



มหาวิทยาลัยราชภัฏเพชรบุรี



Anatomy of Circulation system



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Topic

Anatomy of Circulation system:

I: Anatomy of Heart

II: Anatomy of Blood vessels



Anatomy of Circulation system:

I: Anatomy of Heart



Learning objects

1. To understand the structure of the heart anatomy and its chambers
2. Know the internal features of the atria and ventricle
3. To understand coronary circulation



Pre-test

- Which one is right or wrong?

_____ 1. Heart weight is about 250-300 g.

_____ 2. The heart pumps blood through the network of arteries and veins

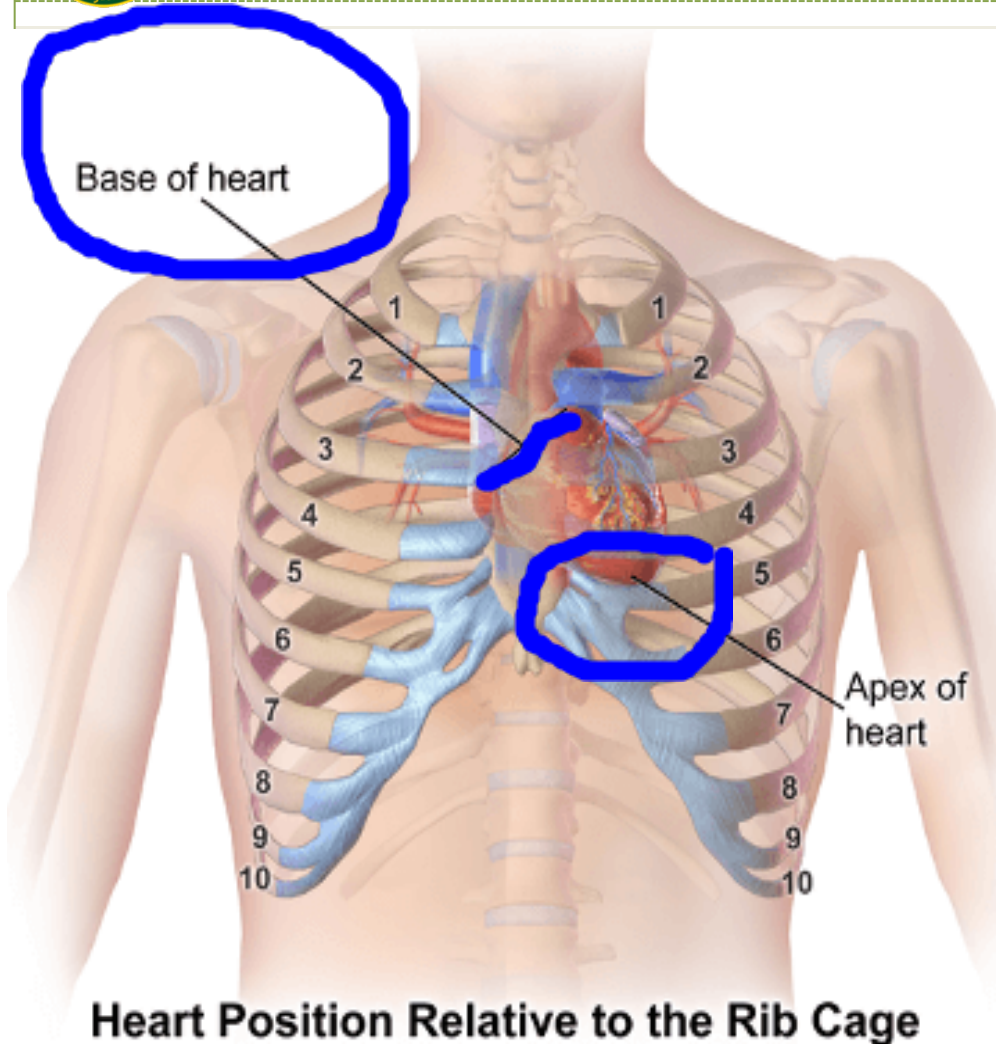
_____ 3. The heart pumping blood around your body as your heart beats.

_____ 4. Bicuspid valve is like gate between Rt. atrium and Rt. Ventricle

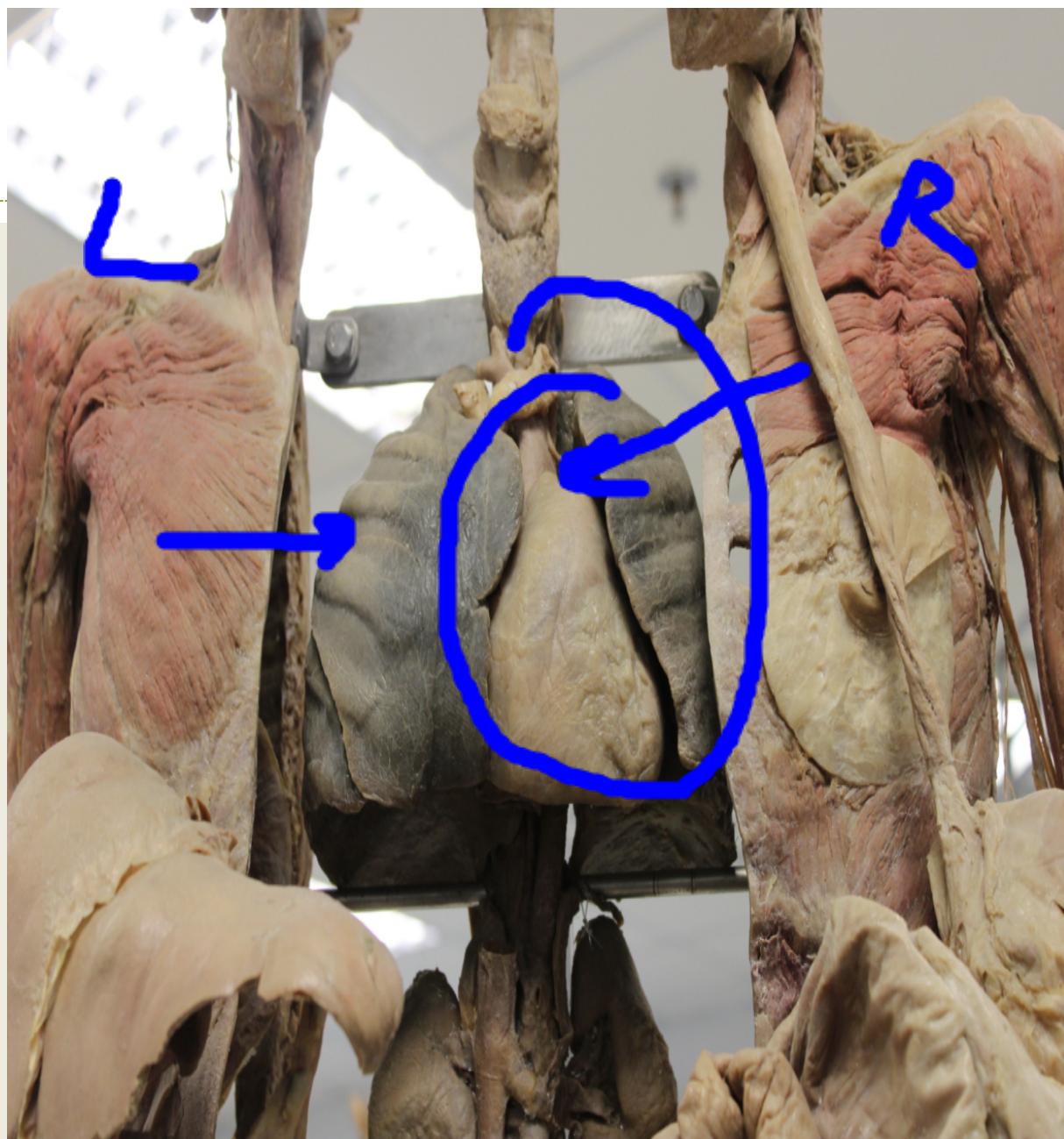
_____ 5. The heart's natural 'pacemaker' is the sino-atrial node



Location of the Heart

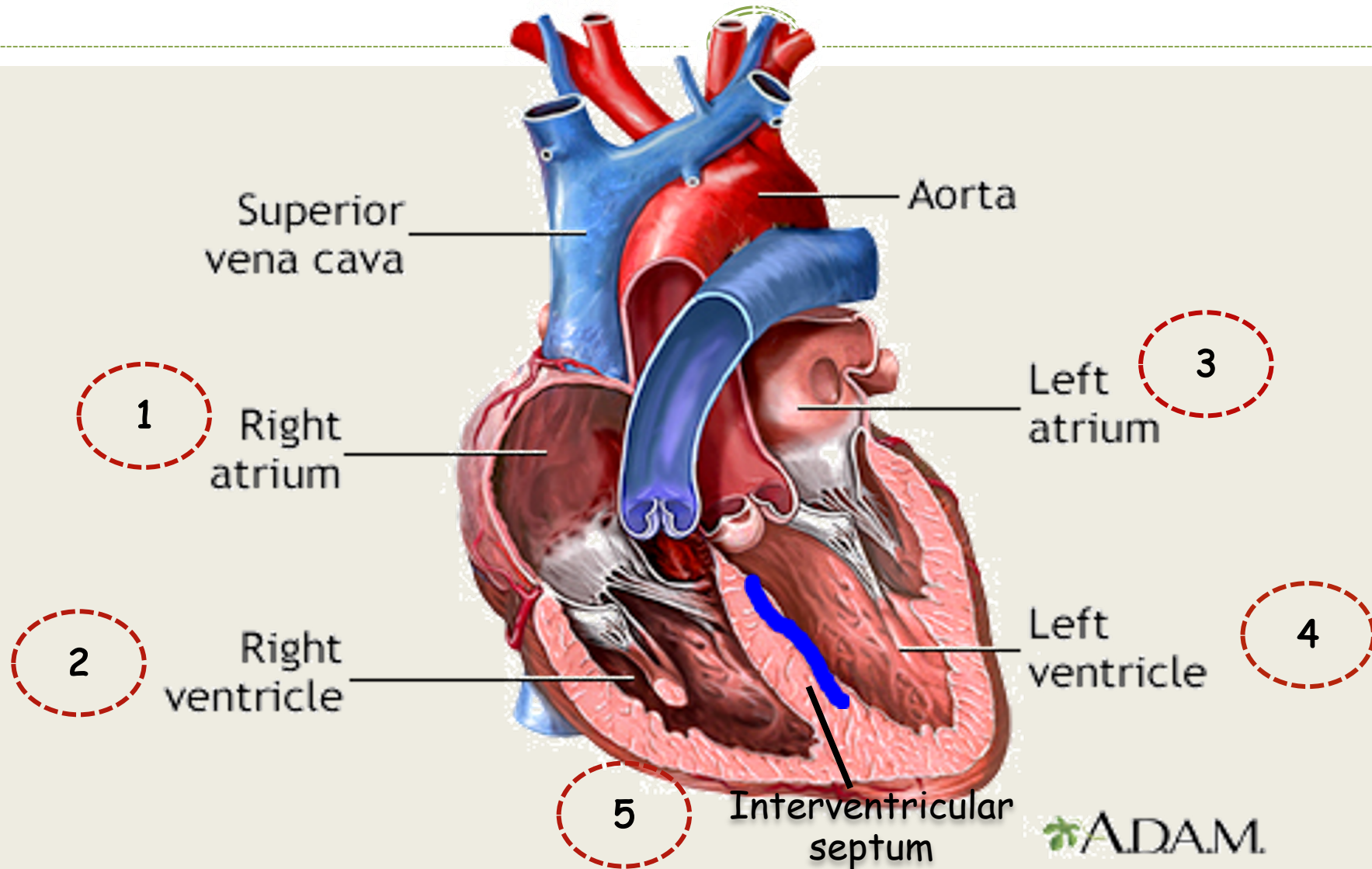


- The heart is located in the chest between the lungs behind the sternum and above the diaphragm.
- It is surrounded by the pericardium.
- Its weight is about 250-300 g.
- Its center is located about 1.5 cm to the left of the mid sagittal plane.
- The esophagus and the spine lie further behind the heart.



