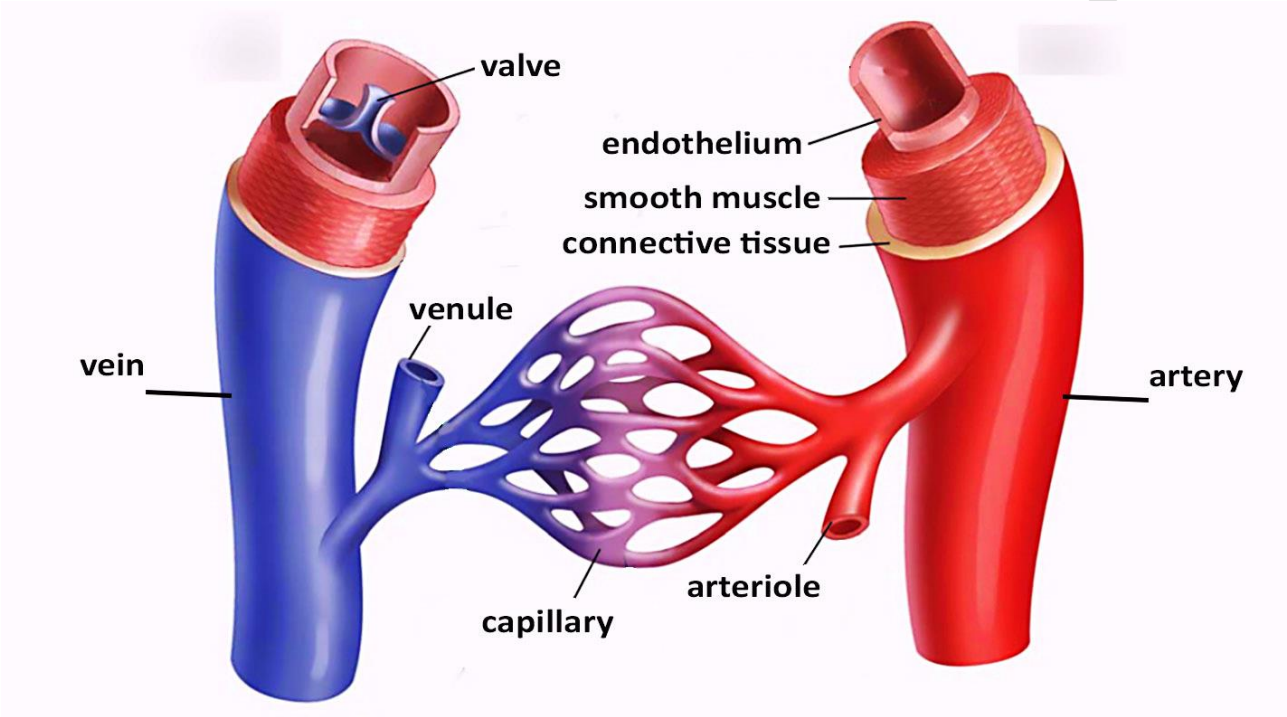
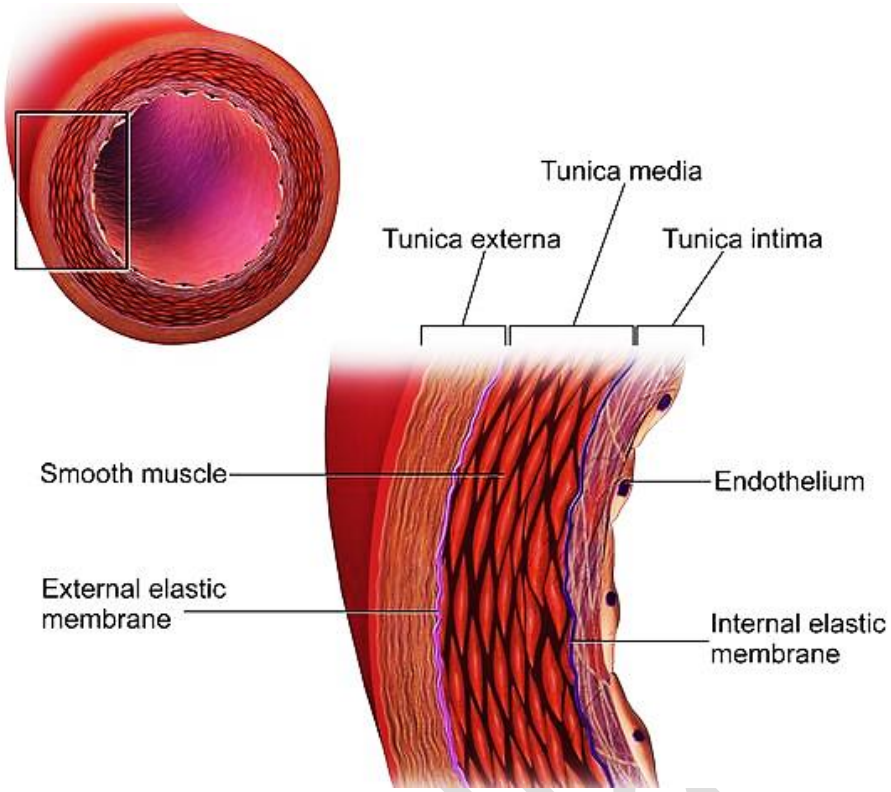
Blood Vessels الاوعية الدموية

