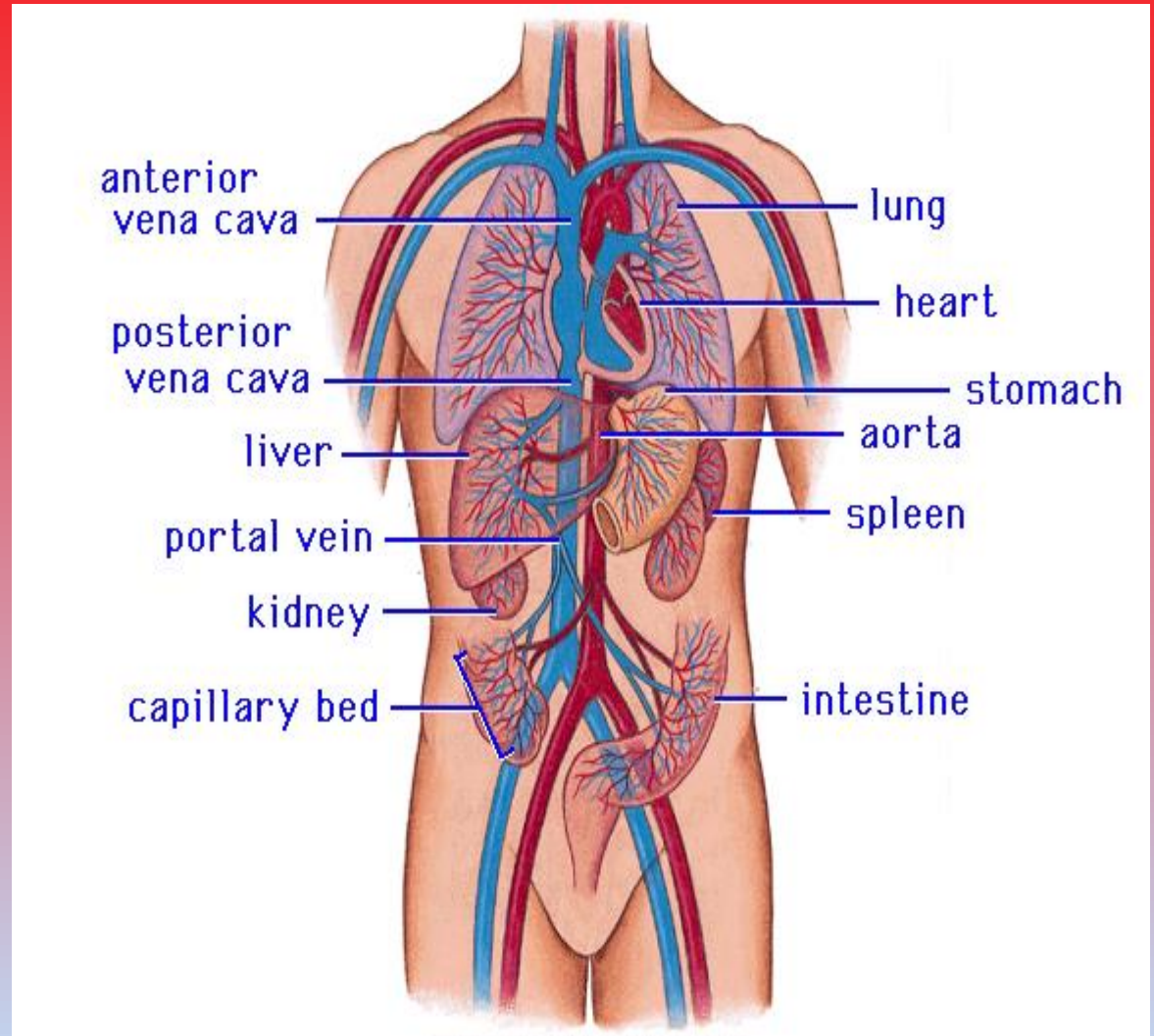


# Circulatory System

All about that blood

# Circulatory System

Purpose: to deliver oxygenated blood to the various organs in your body.