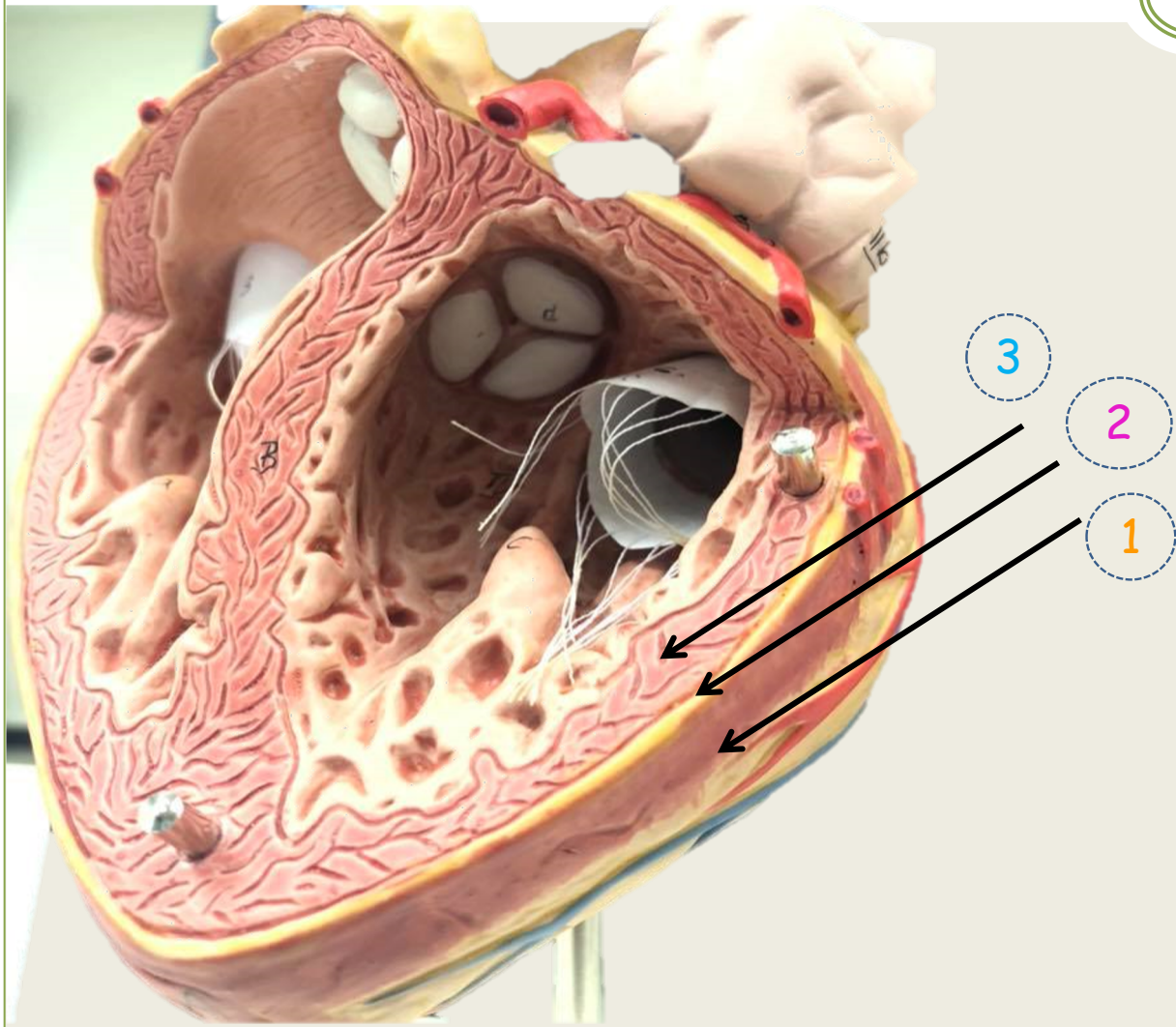


Heart: Chambers of the Heart





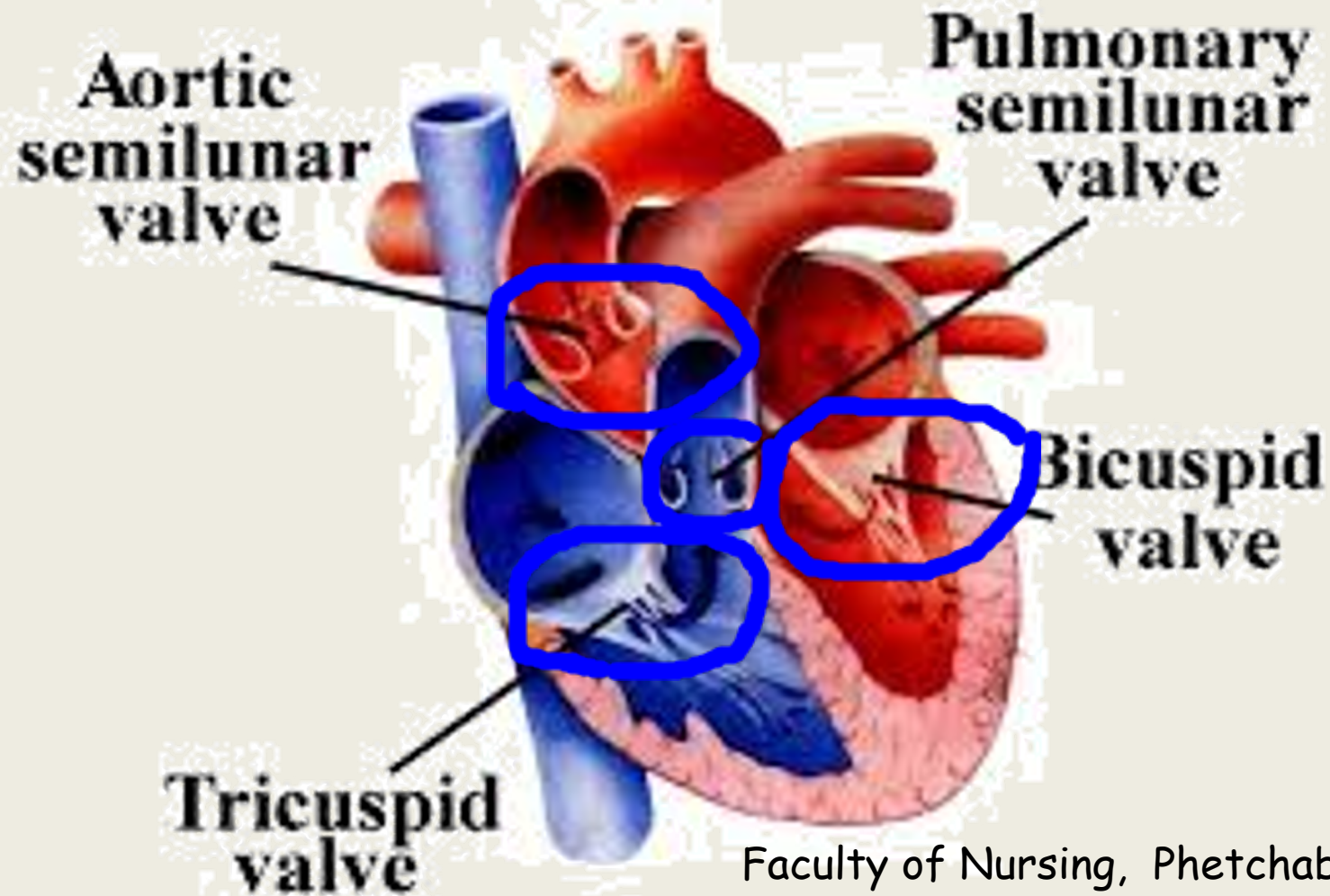
Heart: Layers of the Heart wall



- 1 Epicardium
- 2 Myocardium
- 3 Endocardium



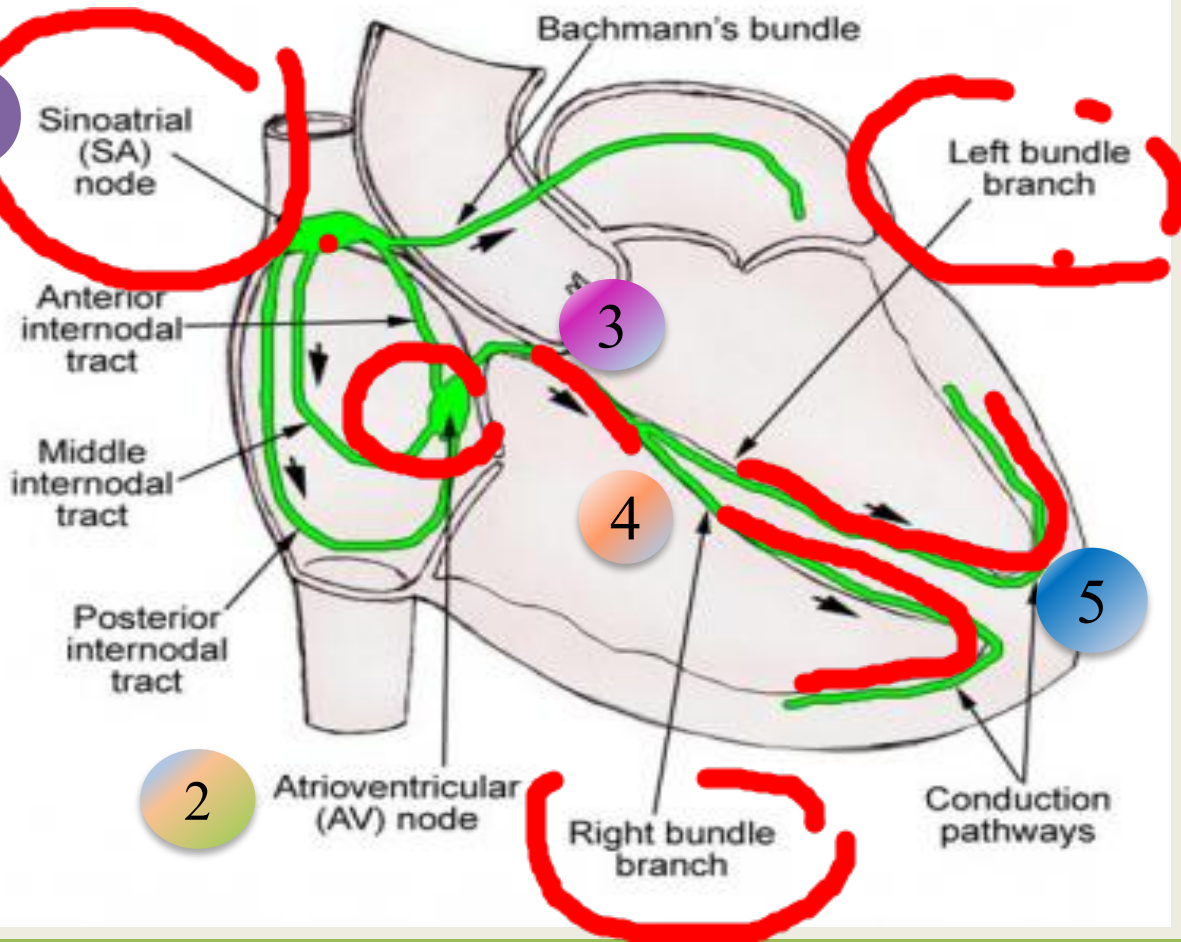
Heart: Valves





Conduction System of the heart

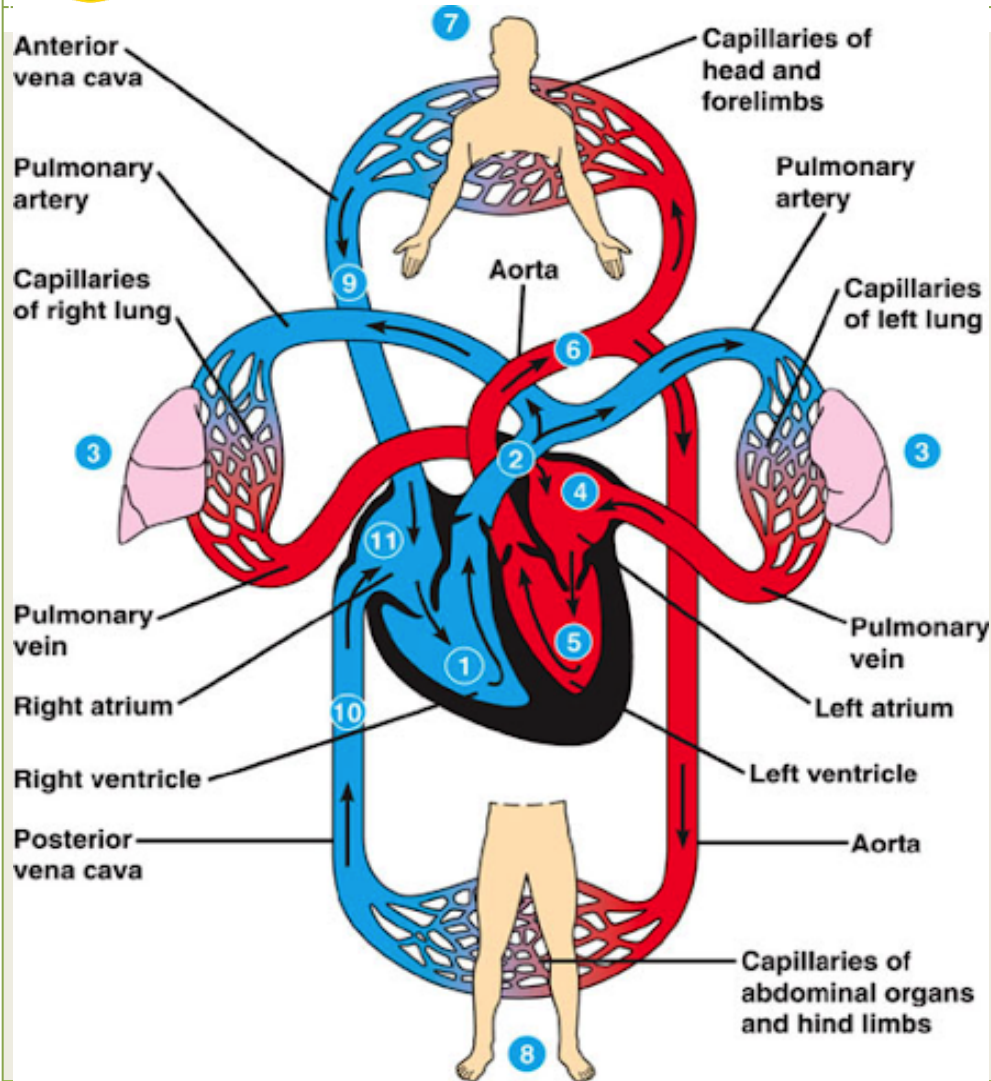
Electrical system of the heart



- 1 Sinoatrial node (SA node)
