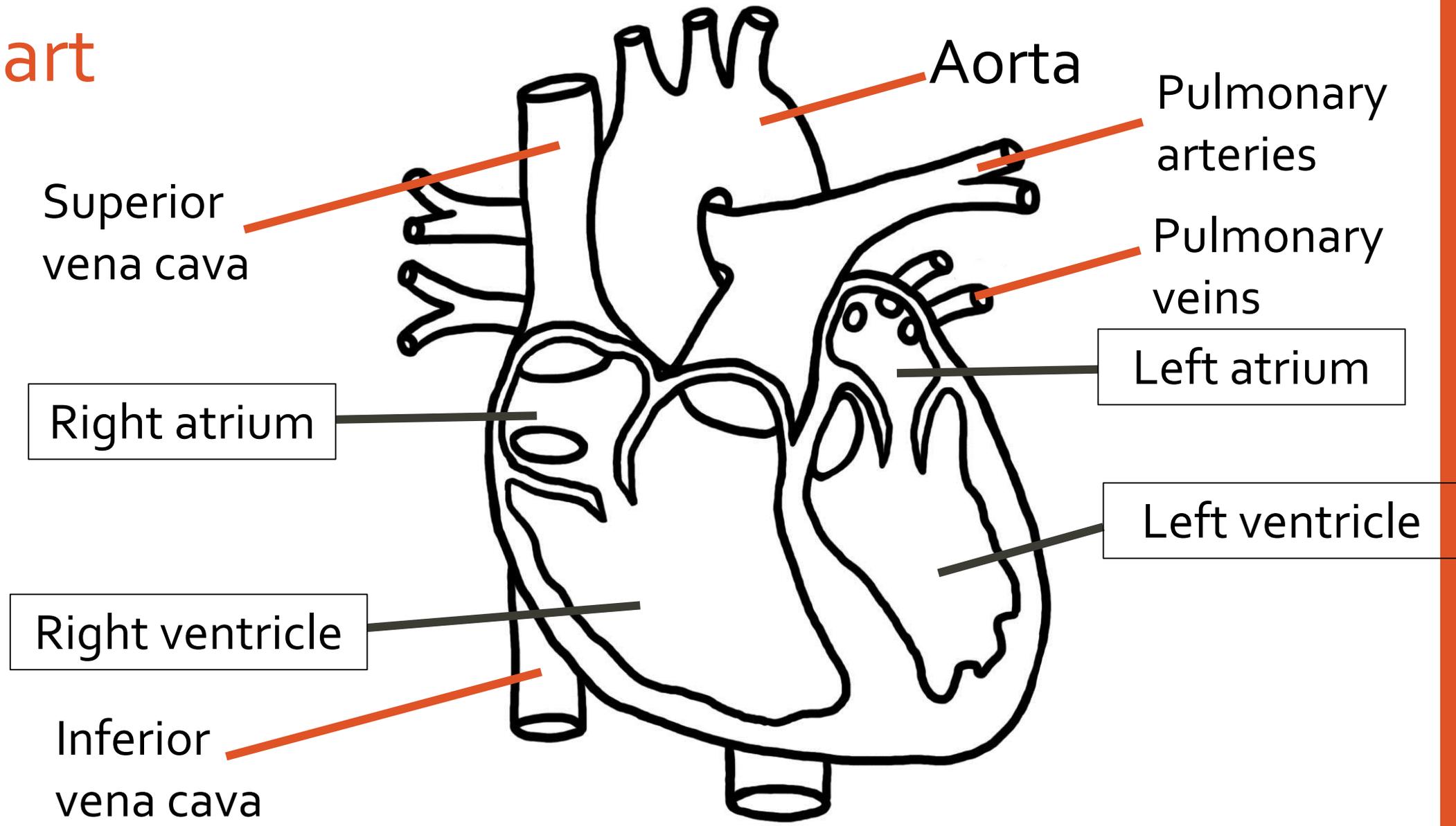


# The Heart

- The heart is located in the thoracic cavity between the lungs (remember the respiratory system?)
  - In adults it is about the size of a fist