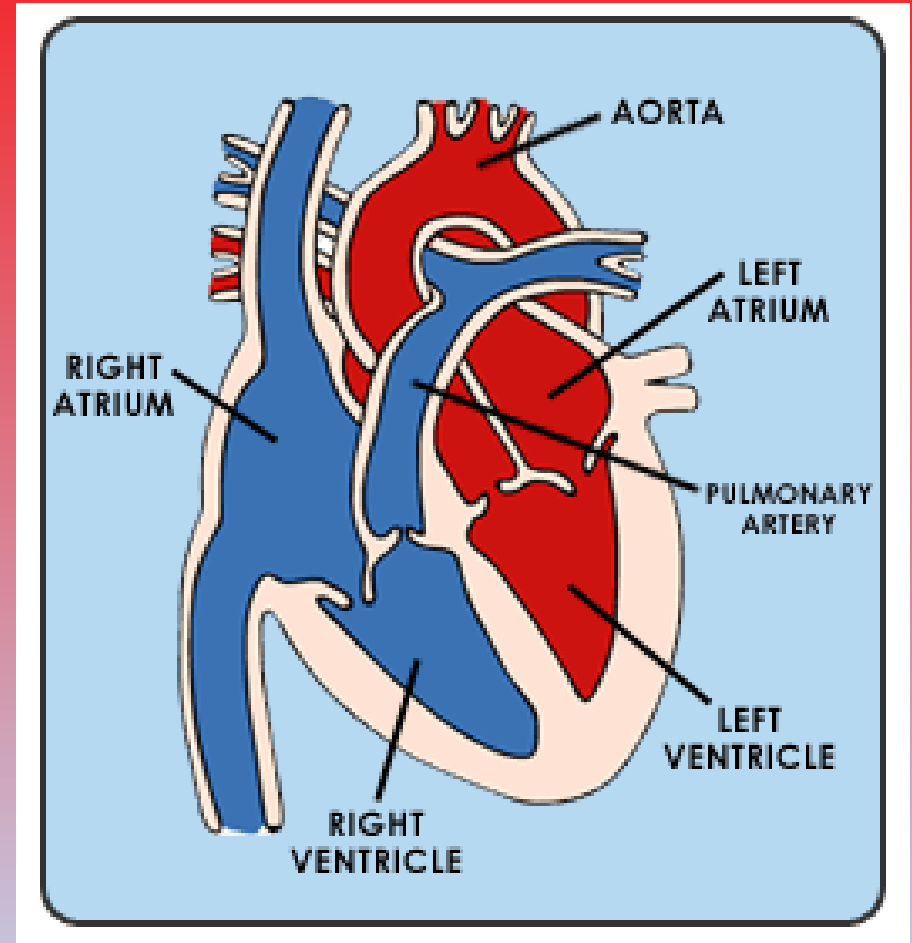


# How does the system work?

- Oftentimes referred to as the **cardiovascular system**, it consists of the **heart**, which is a muscular pumping device, and a closed system of vessels called **arteries, veins, and capillaries**
- the system is important because it maintains continuous and controlled movement of **blood** that reaches every tissue in the body.
- Nutrients and other essential materials pass from capillary blood into the cells of the body and back to the heart.

# The Heart!

- The heart is a strong muscle that continuously moves blood throughout the body.
- Blood flows in on the right side and out on the left.
- The right atrium and ventricle collect deoxygenated blood and send it to the lungs through the pulmonary artery to be replenished with oxygen.
- The left atrium and ventricle are connected to the aorta which sends oxygen-rich blood out to the rest of the body.

