

The Circulatory System

The Closed Circulatory System

- **Humans have a closed circulatory system: blood is confined to vessels and is distinct from the interstitial fluid.**

- The heart pumps blood into large vessels that branch into smaller ones leading into the organs.

- Materials are exchanged by diffusion between the blood and the interstitial fluid bathing the cells.

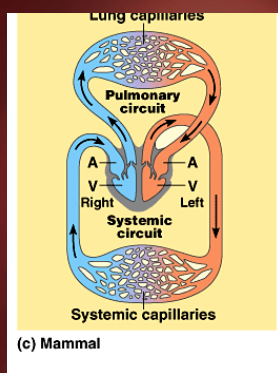
The Cardiovascular System

- **Pulmonary circulation**

- The blood pathway between the right side of the heart, to the lungs, and back to the left side of the heart.

- **Systemic circulation**

- The pathway between the left side of the heart, the body tissues, and the right side of the heart.



The Cardiovascular System

- **Composed of Three Major Elements –**

- 1. **The Heart**- organ that pumps blood around the body

- 2. **Blood Vessels** – arteries, veins and capillaries that carry blood around the body

- 3. **Blood** - a liquid tissue made up of water cells and other materials

The Cardiovascular System

2. Blood Vessels -A network of tubes

-**Arteries**→**arterioles** carry blood away from the heart

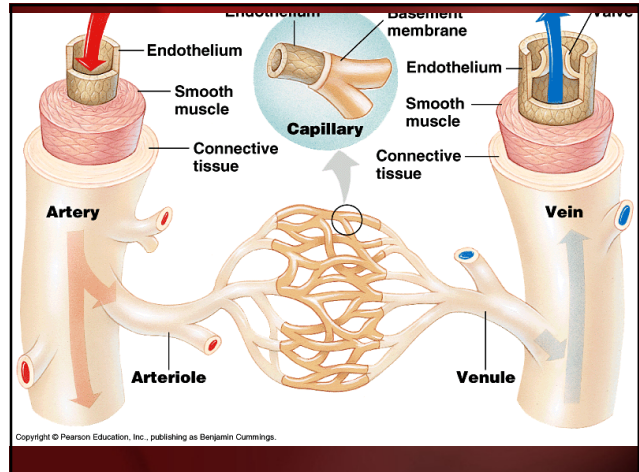
- Elastic Fibers
- Thick walled

-**Capillaries** – where gas and nutrient/waste exchange takes place.

- One cell layer thick

-**Veins**→**Venules** carry blood towards the heart

- Skeletal Muscles contract to force blood back from legs
- One way valves prevent back flow of blood

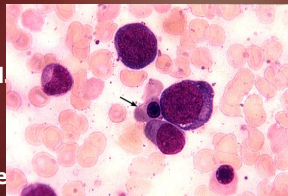


The Cardiovascular System

3. The Blood

A. Plasma

Liquid portion of the blood
Contains water, clotting factors, hormones, antibodies, dissolved gases, nutrients and waste



The Cardiovascular System

•The Blood

B. Erythrocytes - Red Blood Cells

-Carry hemoglobin and oxygen. Do not have a nucleus and live only about 120 days.

-Can not repair themselves.



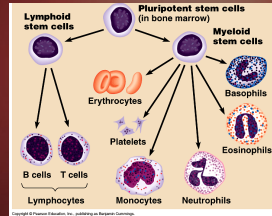
The Cardiovascular System

•The Blood

C. Leukocytes – White Blood cells

–Fight infection and are formed in the bone marrow

–Five types – neutrophils, lymphocytes, eosinophils, basophils, and monocytes.



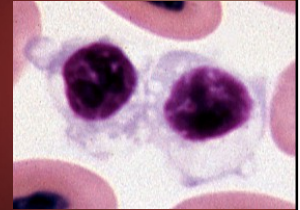
The Cardiovascular System

The Blood

•D. Thrombocytes – Platelets.

–These are cell fragment that are formed in the bone marrow.

–Clot Blood by sticking together – via protein fibers called **fibrin**.



The Heart

Composed of 4 chambers

- 2 atria (thin-walled receiving chambers)
- 2 ventricles (thick-walled pumping chambers)

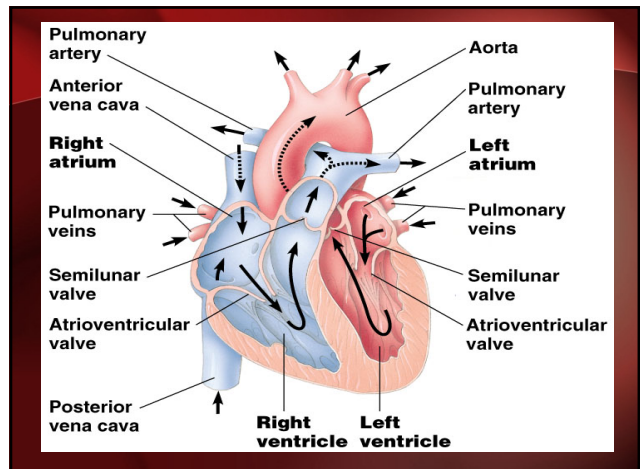
The heart is a double pump:

Right side:

- receives deoxygenated blood from the body
- pumps deoxygenated blood to the lungs

Left side:

- receives oxygenated blood from the lungs
- pumps oxygenated blood to all body tissues



Pathway of the blood

•From body organs and cells----> Superior /Inferior Vena Cava

•---->Right Atrium Tricuspid Valve---->Right Ventricle -->

• Pulmonary semilunar valve---->Pulmonary Arteries ---->

•Lungs---->Pulmonary Veins----->

•Left atrium Bicuspid Valve---->Left Ventricle ---->

Aortic Semilunar Valve---->Aorta----> To the body organs & cells

Disorders of the Circulatory System

- **Anemia** - lack of iron in the blood, low RBC count
- **Leukemia** - white blood cells proliferate wildly, causing anemia
- **Hemophilia** - bleeder's disease, due to lack of fibrinogen in thrombocytes
- **Heart Murmur** - abnormal heart beat, caused by valve problems
- **Heart attack** - blood vessels around the heart become blocked with plaque, also called *myocardial infarction*