- 2 Atrioventricular node (AV node)
- 3 Bundle of HIS
- 4 Bundle branch
- 5 Purkinje fiber



The circulation system

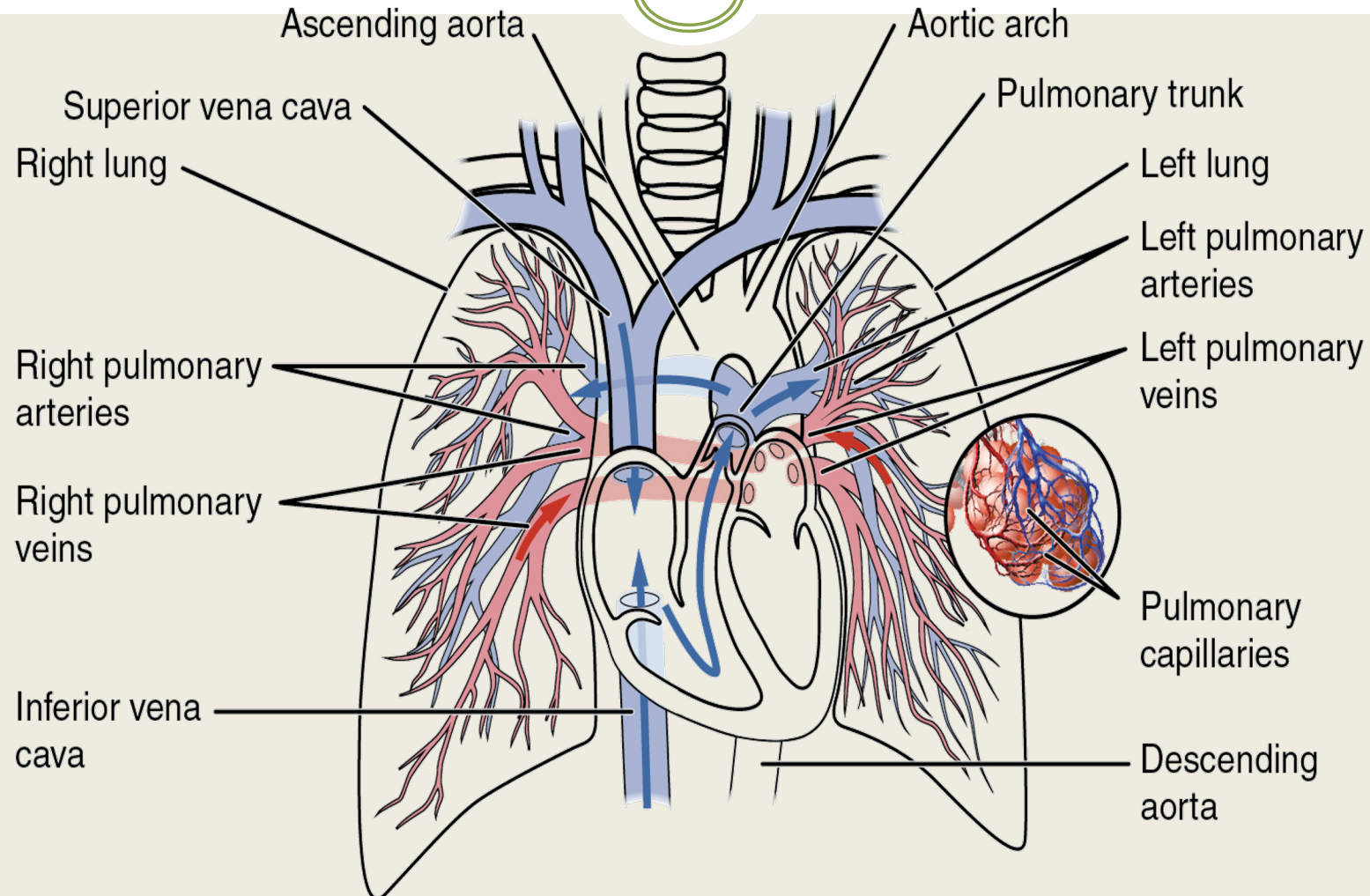


Two pathways come from the heart:

- The pulmonary circulation is a short loop from the heart to the lungs and back again.
- The systemic circulation carries blood from the heart to all the other parts of the body and back again.