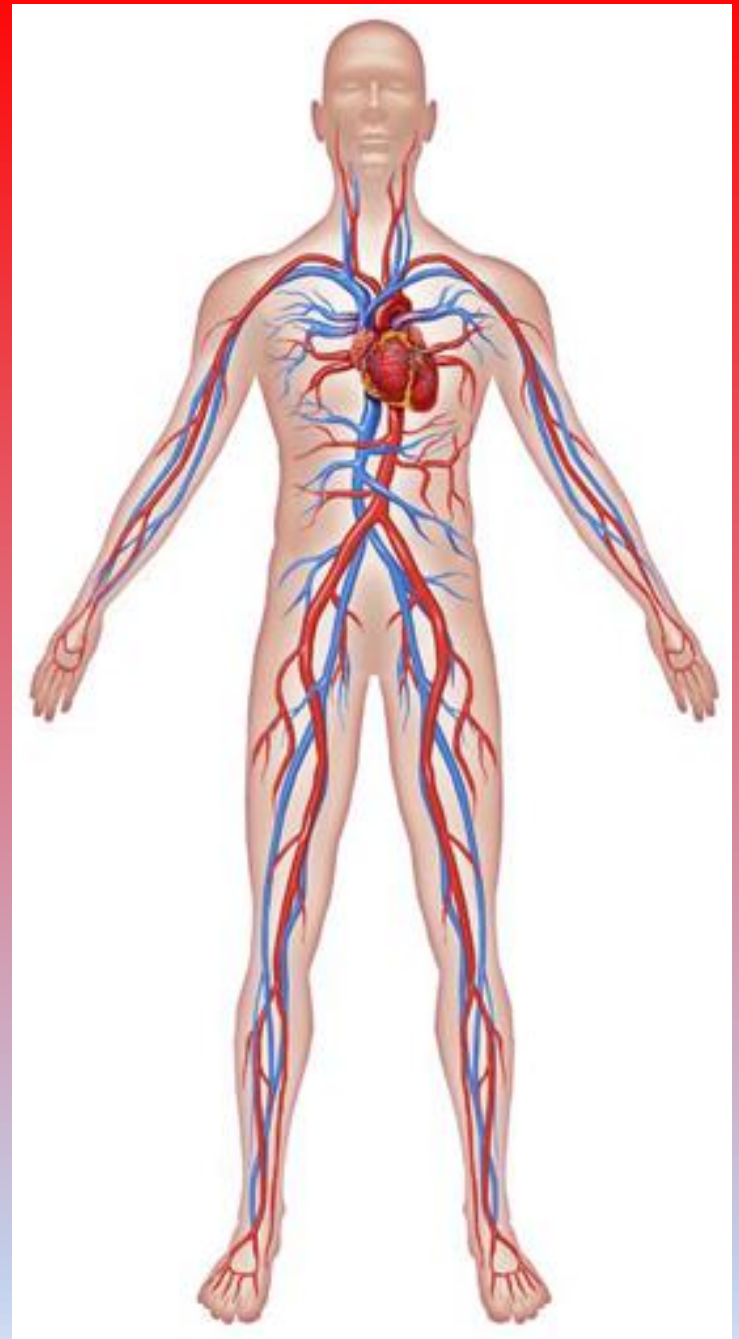


[https://youtu.be/eVG45\\_iF9U](https://youtu.be/eVG45_iF9U)