Blood vessels are an essential part of the circulatory system in humans. They form a complex network of tubes that transport blood throughout the body, delivering oxygen, nutrients, hormones, and other vital substances to the tissues and organs. There are three main types of blood vessels: arteries, veins, and capillaries.

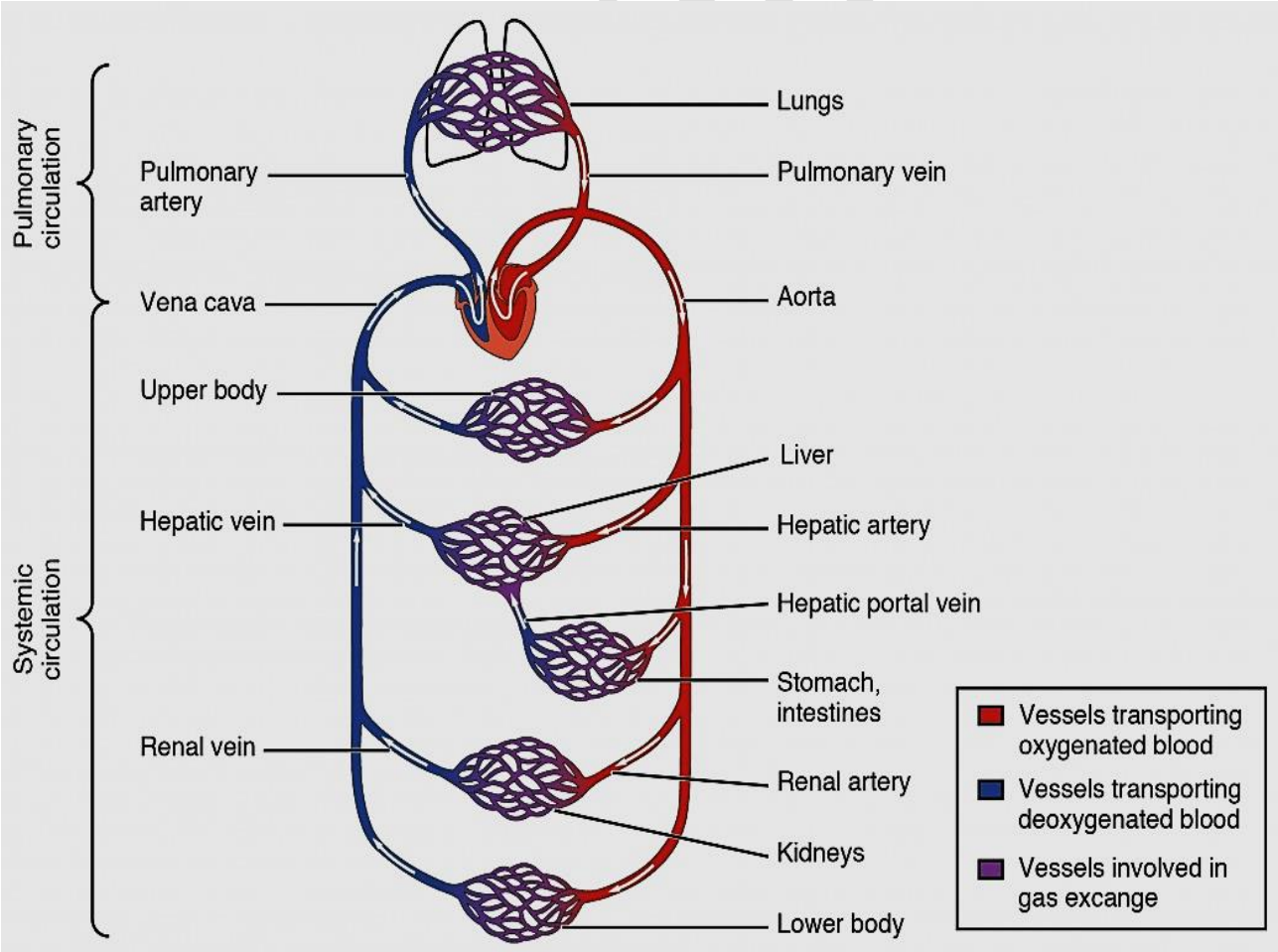


Arteries الشرايين

- Arteries are blood vessels that carry oxygenated blood away from the heart to the tissues and organs of the body. This allows oxygen and nutrients to reach the cells of the body.
- They have thicker, more elastic walls than veins to withstand the higher blood pressures coming directly from the heart. The walls are made up of:
  - ✓ outer layer (tunica externa): It is composed of connective tissue
  - ✓ middle layer (tunica media): It is composed of smooth muscle cells
  - ✓ inner layer (tunica intima): It is composed of a single layer of endothelial cells