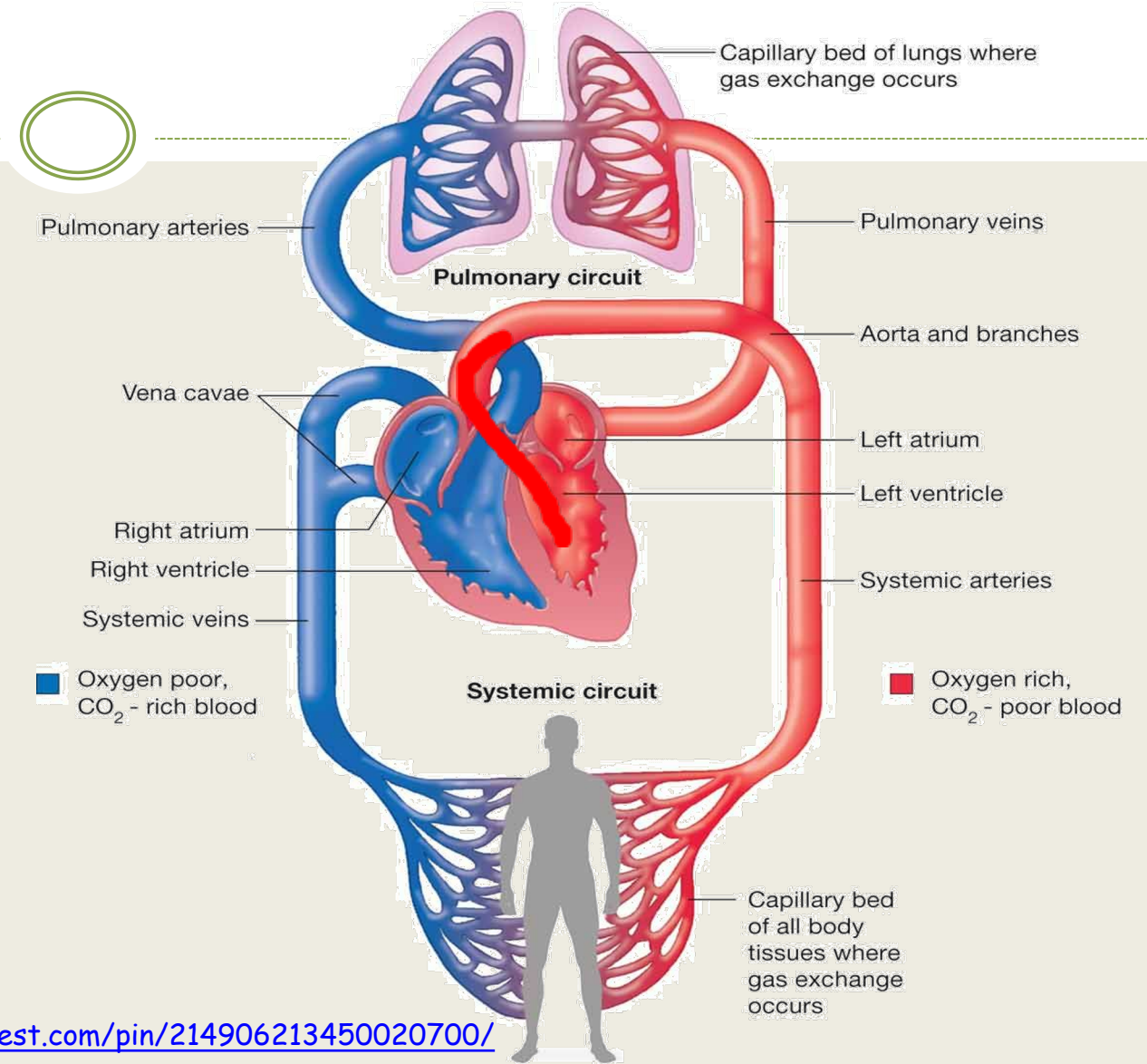
Pulmonary circulation



https://en.wikipedia.org/wiki/Pulmonary_circulation



Systemic circulation



<https://www.pinterest.com/pin/214906213450020700/>



Coronary circulation

Coronary circulation, part of the systemic circulatory system that **supplies blood to and provides drainage from the tissues of the heart.**

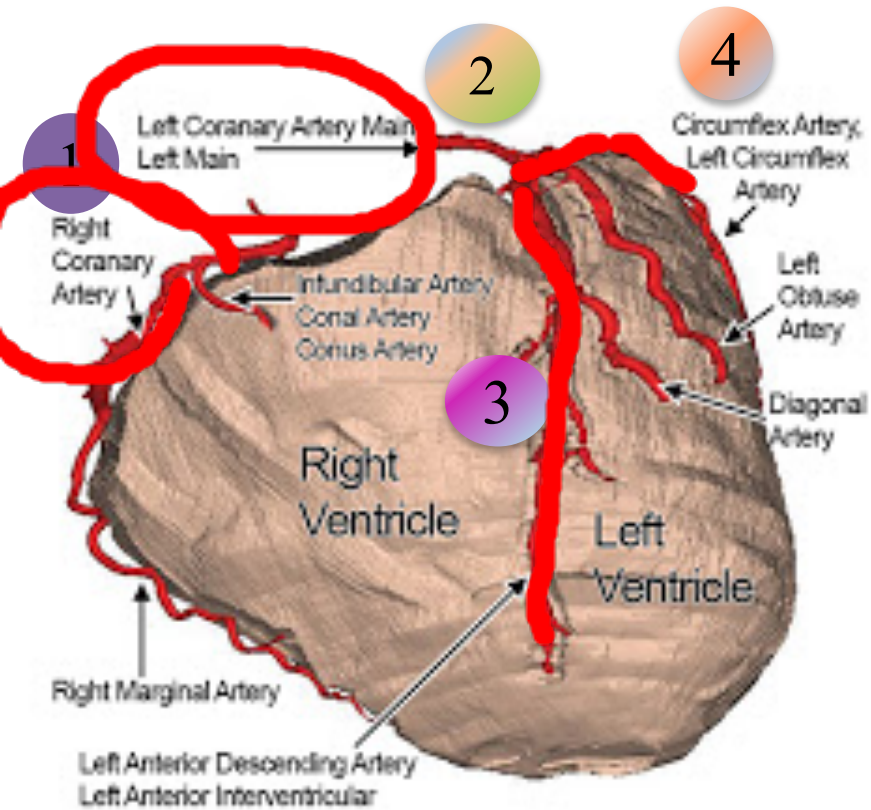
In the human heart, **two coronary** arteries arise from the aorta. The increased aortic pressure above the semilunar valves; during diastole, forces blood into the coronary arteries and thence into the musculature of the heart.

Deoxygenated blood is returned to the chambers of the heart via coronary sinus, which drains into the right atrium.

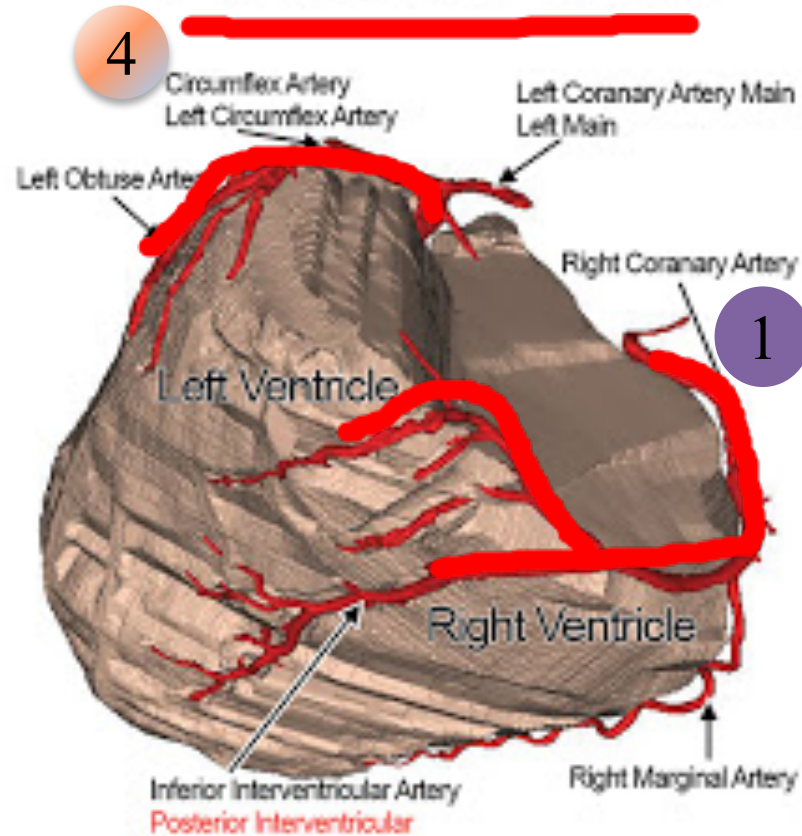


Coronary artery anatomy

Anterior View



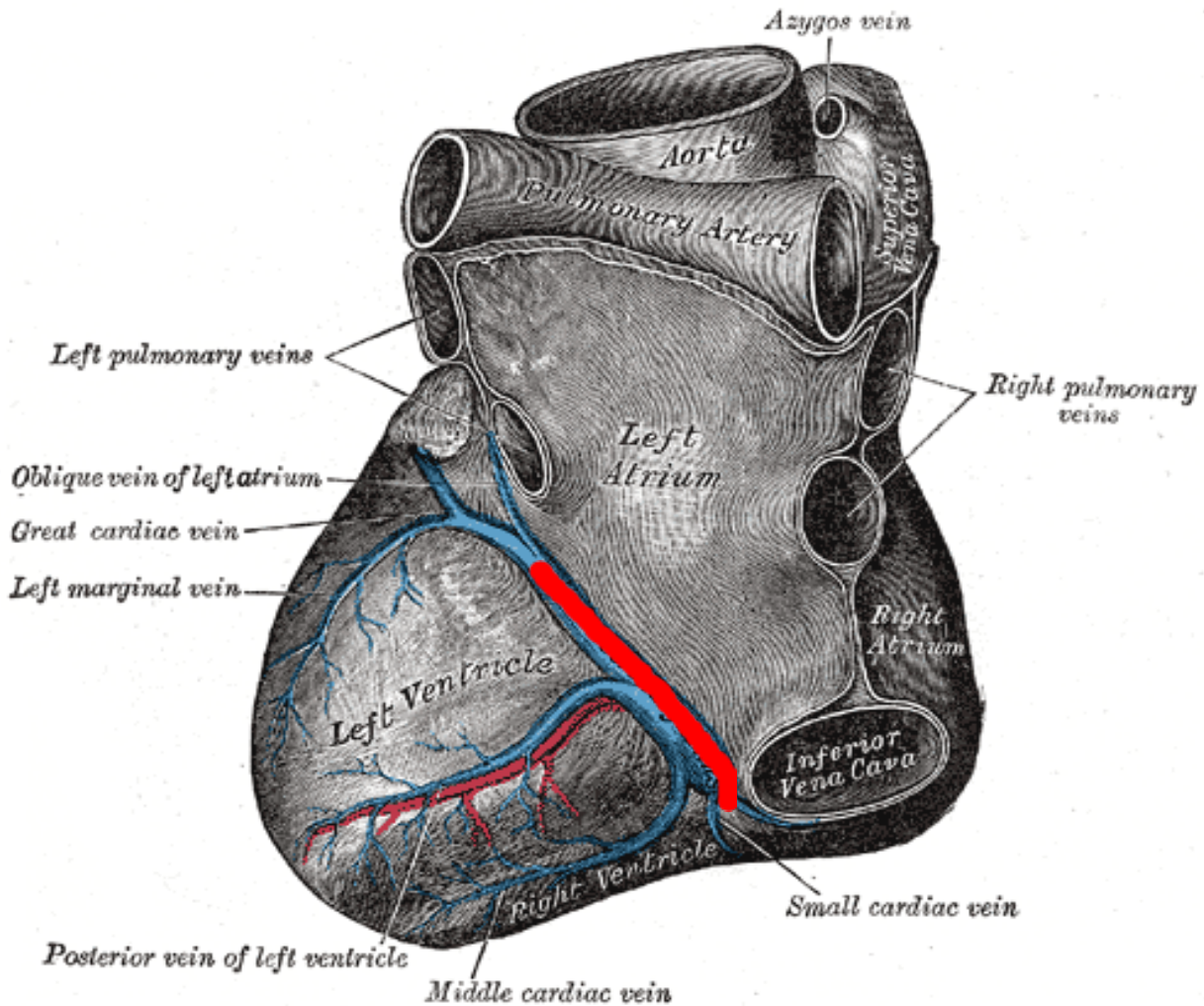
Posterior View



- 1 Right coronary artery
- 2 Left main coronary artery
- 3 Left anterior descending coronary artery
- 4 Circumflex coronary artery



