

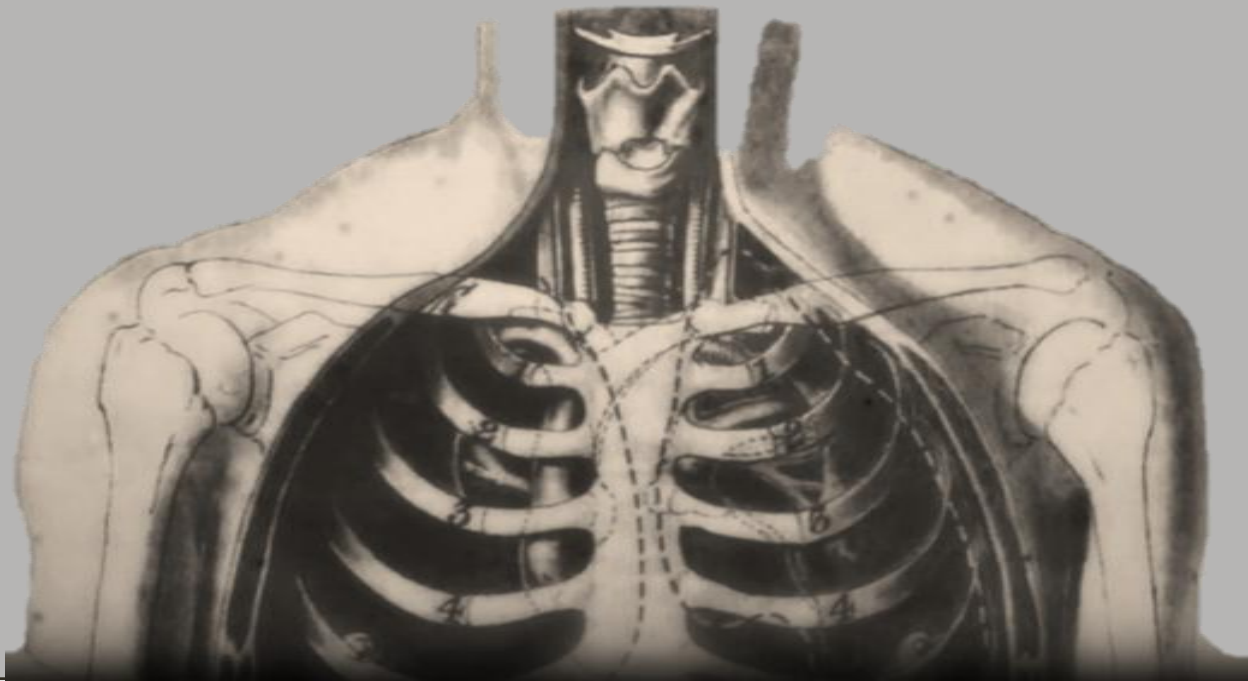


Anatomy Team

433

King Saud University
College of medicine
Foundation block

Cardiovascular System



COLOR INDEX



**IMPORTANT
POINTS**



HEAD LINES



SUBTITLES



**EXTRA
EXPLANATIONS**

You Should:

- # **Identify** the components of the **cardiovascular** system.
- # **Describe** the **Heart** in regard to (**position, chambers** and **valves**).
- # **Describe** the Blood vessels (**Arteries, Veins** and **Capillaries**).
- # **Describe** the **Portal System**.
- # **Describe** the **Sinusoids**.
- # **Describe** the **Functional** and **Anatomical** end arteries.
- # **Describe** the **Arteriovenous Anastomosis**.