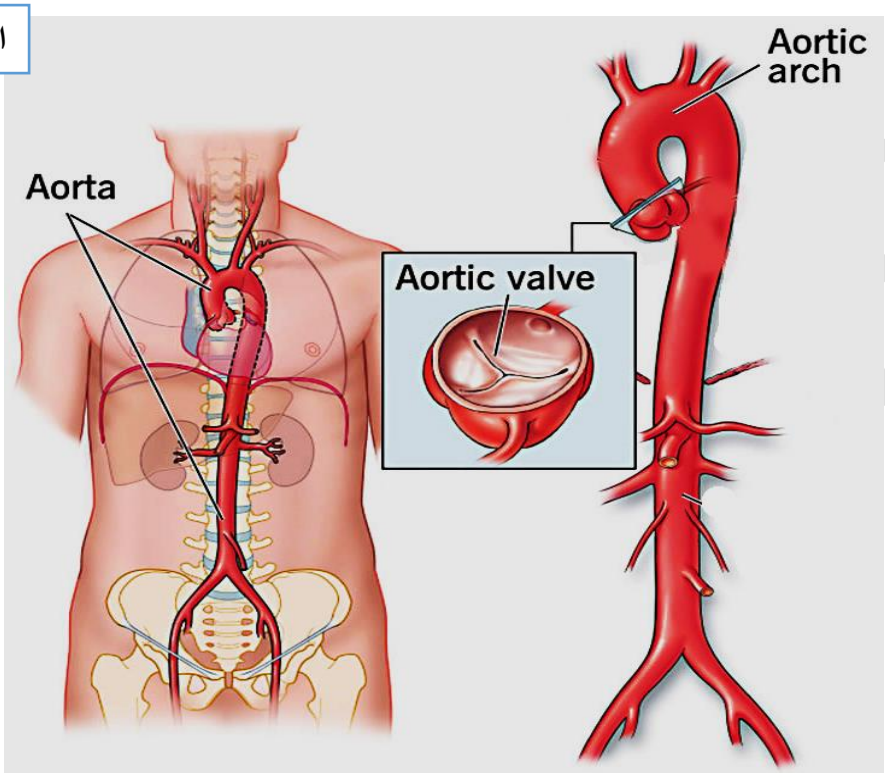


Types of arteries in the human circulatory system



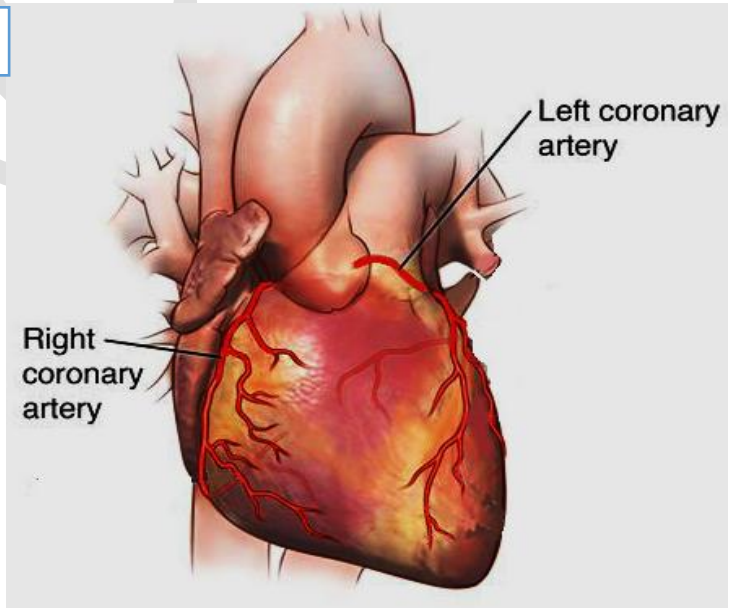
1. **Aorta** : the largest artery in the body, it carries oxygen-rich blood away from the heart to all parts of the body. The aorta starts at the left ventricle of the heart and runs down through the chest and abdomen, branching into smaller arteries along the way. The aorta is about (2.5 cm) in diameter.