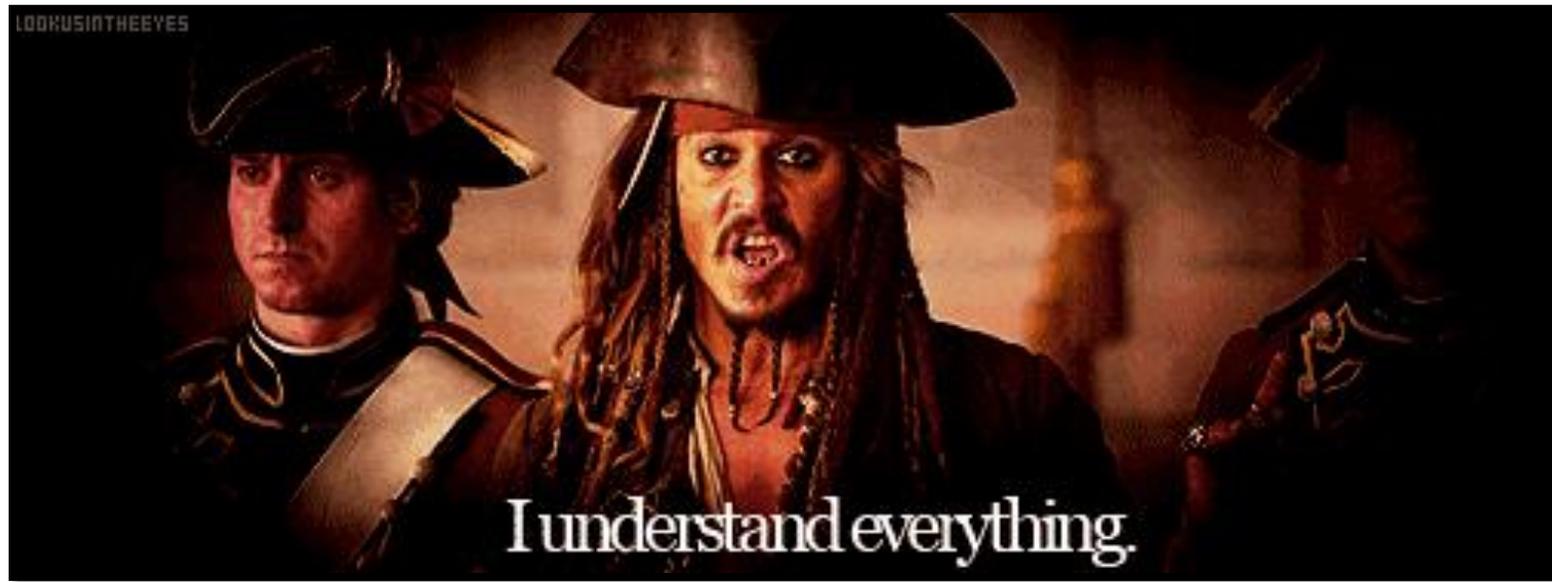
# The Heart



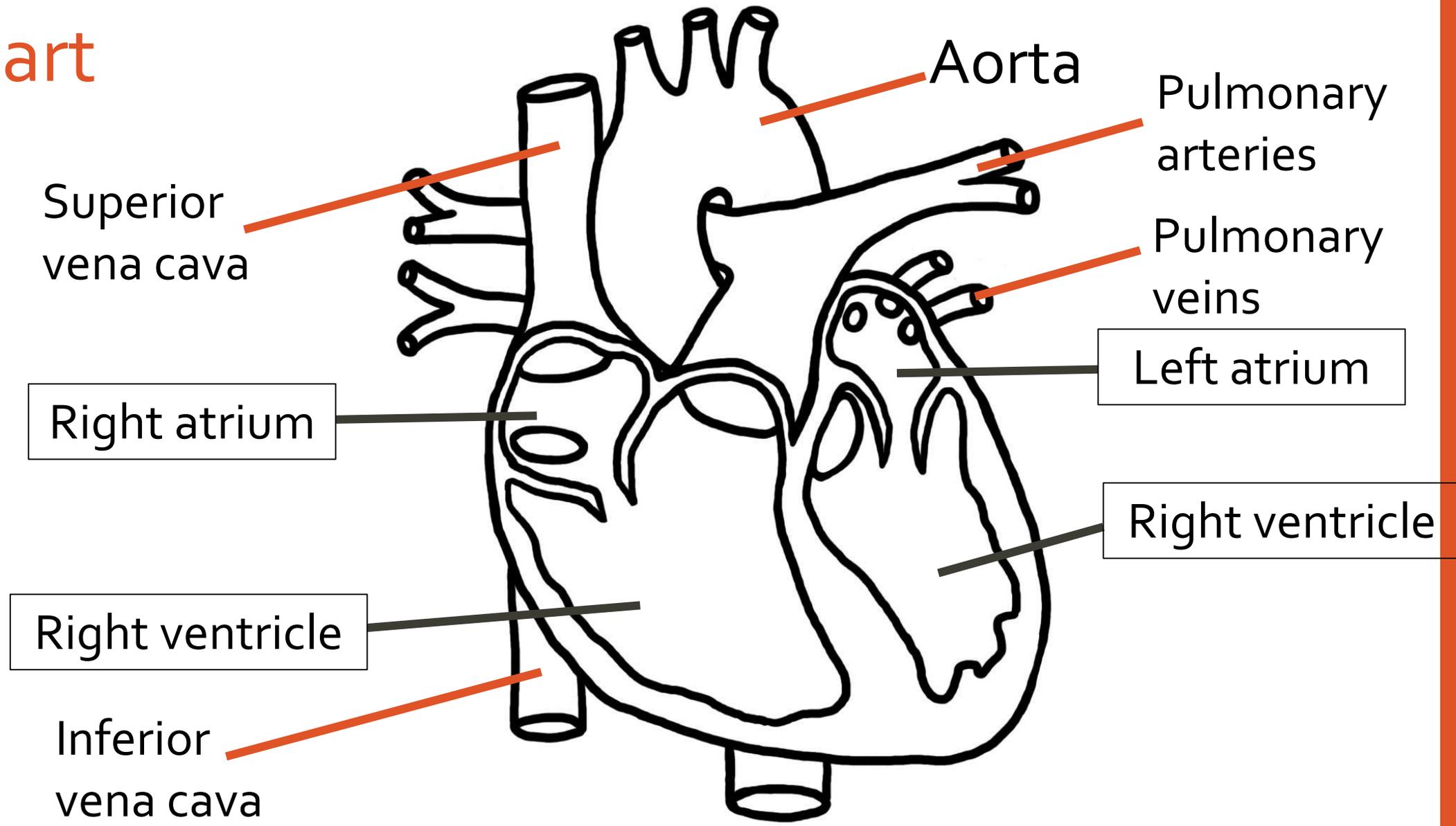
Left is Right?!



The picture is drawn as if you're looking at someone!