Coronary sinus



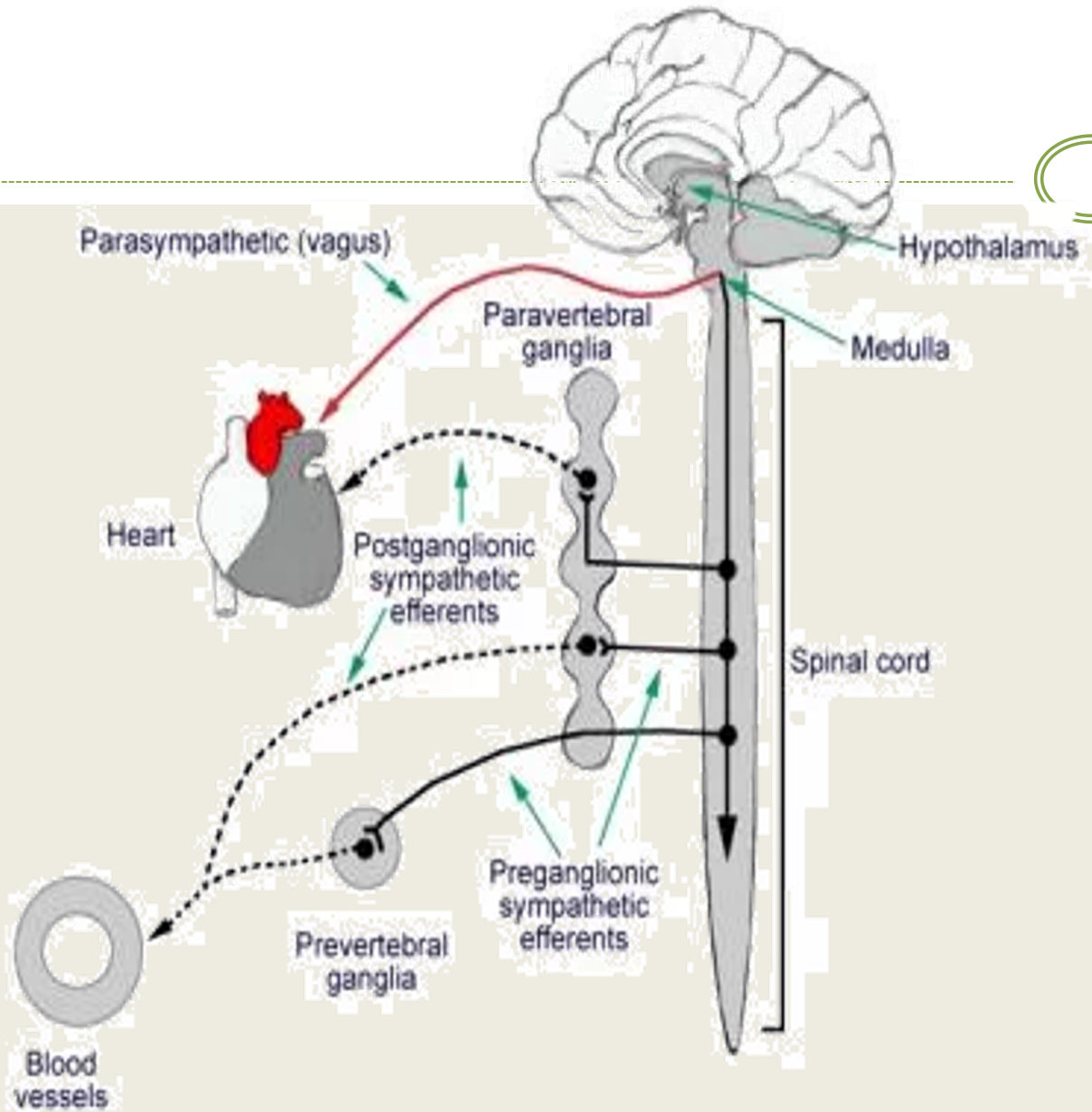
Cardiac veins

- The great cardiac vein
- The middle cardiac vein
- The small cardiac vein
- The smallest cardiac veins
- The anterior cardiac veins.

Most of the blood of the coronary veins returns through **the coronary sinus.**

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Nerve supply the Heart



The heart is innervated by **sympathetic** and **parasympathetic** fibers of the autonomic nervous system via the cardiac plexuses situated below the arch of the aorta



Anatomy of Circulation system:

II: Anatomy of Blood vessels



Learning objects

1. To understand the structure of blood vessels walls.
2. To understand the structures and functions of the various blood vessels.



The three major types of vessels

Blood is carried in a closed system of vessels that begins and ends at the heart. The three major types of vessels are **arteries**, **capillaries**, and **veins**

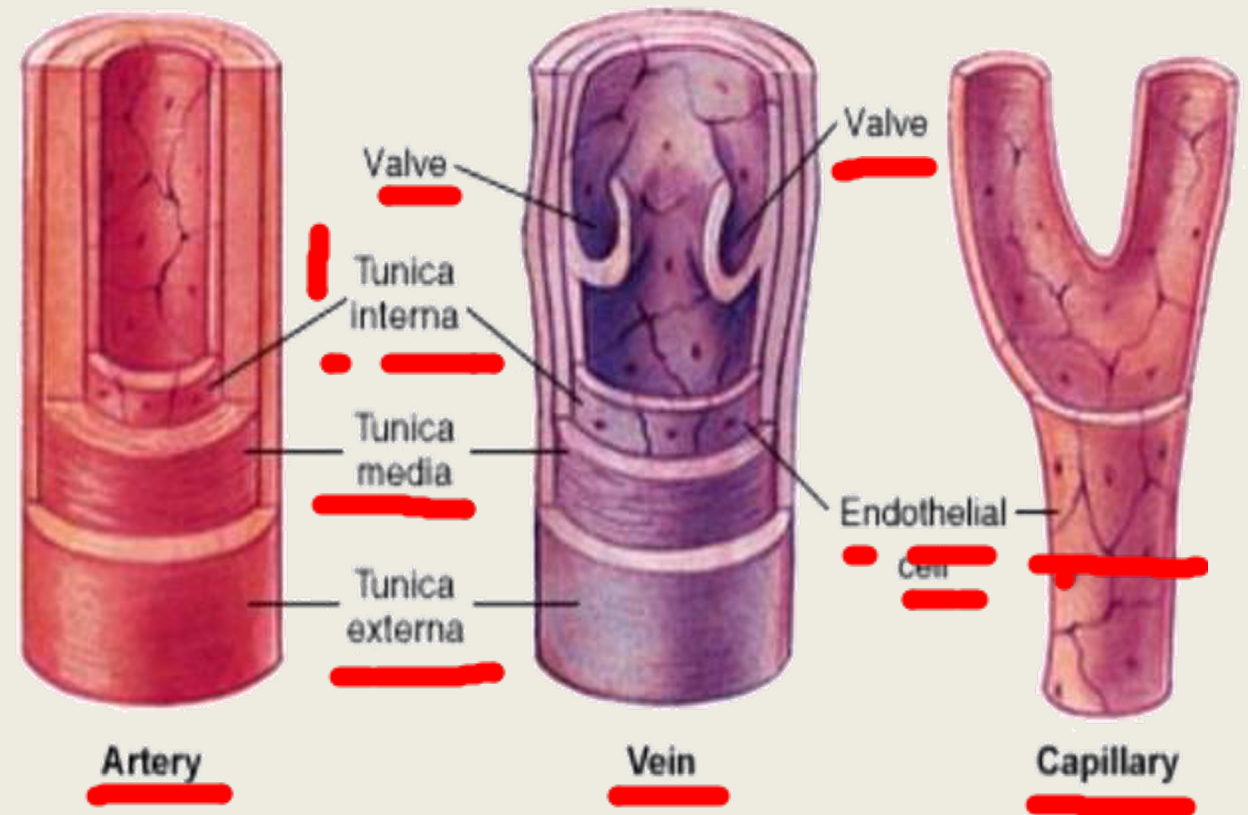
- **Arteries** carry blood *away from the heart*.
- **Capillaries** contact tissue cells and directly serve cellular needs.
- **Veins** carry blood *toward the heart*.



Structure of Blood Vessels

Arteries and veins are composed of 3 tunics

- tunica interna
- tunica media
- tunica externa





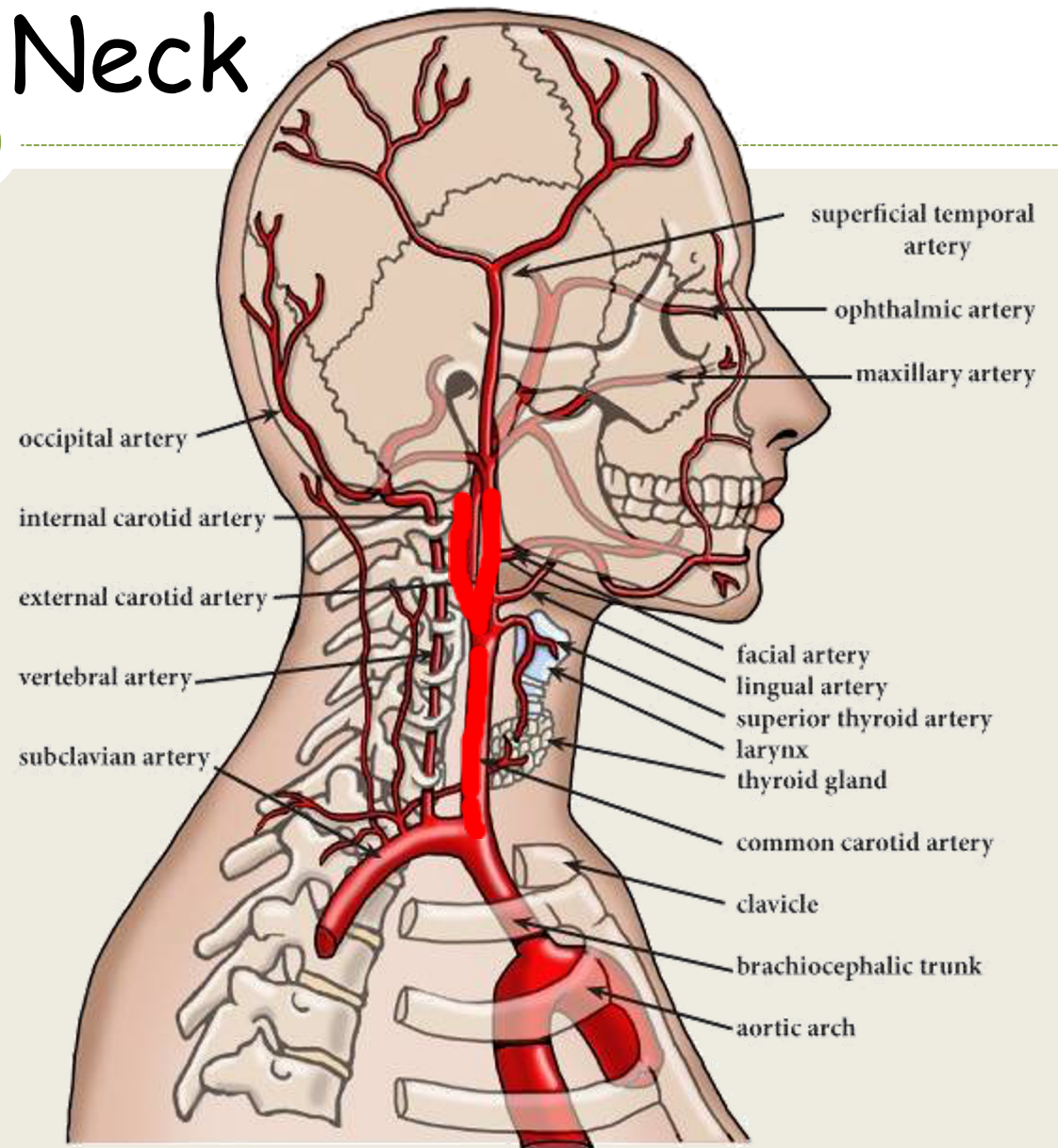
Vessels of Arteries Systemic

- Arteries of Head & Neck
- Arteries of Upper Limbs & Thorax
- Arteries of the Abdomen
- Arteries of the Lower Limbs



Arteries of Head and Neck

The left and right **common carotid arteries** are arteries that supply the head and neck with oxygenated blood; they divide in the neck to form the **external** and **internal carotid arteries**.