الشريان الابهر



2. **Coronary arteries** : supply the heart muscle itself with oxygenated blood. The right and left coronary arteries branch off the aorta and spread over the surface of the heart. The diameter of the coronary arteries ranges about (0.5 – 4) mm

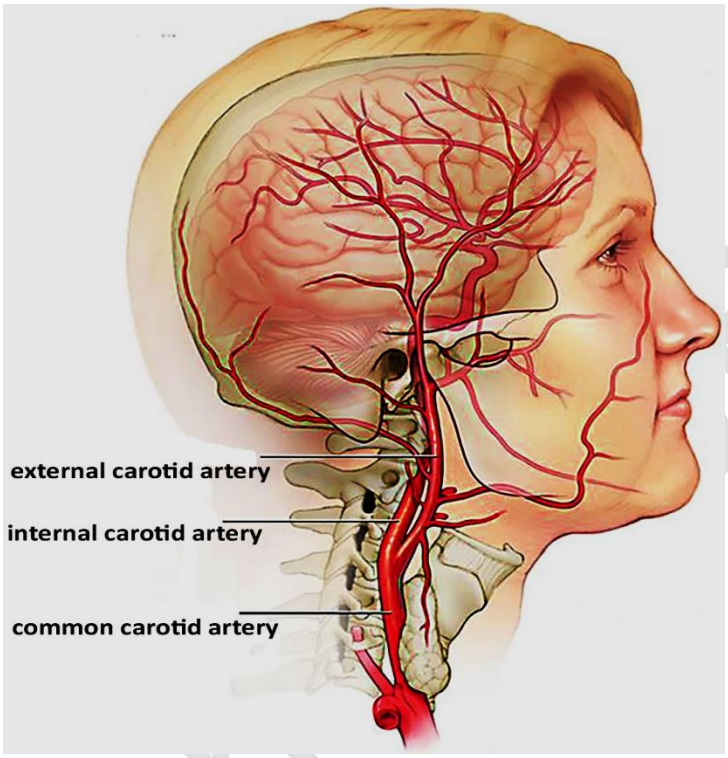
الشريان التاجي



3. Carotid arteries : there is a right and left common carotid artery on each side of the neck that carry blood to the head and brain. Each branches into the:

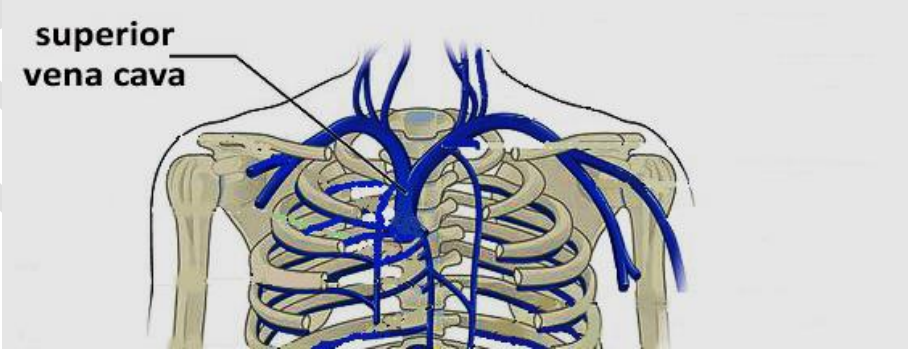
- ✓ **Internal carotid - supplies the brain**
- ✓ **External carotid - supplies face, scalp, skull and meninges**

الشريان السباتي



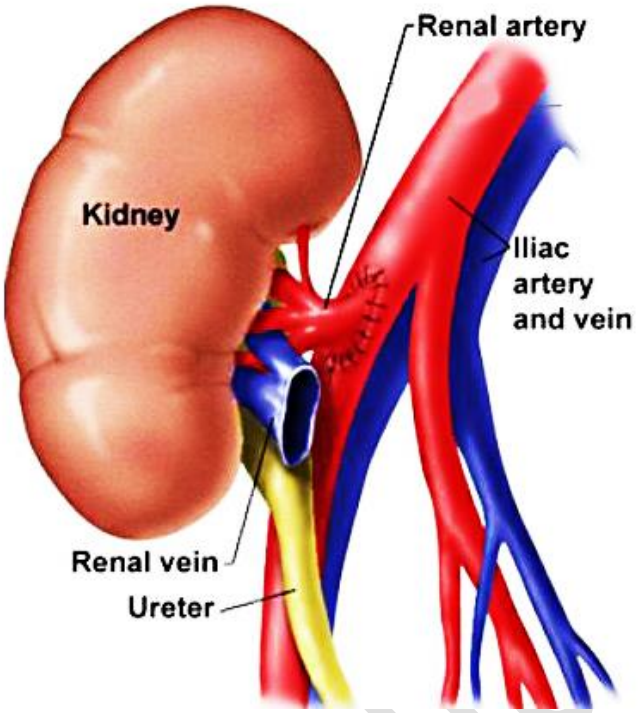
4. Subclavian arteries : a right and left subclavian artery that carries blood to the arms, shoulders and upper back.