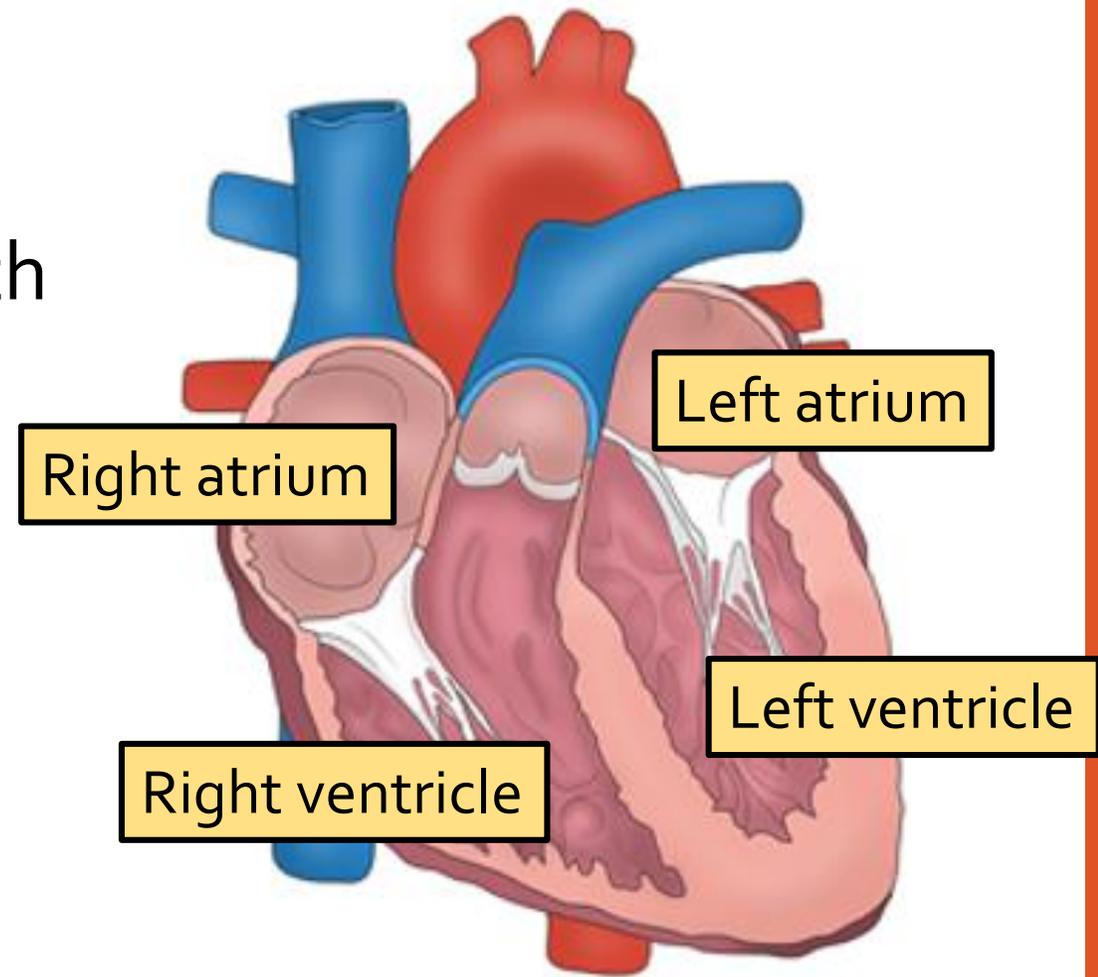


# The Heart

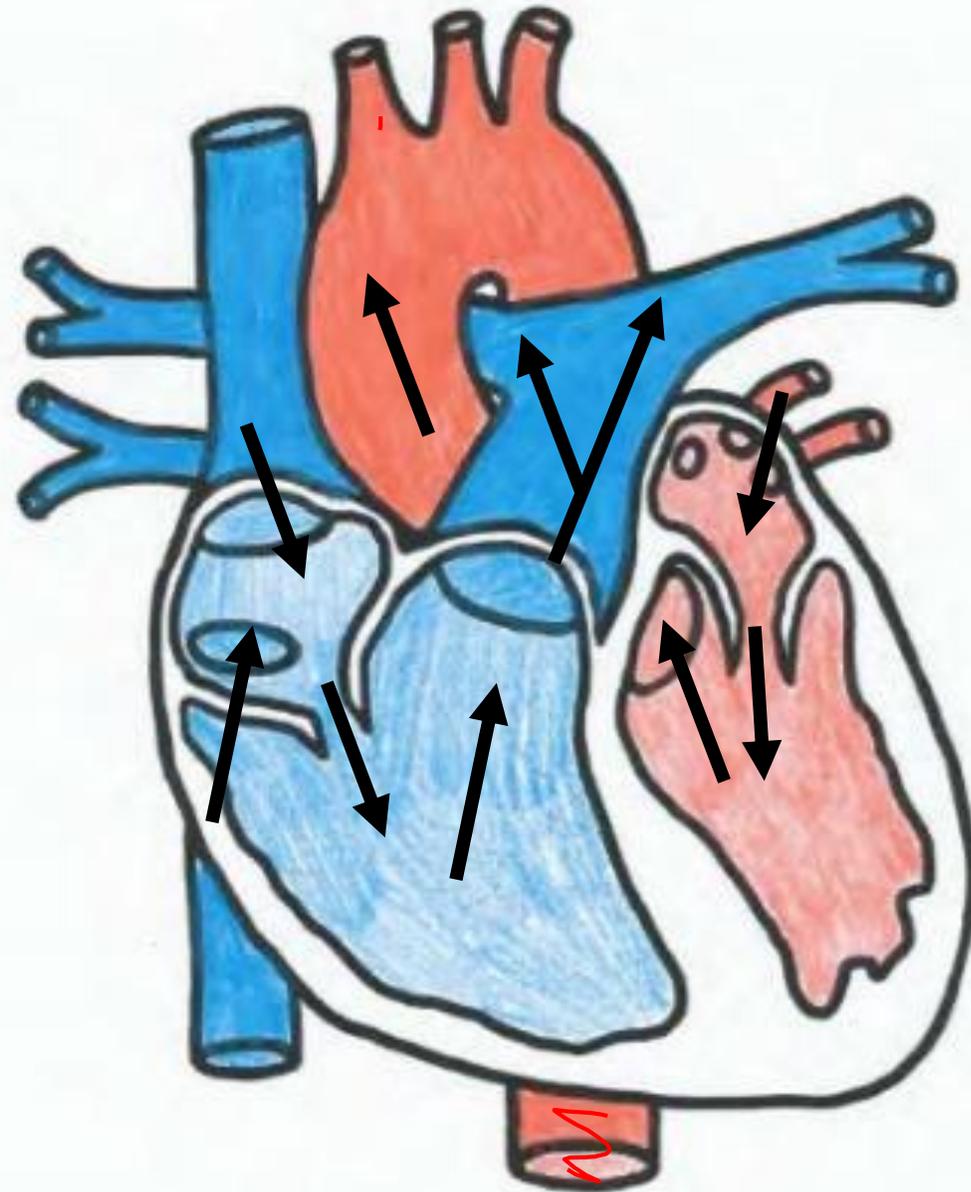


# The Heart

- The heart is a hollow muscle with four cavities
  - The right atrium
  - The left atrium
  - The right ventricle
  - The left ventricle



# Blood Flow



# The Heart

- The right atrium is connected to the right ventricle through a valve
  - the tricuspid valve
- The left atrium is connected to the left ventricle through a valve
  - The bicuspid (or mitral) valve

# The Heart

- The tricuspid and bicuspid valves are the atrio-ventricular valves (because they connect the atria to the ventricles) and are designed so that blood can only move in one direction
  - From the atrium into the ventricle
- There is no direct blood movement between the left and right side of the heart

# The Heart

Think of the  
French word  
"viens"

- Blood enters the heart through 2 sets of veins 
- The pulmonary veins
  - Blood coming from the lungs to the heart
- The superior and inferior vena cava
  - Blood coming from the rest of the body to the heart

# The Heart

- Blood **exits** the heart through 2 main sets of arteries
  - The pulmonary arteries
    - Blood going to the lungs
  - The aorta
    - Blood going to the rest of the body



# Function of the Heart

- **Remember:** the heart is responsible for circulating blood throughout the body
  - For this to happen blood must be allowed to enter the heart before it can be pumped out