Arteries of head

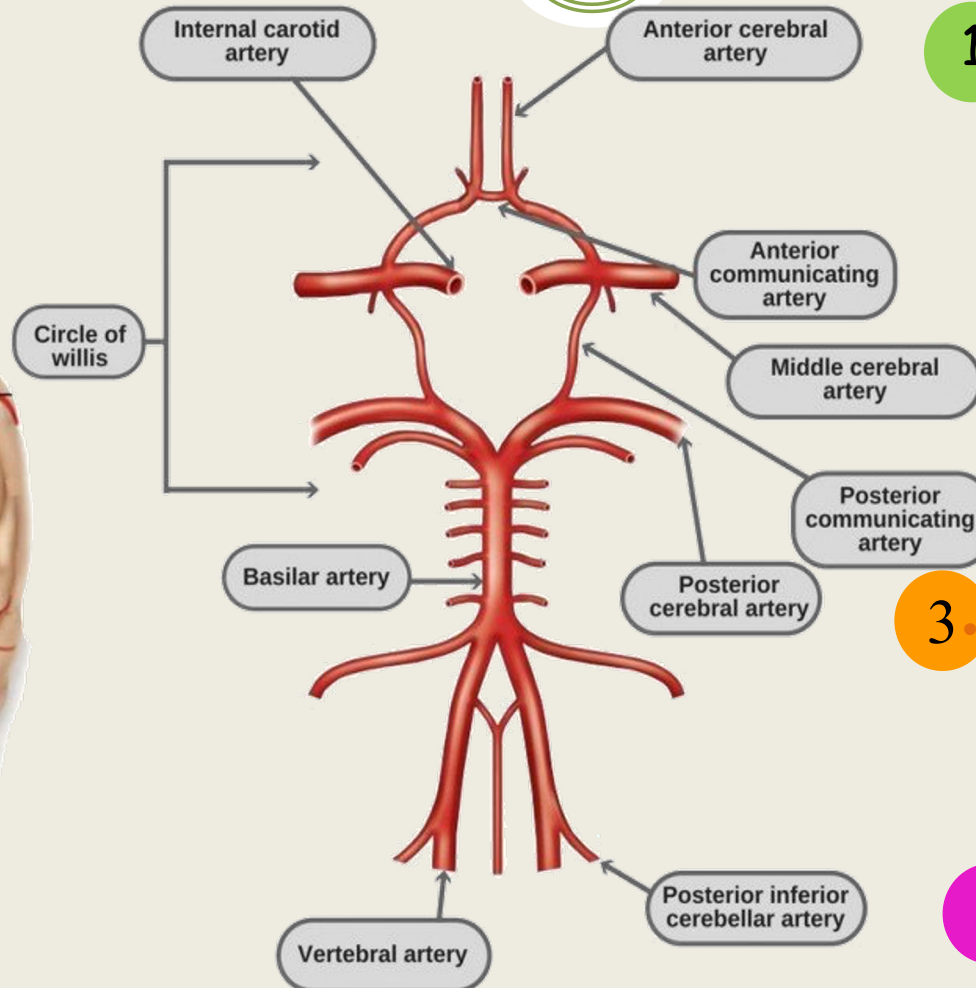
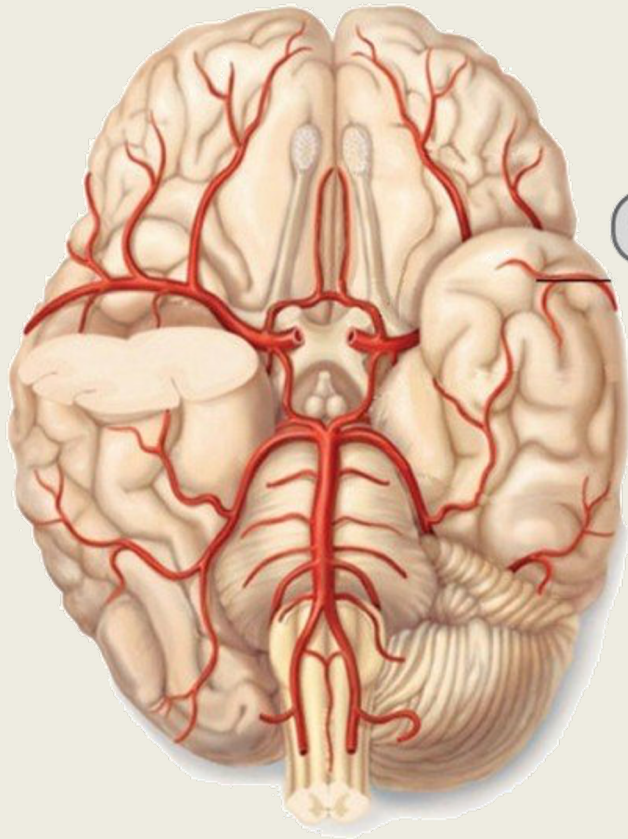


Vessels which arise and travel to all parts of the brain: **circle of willis**

- the anterior cerebral artery (ACA)
- the middle cerebral artery (MCA)
- the posterior cerebral artery (PCA)
- Posterior Inferior Cerebellar Arteries (PICA), which branch from the vertebral arteries, supplies for the cerebellum.



Arteries of head



1 anterior cerebral artery (ACA)

2 middle cerebral artery (MCA)

3 posterior cerebral artery (PCA)

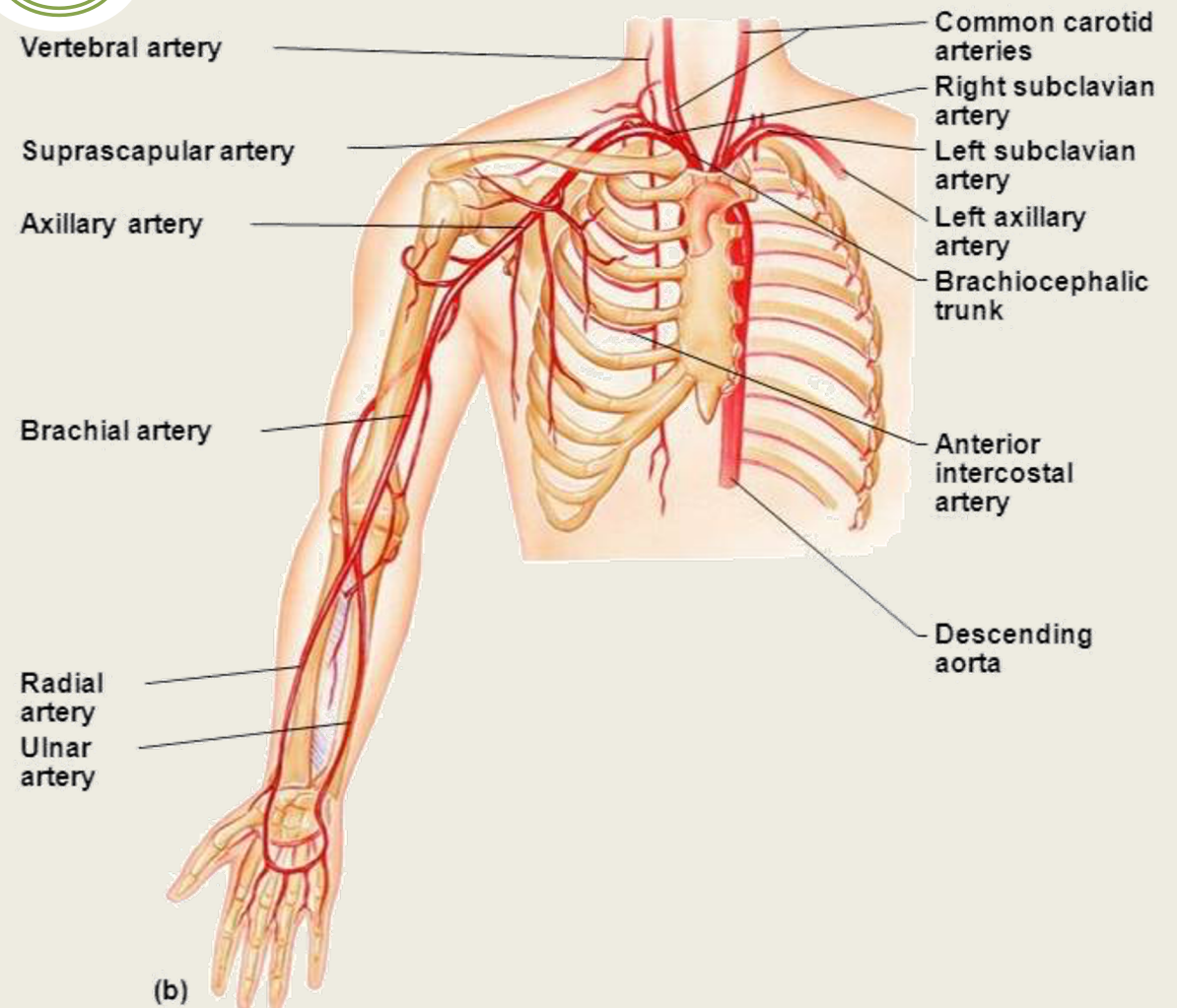
4 Posterior Inferior Cerebellar Arteries (PICA),



Arteries of Upper Limbs & Thorax

Artery within the upper limb will change it's name into 3 names;

- Subclavian artery
- Axillary artery
- Brachial artery in upper arm split into radial & ulnar arteries.