😊 You Can Do It 😊

CONTENT

Cardiovascular system is composed of:

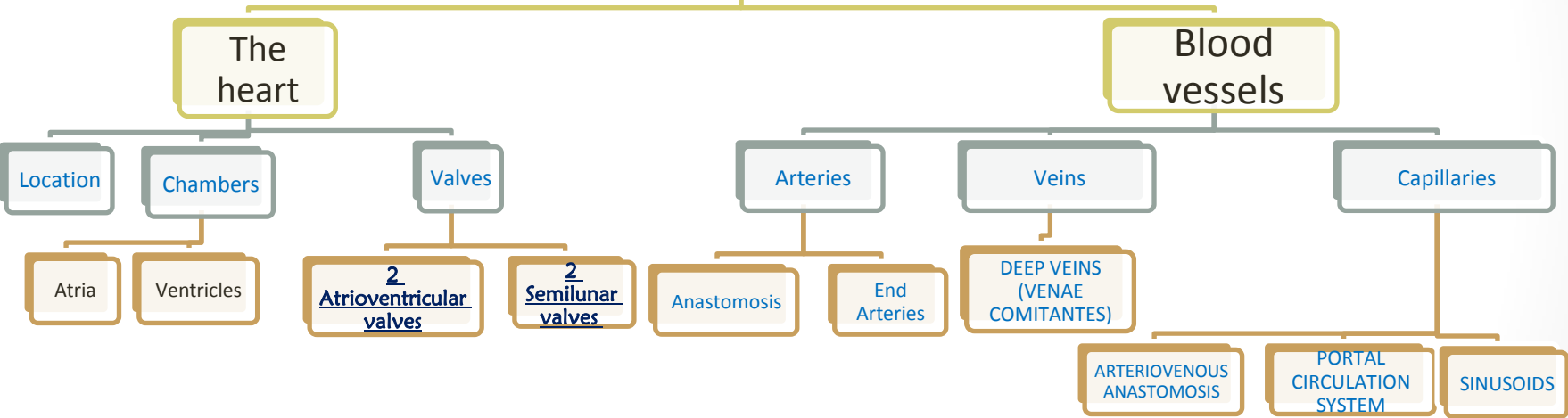
Network of
Tubes: Blood
vessels

pump:
Heart

Transportation of blood. By
constriction of the heart.

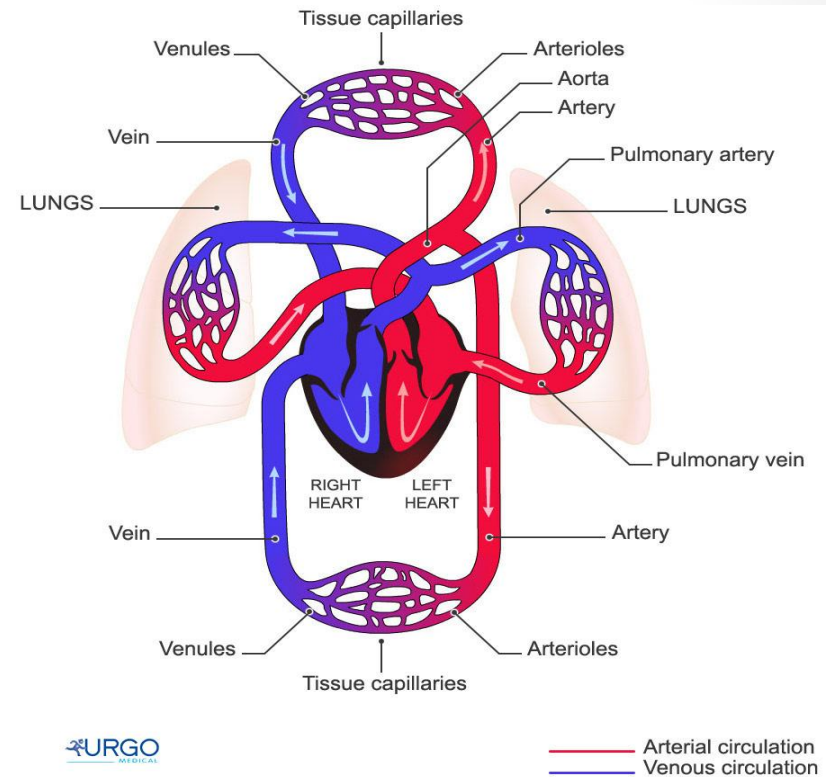
MIND MAP

CardioVascular System (CVS)



FUNCTIONS

- 1 It is a transportation system which uses the blood as the transport vehicle.
- 2 It carries oxygen, nutrients, cell wastes, hormones and many other substances vital for body homeostasis.
- 3 Provide forces to move the blood around the body by the beating Heart.