2:25-4:50

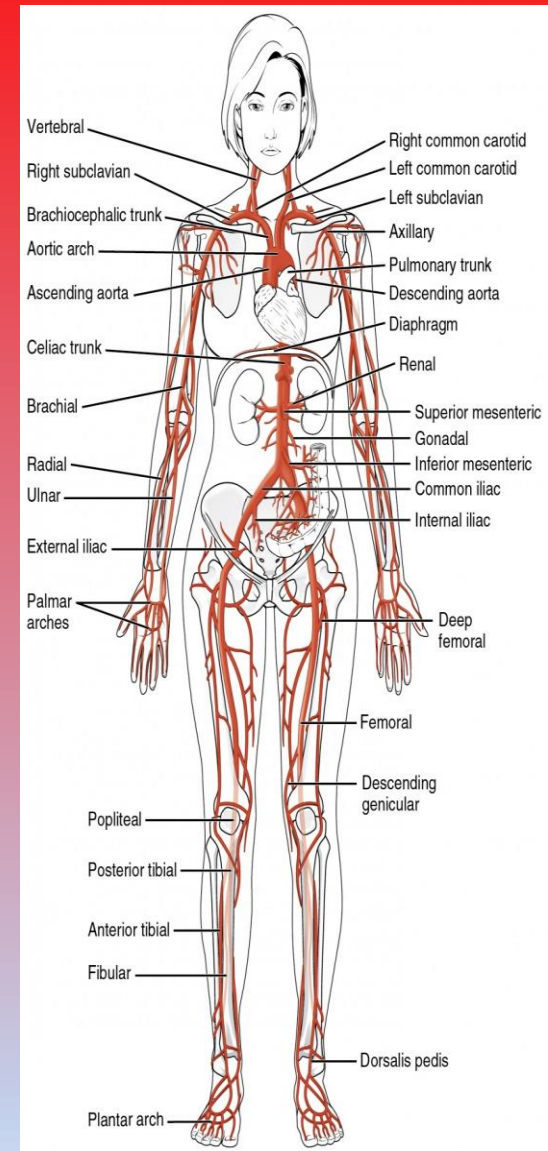
# A series of vessels

- The blood pumped by your heart must reach EVERY organ of the body.
- There are 3 types of blood vessels– arteries, capillaries, and veins.



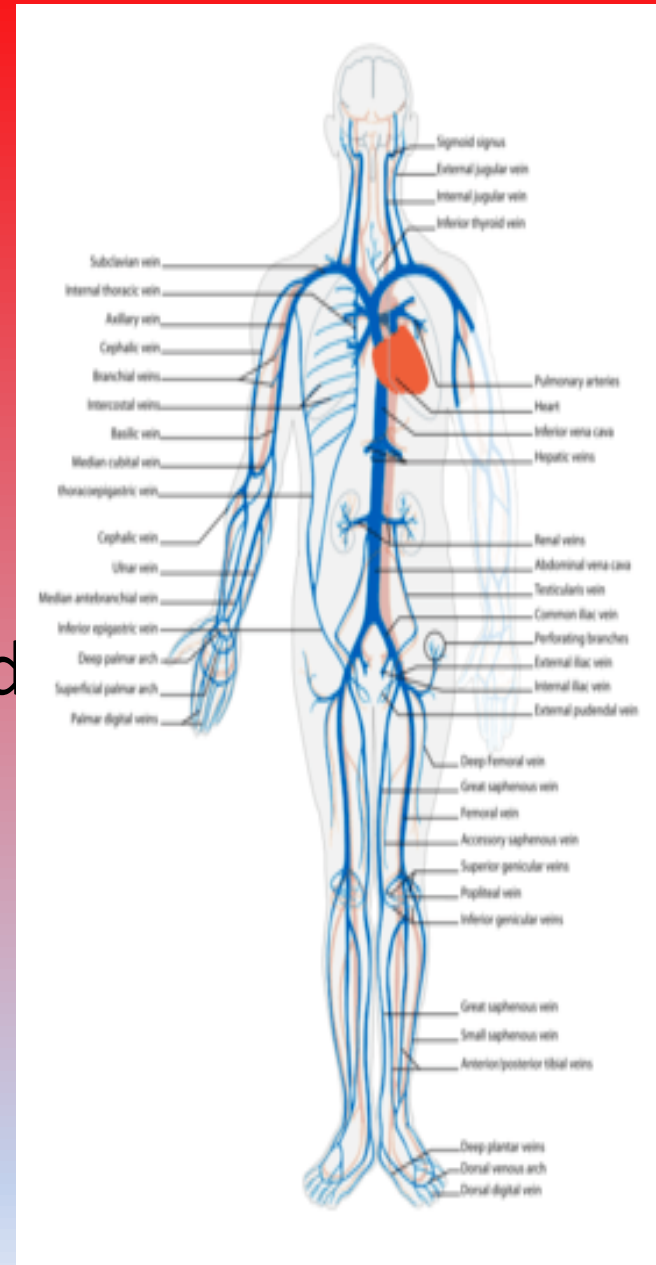
# Arteries

- Arteries carry blood AWAY from your heart.
- The pulmonary artery, in your heart, takes deoxygenated blood to the lungs to be replenished.
- The other arteries carry fresh blood to EVERY ORGAN OF THE BODY! (Blood exits the heart through the aorta)
- In diagrams, arteries are red to indicate fresh, oxygen-rich, ready to use blood.