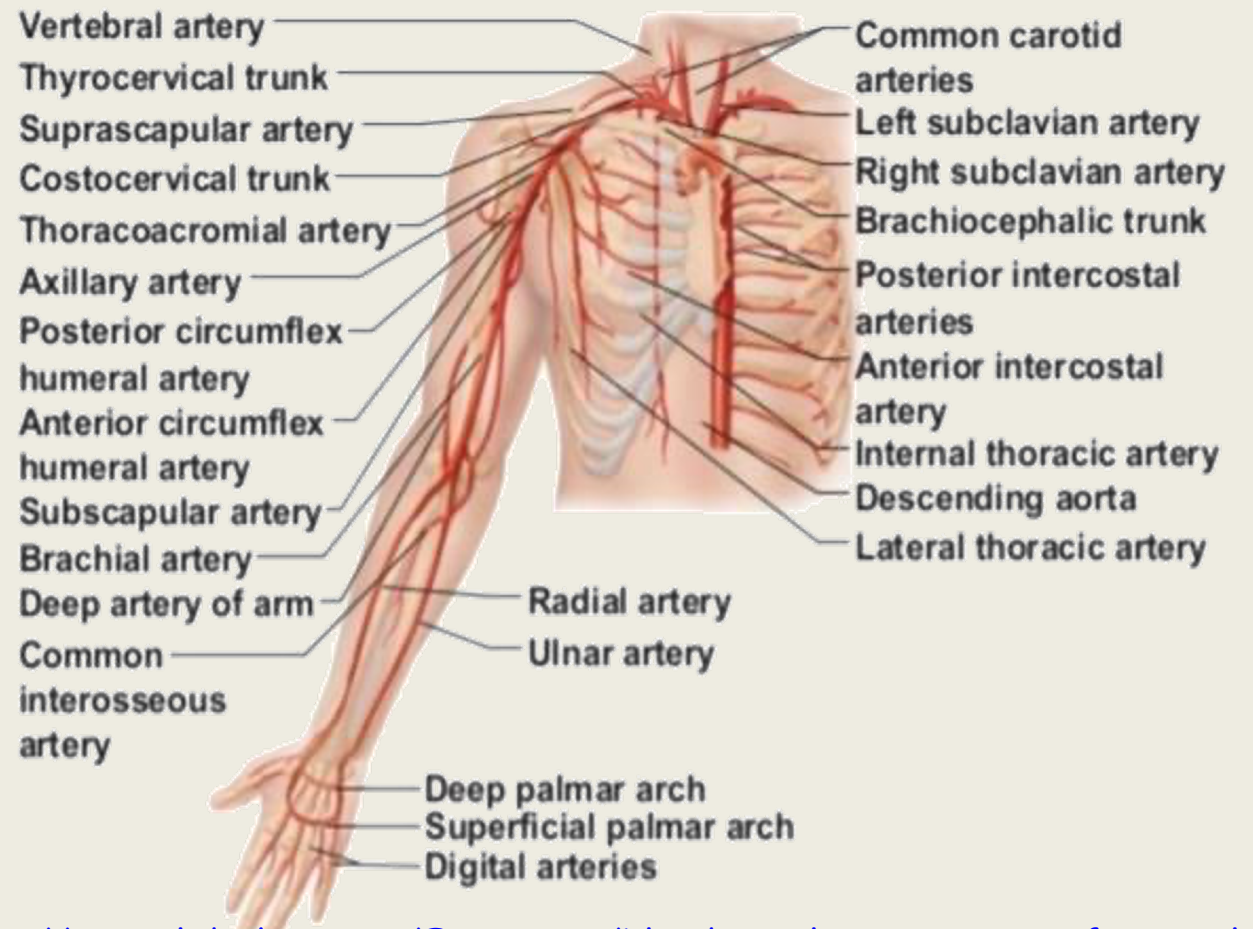




Arteries of Upper Limbs & Thorax

From aortic arch run to
descending aorta located
inferior to the T4.

The **internal thoracic artery**
arises from the subclavian
artery near its origin.



https://www.slideshare.net/E_neutron/blood-supply-innervation-of-upper-limb



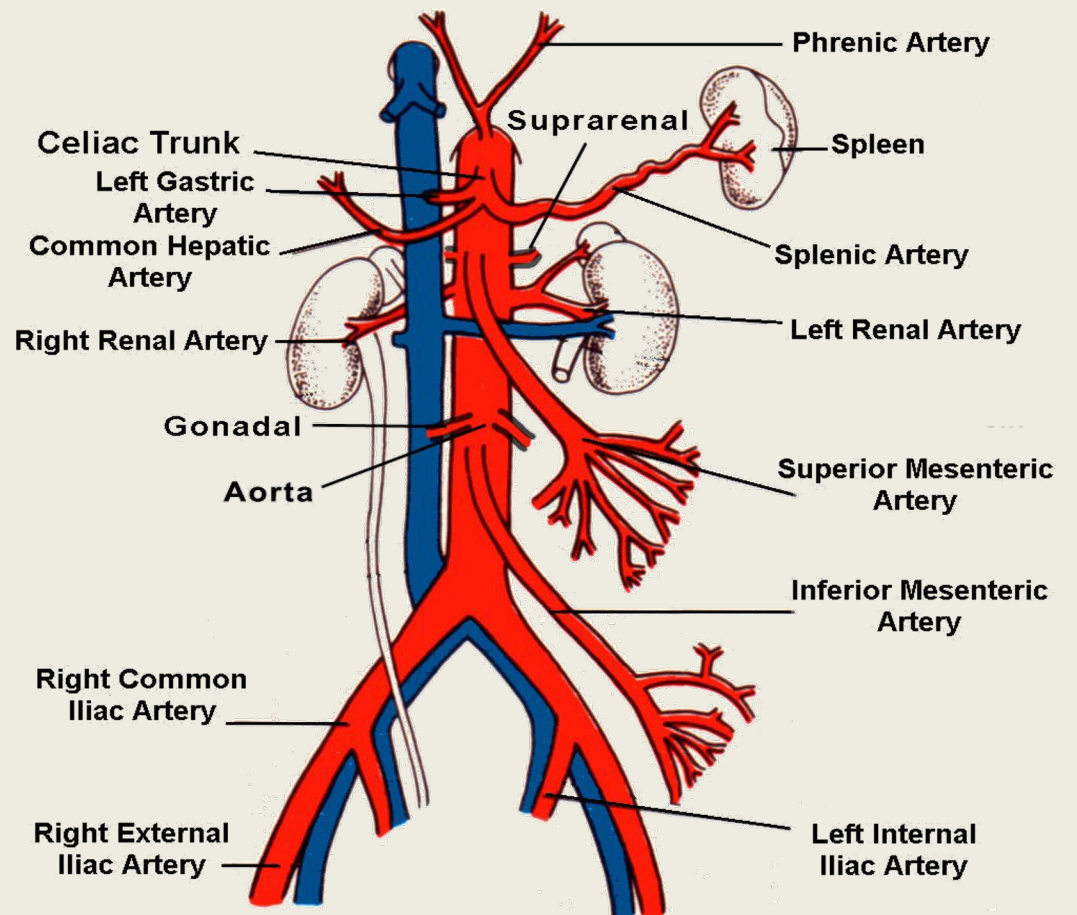
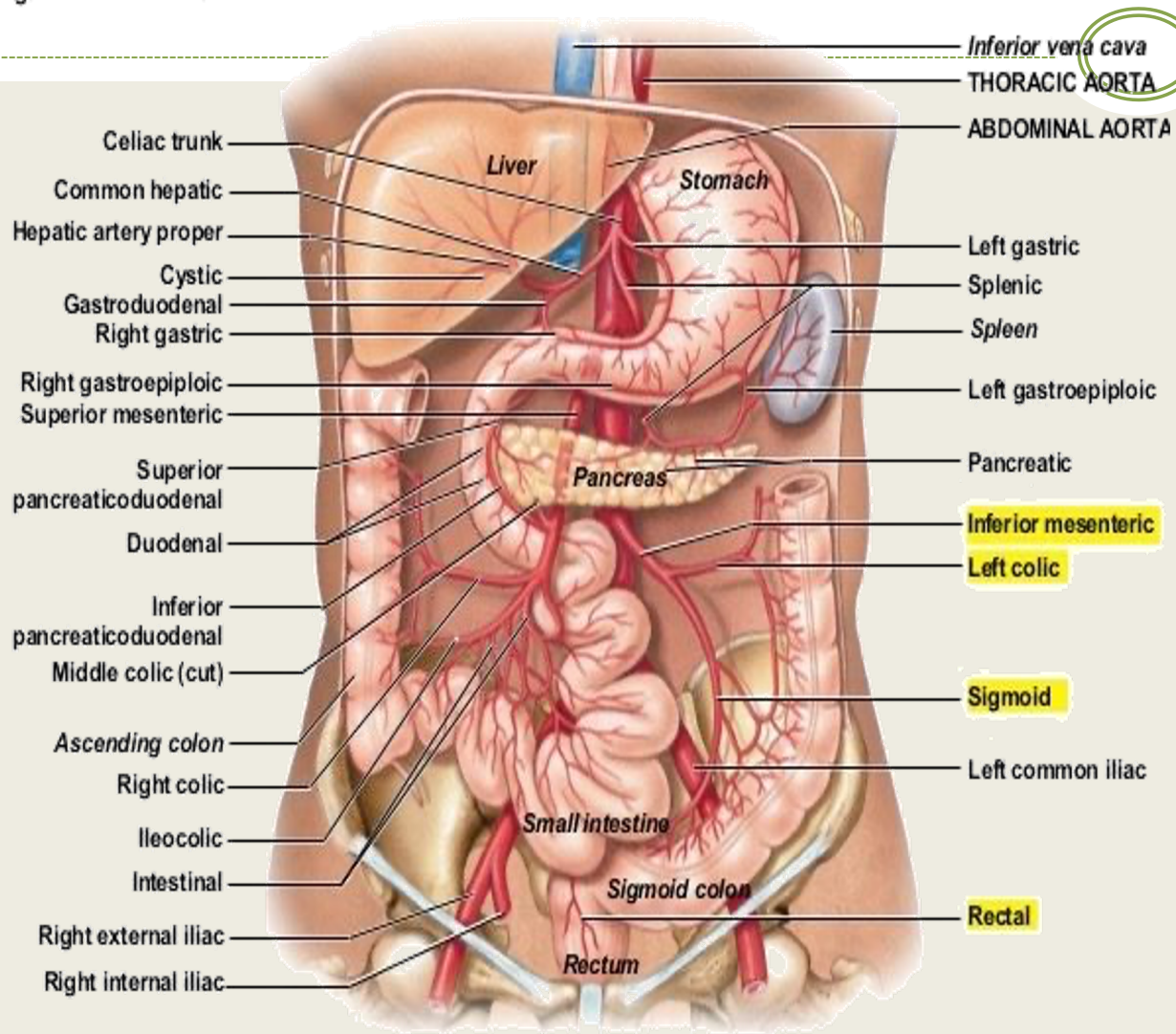
Arteries of the Abdomen



The abdominal aorta passes through base of diaphragm it has 3 anterior branches : **Celiac trunk**, **Superior mesenteric artery**, **Inferior mesenteric artery**.