الشريان تحت الترقوة



5. Renal arteries : branch off the abdominal aorta and carry blood to the kidneys.

الشريان الكلوي



6. Iliac arteries : branch off the descending aorta and take blood to the pelvis and legs.

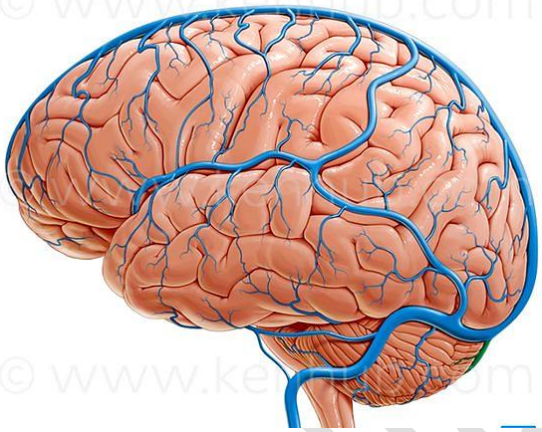
الشريان الحرقفي

Veins الاوردة

are blood vessels that carry deoxygenated blood from the body tissues back to the heart. Veins have thinner walls and valves that prevent backflow of blood and range from (1 – 30) mm in diameter. Some veins include:

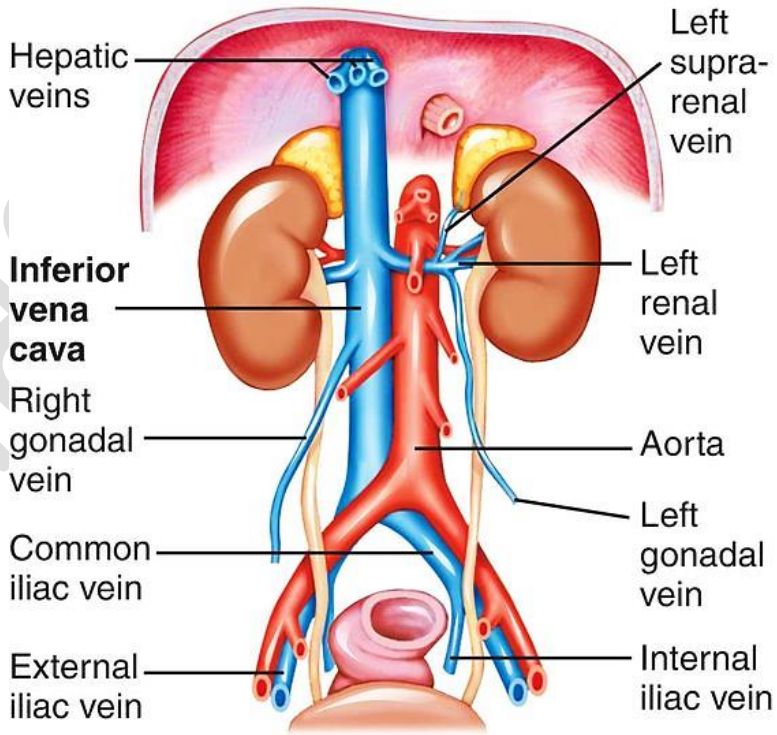
1. Jugular veins : return blood from the brain