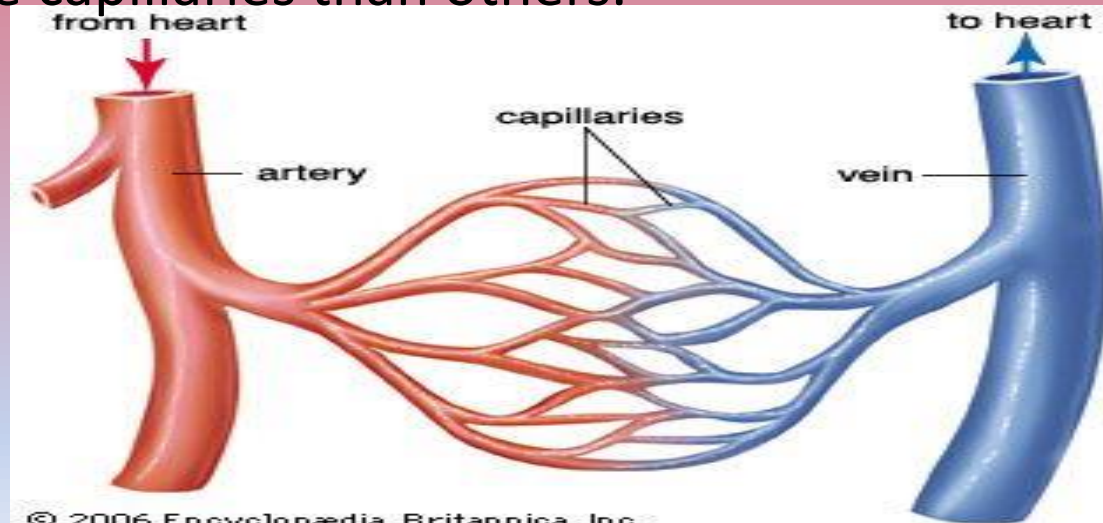
# Veins

- Veins carry blood TO the heart.
- The **Pulmonary Vein** connects the lungs to the heart.
- When the nutrients, oxygen, and other materials in blood have been delivered to and used by the organs, it returns to the heart through a system of veins to be replenished.
- In diagrams, veins are blue to indicate depleted blood.



# Capillaries

- Capillaries are tiny vessels that connect arteries and veins to organs and one another.
- They are one of the most important parts of the circulatory system because oxygen, nutrients, hormones, etc. are delivered to the organs through the capillaries.
- The number of capillaries connected to an organ depends on how much blood the organ needs. Very active organs like the liver and lungs have more capillaries than others.





# Blood

- Blood is our delivery system.
- Blood is essential for breath – it carries oxygen from the lungs to all the cells and carbon dioxide from the cells back to the lungs.
- Blood is essential for growth– it carries hormones from the endocrine system and nutrients from the digestive system to various body parts that need them.
- Blood is essential for health– it carries antibodies from the immune system that fight disease.
- Blood keeps us alive!

# What's in a drop?

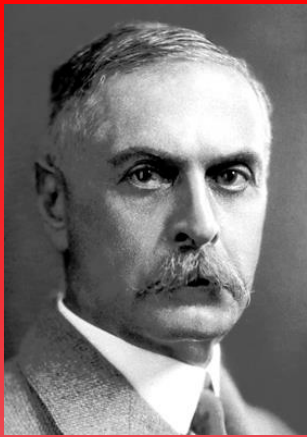
Blood has 4 components:.

Plasma-Yellow liquid made of mostly water mixed with nutrients, hormones, proteins, etc from the organs that need to be delivered to various locations in the body.