It has also 2 main branches which are **2 renal arteries and gonadal artery**.

The end at L4 has 2 terminal branches the **Right & Left common iliac artery**



<https://www.pinterest.com.au/pin/129267451784905393/>

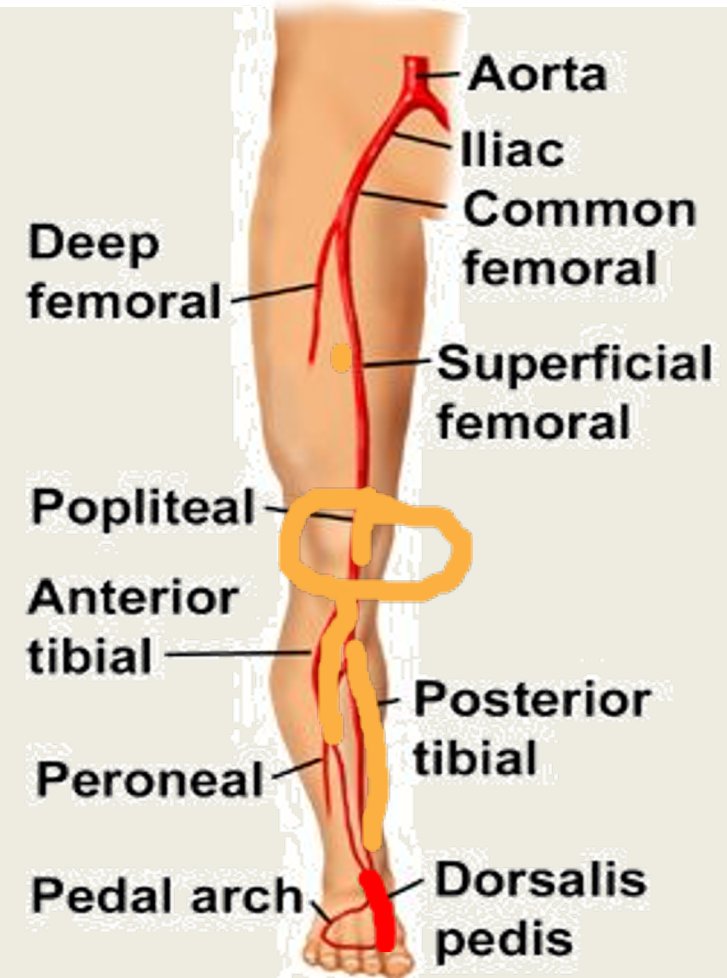


Arteries of the Lower Limbs

External iliac passes under inguinal ligament through inguinal canal becoming **Femoral artery**.

At back of knee femoral becomes **popliteal artery**, and branches.

Then we have 2 **tibial & fibular & dorsalspedis arteries**.

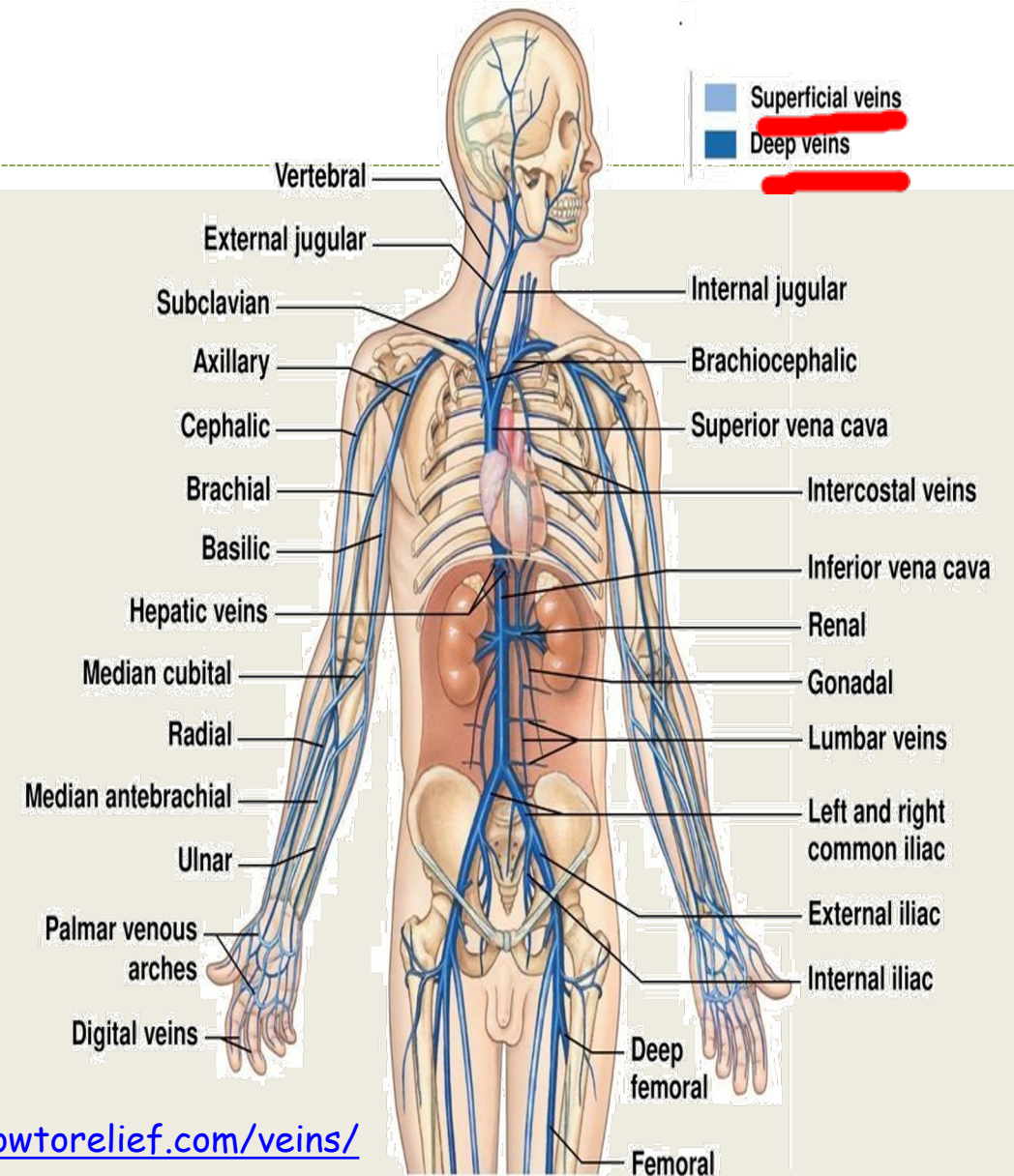


[https://br.pinterest.com/pin/741968107332390471/?amp_client_id=CLIENT_ID\(\)&mweb_unauth_id={{default.session}}&simplified=true](https://br.pinterest.com/pin/741968107332390471/?amp_client_id=CLIENT_ID()&mweb_unauth_id={{default.session}}&simplified=true)



Venous system

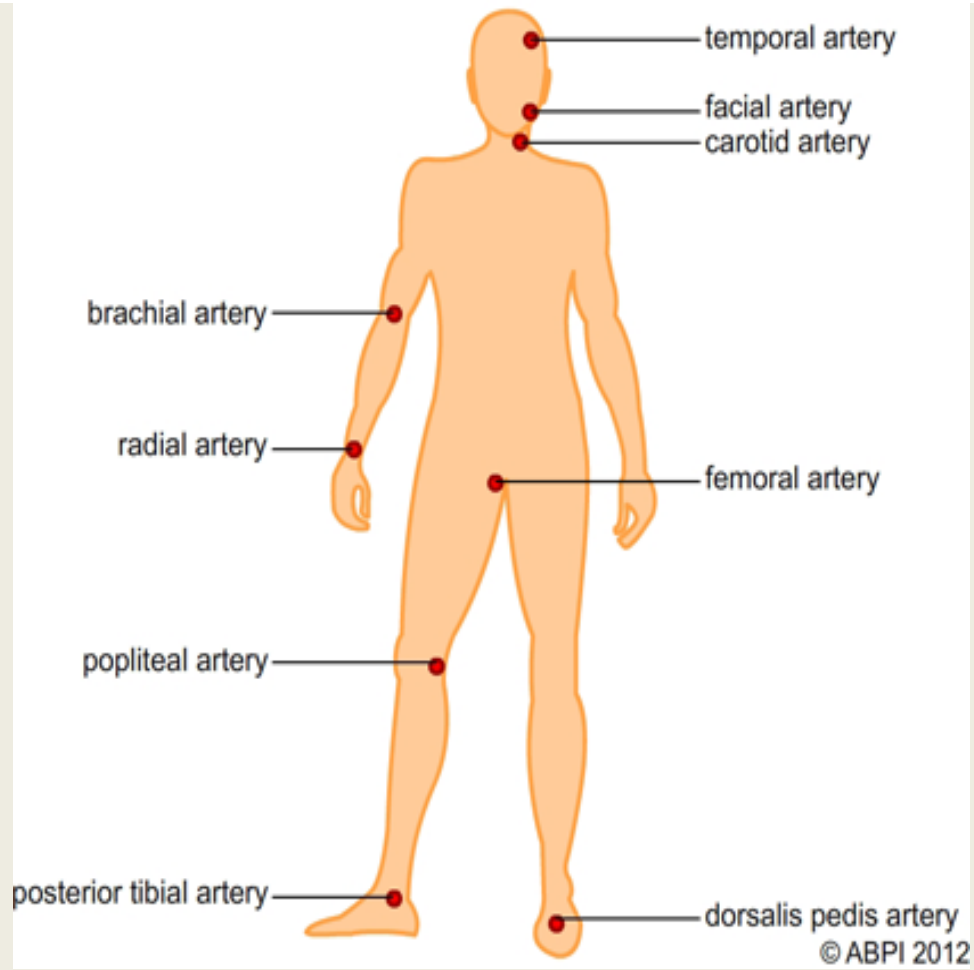
- Veins have much lower blood pressure and thinner walls than arteries
- To return blood to the heart, veins have special adaptations
 - Large-diameter lumens, which offer little resistance to flow
 - Valves (resembling semilunar heart valves), which prevent backflow of blood
- **Venous sinuses** – specialized, flattened veins with extremely thin walls (e.g., coronary sinus of the heart and dural sinuses of the brain)



<https://www.howtorelief.com/veins/>



Pulses location on the body



- Temporal artery
- Facial artery
- Carotid artery
- Brachial artery
- Radial artery
- Femoral artery
- Popliteal artery
- Posterior tibial artery
- Dorsalis pedis artery

<https://www.pinterest.com/pin/365565694723888244/>

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Post-test

- Which one is right or wrong?

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✓ 2. The heart pumps blood through the network of arteries and veins

✓ 3. The heart pumping blood around your body as your heart beats.

✗ 4. Bicuspid valve is like gate between Rt. atrium and Rt. Ventricle

✓ 5. The heart's natural 'pacemaker' is the sino-atrial node

SA node

Discuss & any Questions