THE HEART

- It is a hollow, cone shaped muscular pump that keeps circulation going on.
- It is the size of a hand's fist of the same person.

The heart has

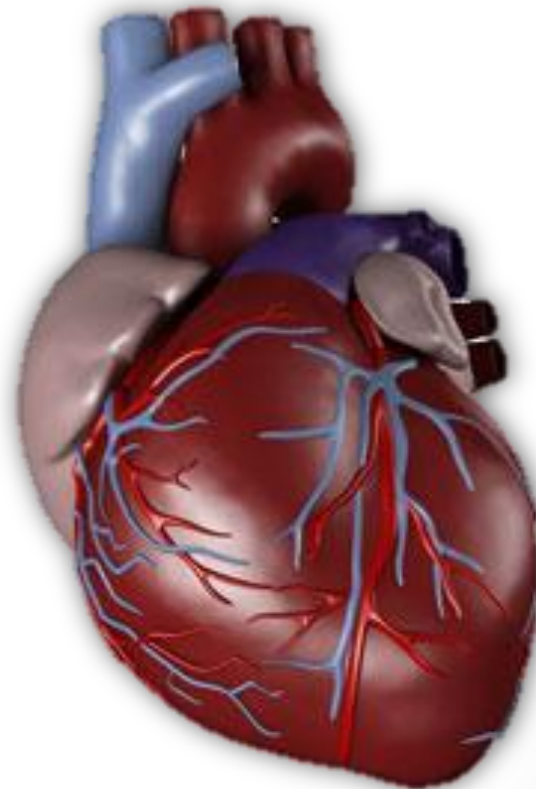
Apex: directed inward inferiorly.

Base: superior.

2 surfaces:

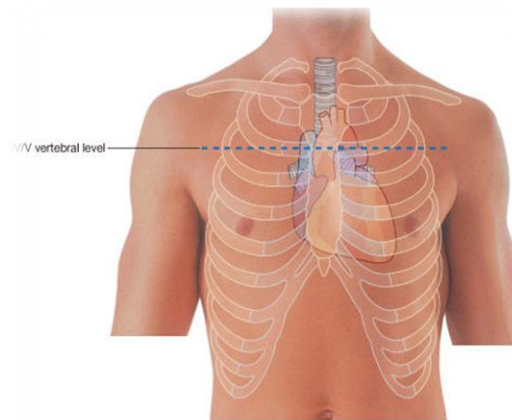
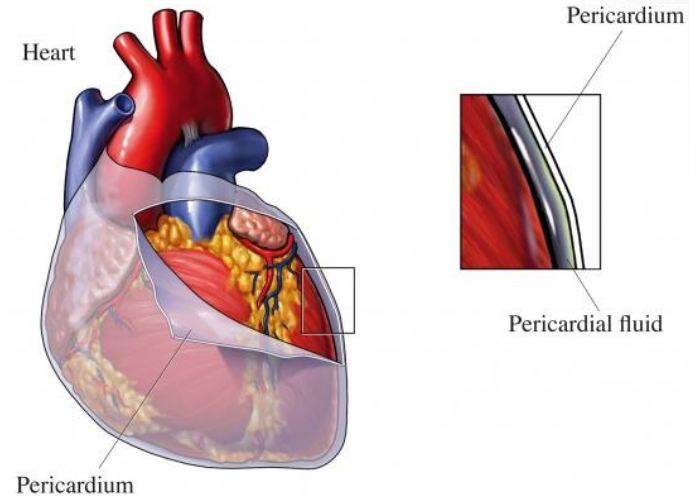
1. Diaphragmic: on diaphragm.
2. Sternocostal: between ribs and sternum.