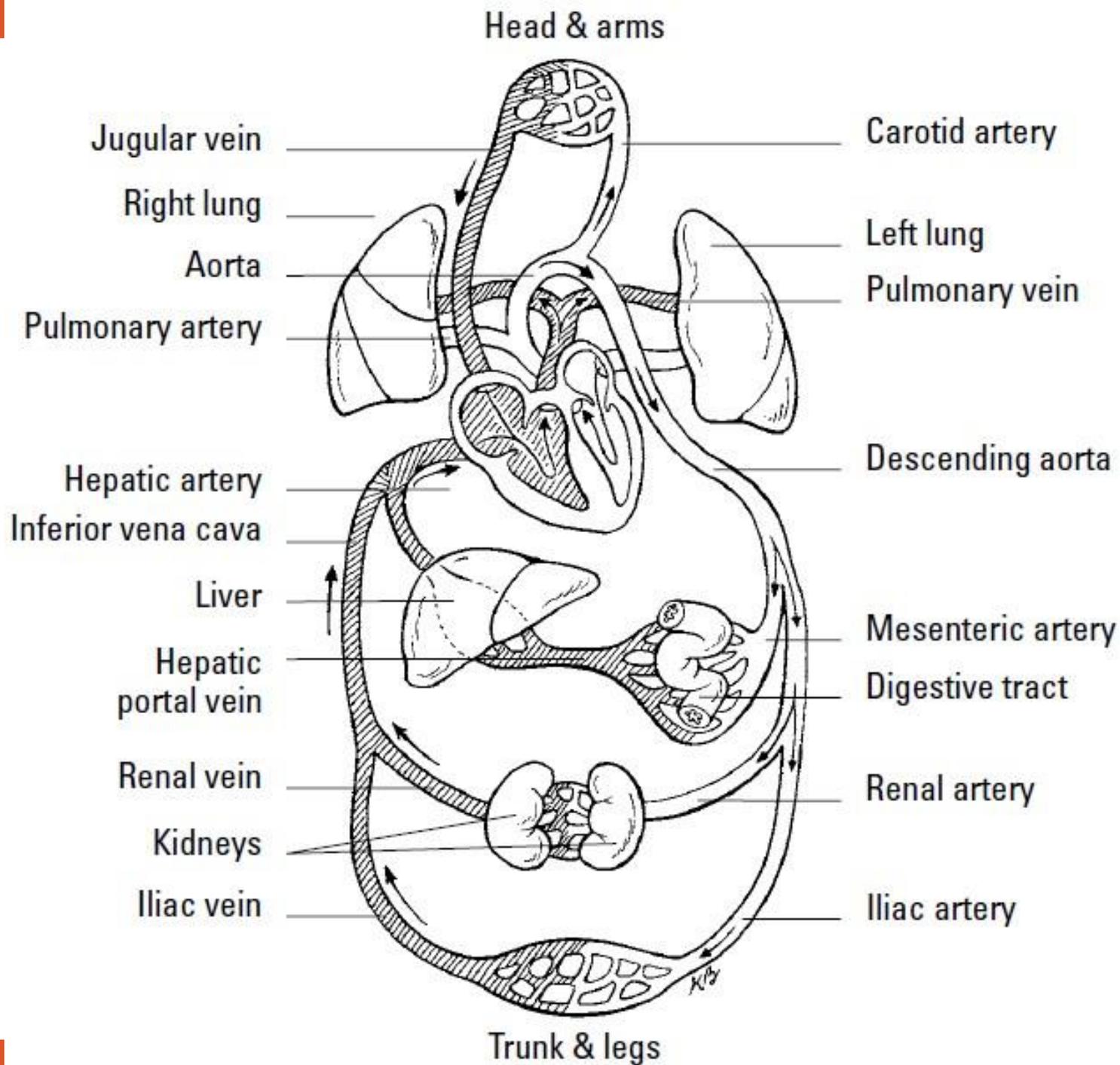
# Function of the Heart

- **Blood entering the heart**
  - For blood to enter the heart (through the atria), the muscles must be at rest (relaxed, not contracting)
    - This is called the diastole phase

# Function of the Heart

- **Blood exiting the heart**
  - For blood to exit the chambers, the muscles must contract
    - Both atria contract at the same time, pumping blood into the ventricles
    - A few tenths of a second later, both ventricles contract in order to push the blood into the arteries
      - This is called the systole phase