White Blood Cells-  
Bigger than Red blood cells but less plentiful. They fight disease and infection. If you are sick, your body produces much more white blood cells than usual to get you healthy again.

Red Blood Cells—  
Contain hemoglobin that makes blood turn red. Delivers oxygen to all body parts. Usually hundreds of these in a single drop of blood.

Platelets— tiny, round cells that clot together to stop bleeding if a vessel is broken. Without platelets, cuts or scrapes would bleed endlessly.



## Bad Blood?

- In the early days of blood transfusion, they had a very high failure rate. Sometimes, they would work, but most times the procedure would fail and the patient would die. (1818-1900)
- Karl Landsteiner discovered the four different blood types in 1901 and subsequently won the Noble Prize for his work.

# Blood Types

There are 4 major blood types: A, B, AB, and O

The blood types are named for the type of antigen (an antigen is a substance that triggers an immune system response i.e.- if the wrong one is in your body, your immune system attacks).

People with type A blood have an A antigen, and react negatively to B.

People with type AB blood have both antigens, and react negatively to neither.

People with type B blood have a B antigen, and react negatively to A.

People with type O blood have neither antigen, and react negatively to both.

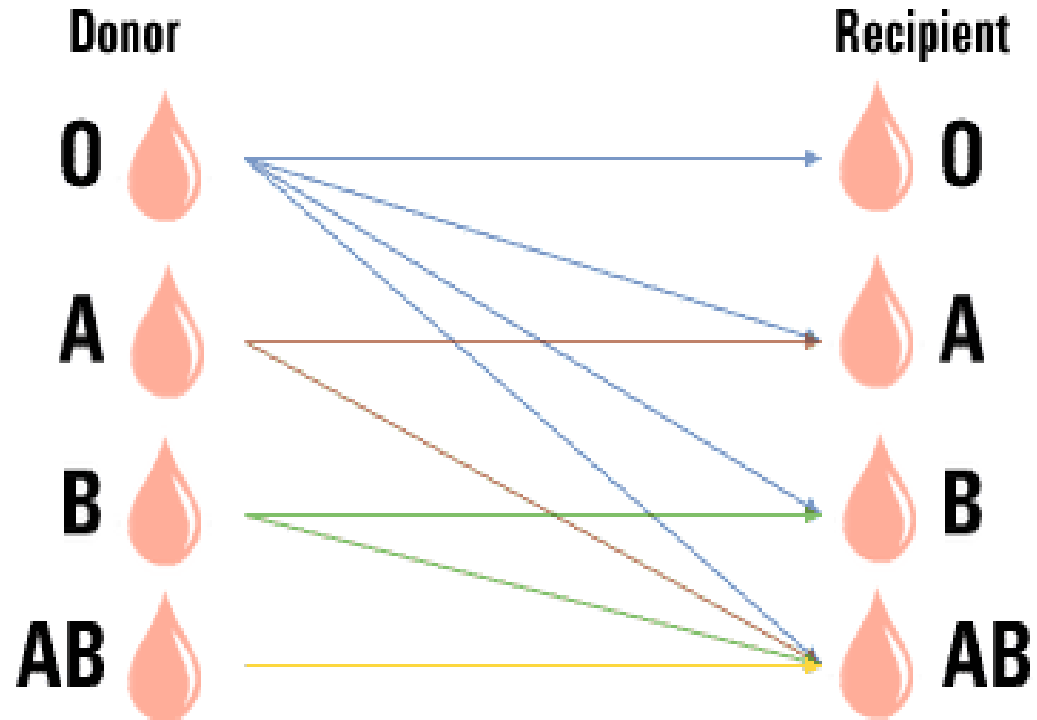
# Donating and Receiving Blood.

Group O can donate red blood cells to anybody. It's the universal donor.

Group A can donate red blood cells to A's and AB's.

Group B can donate red blood cells to B's and AB's.

Group AB can donate to other AB's, but can receive from all others.



\*Diagram Courtesy of the American Red Cross