الوريد الوداجي

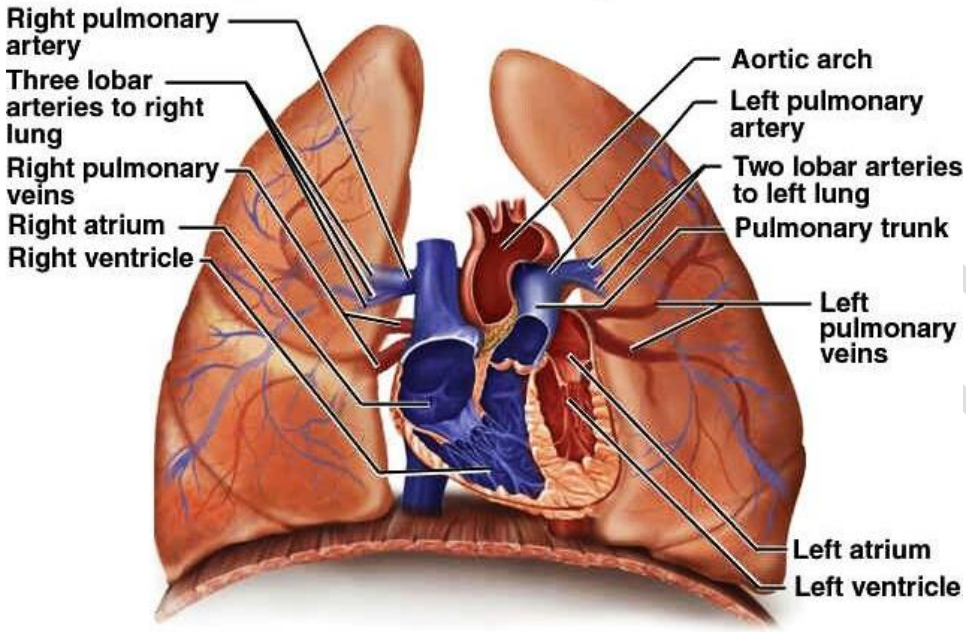


2. Vena cava : two large veins that return blood from the upper and lower parts of the body back to the heart.

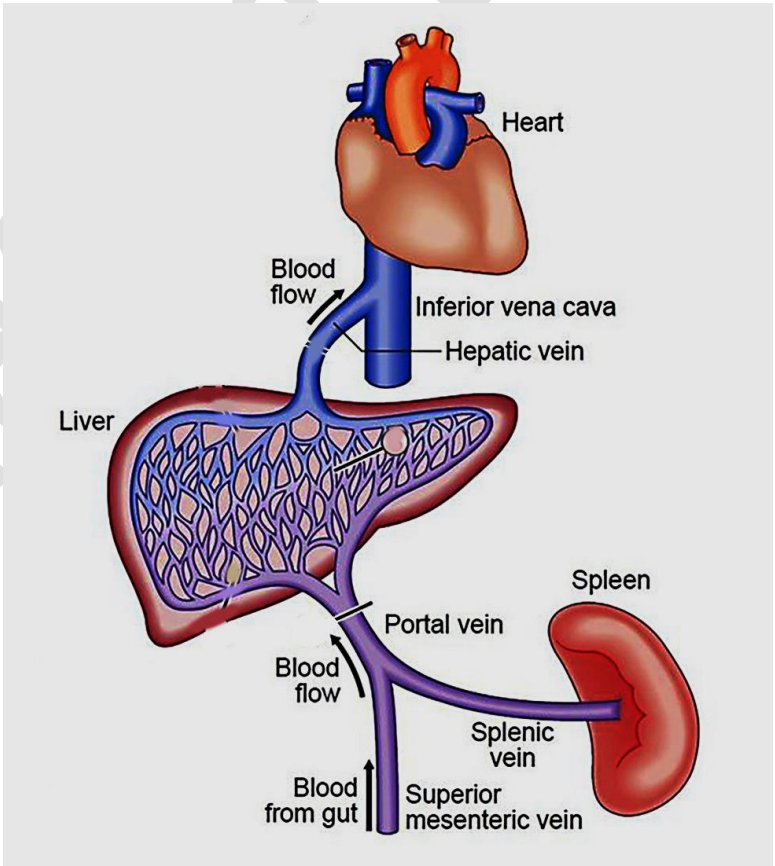
الوريد الاجوف



3. Pulmonary veins : carry newly oxygenated blood from the lungs back into the left atrium of the heart. الوريد الرئوي



4. Portal vein : transports blood from the gastrointestinal system to the liver for filtering before returning it to the heart. الوريد البابي



Capillaries الشعيرات الدموية

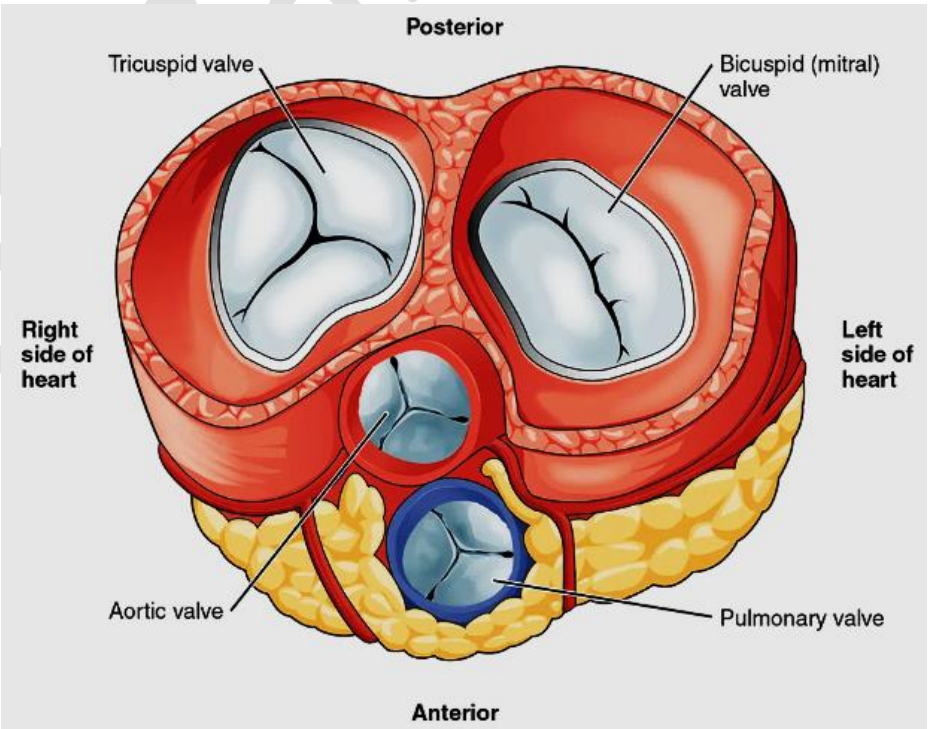
are the smallest and thinnest blood vessels in the body. They connect arteries and veins and are responsible for the exchange of gases, nutrients, and waste products between the blood and the tissues. Capillary walls are composed of a single layer of endothelial cells, which allows for easy diffusion of substances. They are about (5-10) µm in diameter.