Circulation  
between  
lungs and  
heart  
=  
Pulmonary  
circulation

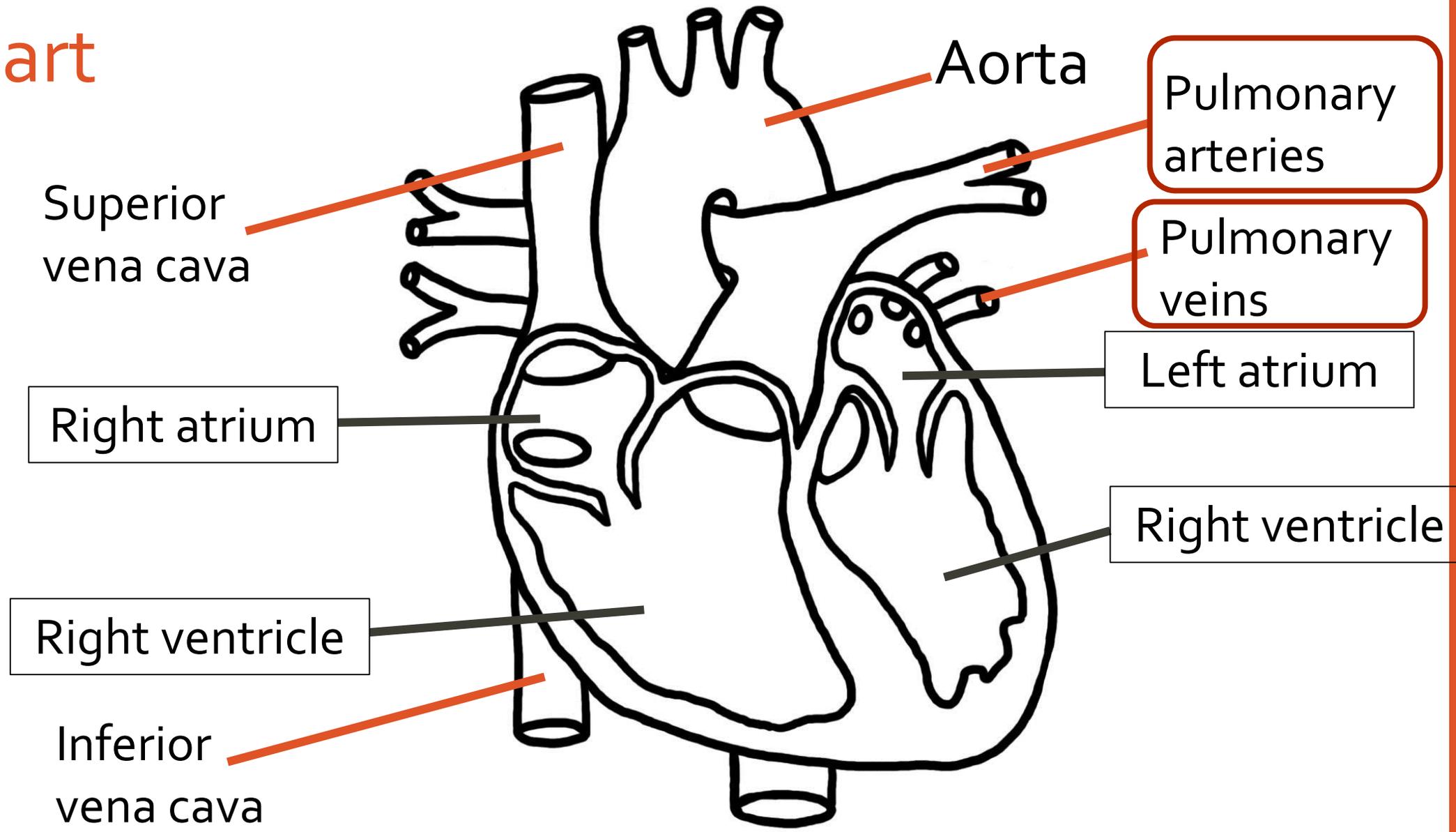


Circulation  
between  
the rest of  
the body  
and heart  
=  
Systemic  
circulation

# Types of Circulation

- **Pulmonary:** the path followed by deoxygenated (venous) blood away from the heart to the lungs and then back to the heart as oxygenated (arterial) blood
- Carbon dioxide diffuses out of the blood and into the alveoli and oxygen diffuses into the blood (gas exchange)
- Begins at the right ventricle, ends with the left atrium

# The Heart



# Types of Circulation

- **Systemic:** the circulation of blood to all parts of the body, except to the lungs.
- Transports oxygenated blood away from the heart to the rest of the body, and returns deoxygenated blood ( $\text{CO}_2$  rich) to the heart
- Gas exchange –  $\text{O}_2$  out of blood,  $\text{CO}_2$  into blood
- Begins in the left ventricle, ends with right atrium