Valves الصمامات

They open to allow blood to flow through and then close to prevent backflow.

Located between the chambers of the heart and at the exits. Ensure one-way blood flow through the heart. There are several types:

- ✓ **Tricuspid valve** - between right atrium and right ventricle
- ✓ **Bicuspid (Mitral) valve** - between left atrium and left ventricle
- ✓ **Pulmonary valve** - at the exit of the right ventricle to the lungs
- ✓ **Aortic valve** - at the exit of the left ventricle to the aorta
- ✓ **Venous Valves** - found in veins, especially in the legs and feet. Prevent backflow of blood.



Nervous System in Human Body

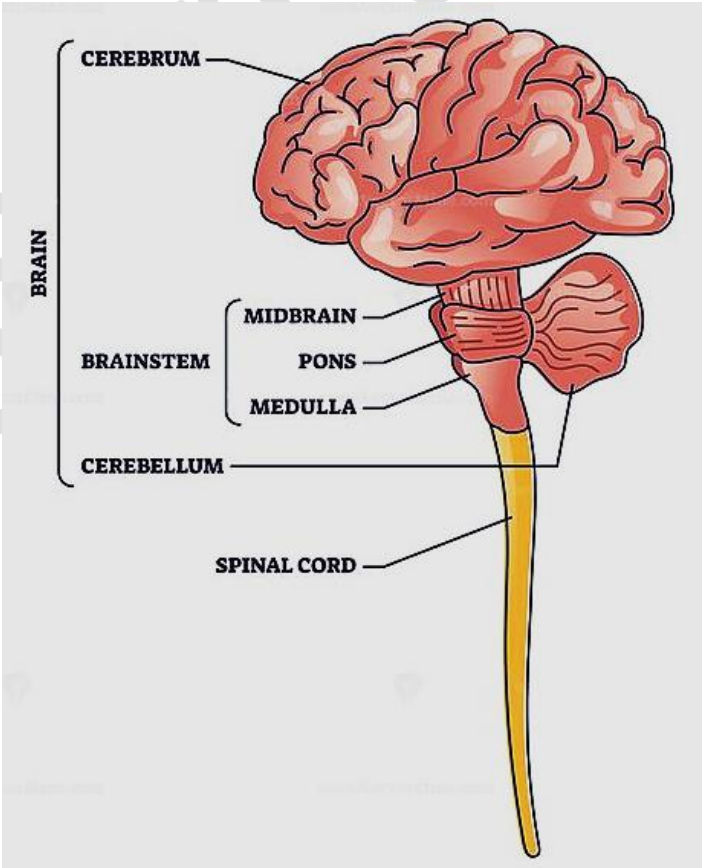
The nervous system consists of the central nervous system (CNS) and peripheral nervous system (PNS).

1. **Central Nervous System (CNS)**

- Consists of the brain and spinal cord

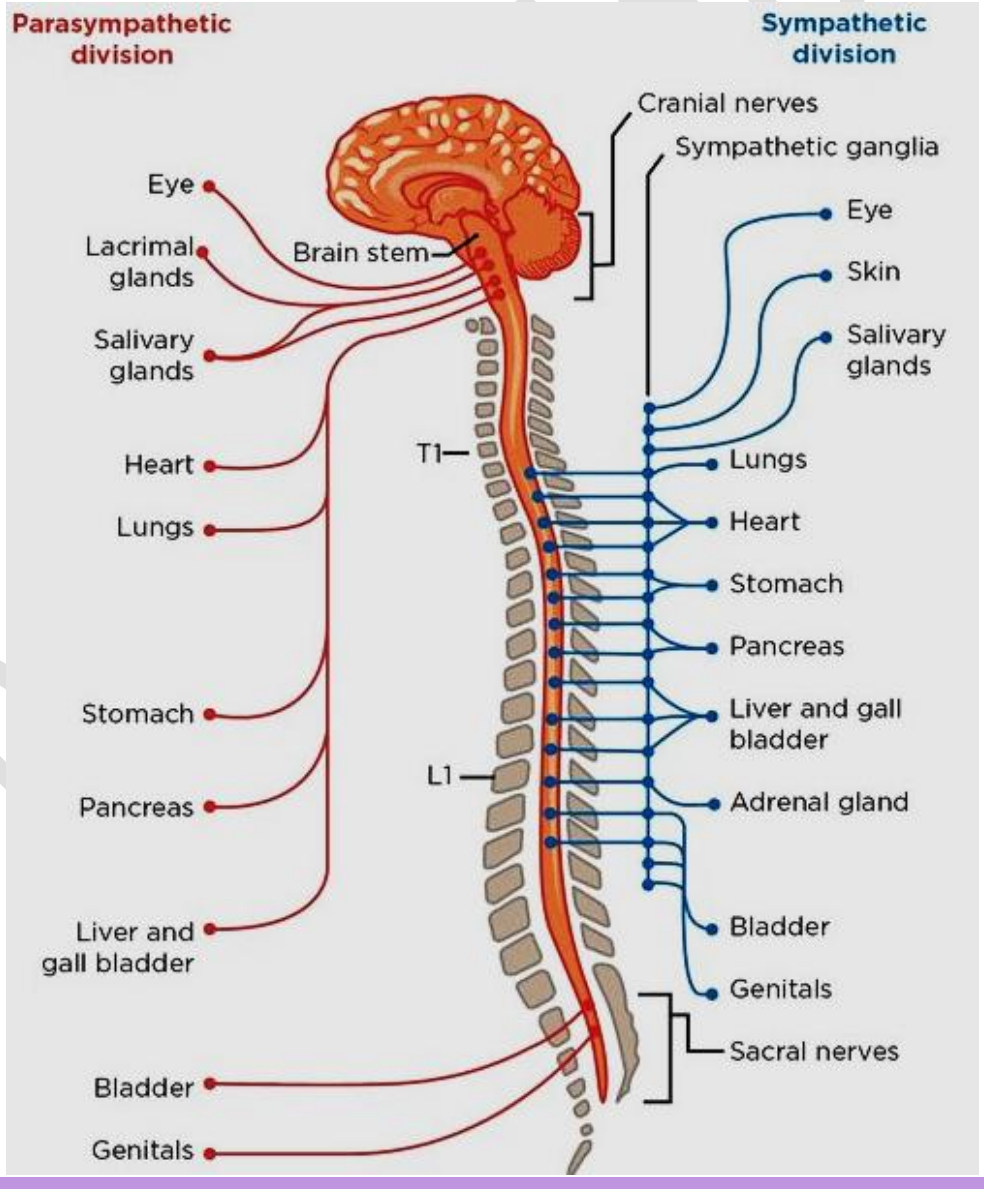
- **Brain** : is command center. It is divided into different regions, each with specific functions such as:
  - ✓ cerebrum (responsible for conscious thought, memory, speech and sensory processing)
  - ✓ cerebellum (responsible for coordination and balance)
  - ✓ brainstem (responsible for regulates breathing and heartbeat)
- **Spinal Cord** : is a long, cylindrical bundle of nerve fibers that extends from the base of the brain to the lower back. It serves as a communication pathway between the brain and the rest of the body.

الحبل الشوكي



2. Peripheral Nervous System (PNS)

- Consists of all nerves that lie outside brain and spinal cord
- Connect the CNS to the rest of the body
- It is further divided into two components:
  - Somatic nervous system: controls voluntary muscle movement
  - Autonomic nervous system:
    - ✓ Sympathetic: mobilizes body in times of stress. It increases heart rate, dilates blood vessels, and prepares the body for "fight-or-flight" responses.
    - ✓ Parasympathetic: helps the body to decrease stress, decrease heart rate, conserves energy and promotes digestion



The Neuron الخلية العصبية

is play a critical role in transmitting and processing information throughout the body. Neurons are composed of three main parts:-

- ✓ **Cell body (soma) : contains the nucleus and carries out essential cellular functions.**
- ✓ **Dendrites : are branch-like extensions that receive signals from other neurons or sensory receptors. They collect information and transmit it towards the cell body.**
- ✓ **Axon : is a long, cable-like projection that carries electrical signals, known as action potentials, away from the cell body to other neurons, muscles, or glands.**

Neurons also have a unique feature called the myelin sheath, which is a fatty substance that surrounds the axon and acts as an insulating layer. It helps to speed up the conduction of electrical signals along the axon.