Borders: right, left and inferior.

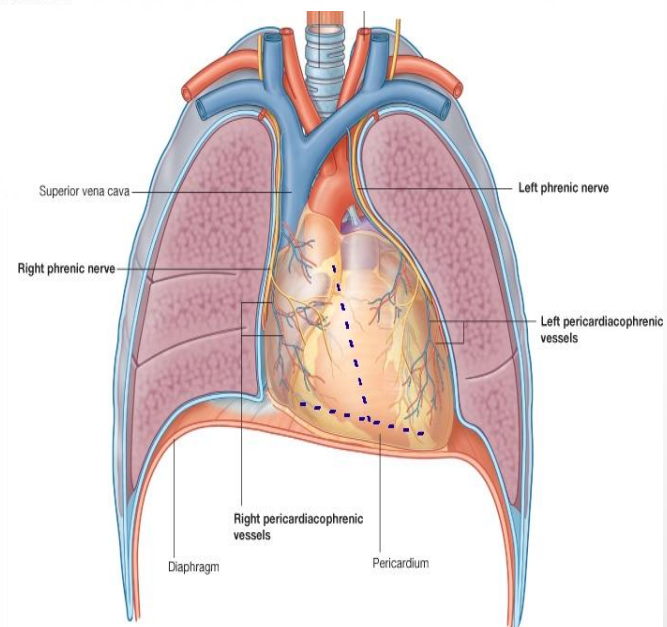


LOCATION OF THE HEART

- It lies in a centrally located partition in the thoracic cavity known as the **Middle Mediastinum** between the two pleural sacs. between the 2 lungs
- Enclosed by a double sac of serous membrane (**Pericardium**).
- (القلب يكون محمي داخل كيس يُسمى **Pericardium**).
- 2/3 of the heart lies to the left of median plane.



Anterior view of the chest wall of a man showing the locations of various structures related to the T4/T5 level



© Elsevier Ltd. Drake et al: Gray's Anatomy for Students www.studentconsult.com

Chambers of the heart

Atria:

They are two
(Right & Left).

Superior in position.

They are the **receiving chambers**.

Note: 1, 2 valves they open and close at the same time.

(if the heart is in his healthy normal conditions blood wont go back.)

3, 4 valves open and close at the same time too.

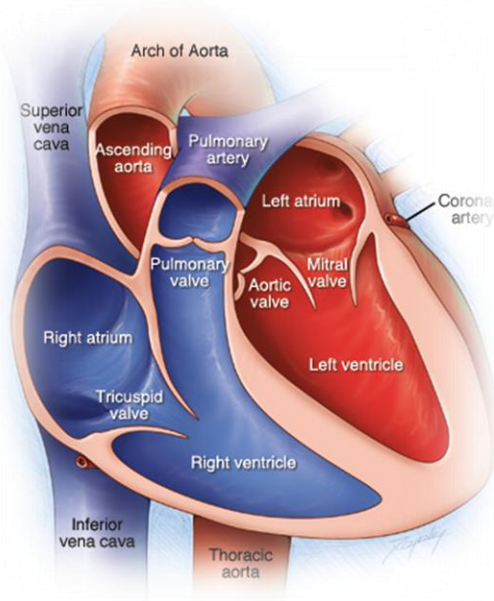
They have thin walls.
The upper part of each atrium is the **Auricle**.

The Right Atrium receives the **venous blood** coming to the heart.

Left Atrium receives **arterial blood** coming from the lungs.

Note: the blood enters from the 1, 2 valves and exits from the 3, 4 valves.

الأذين الأيمن : يستقبل الدم الغير
مؤكسج من الوريد (الجسم)
الأذين الأيسر : وبالتزامن مع
الأذين الأيمن يستقبل الدم
المؤكسج من الشريان (الرئتين)



Chambers of the heart

Ventricles

The inferior chambers:
They are two (right & left)it forms the apex.

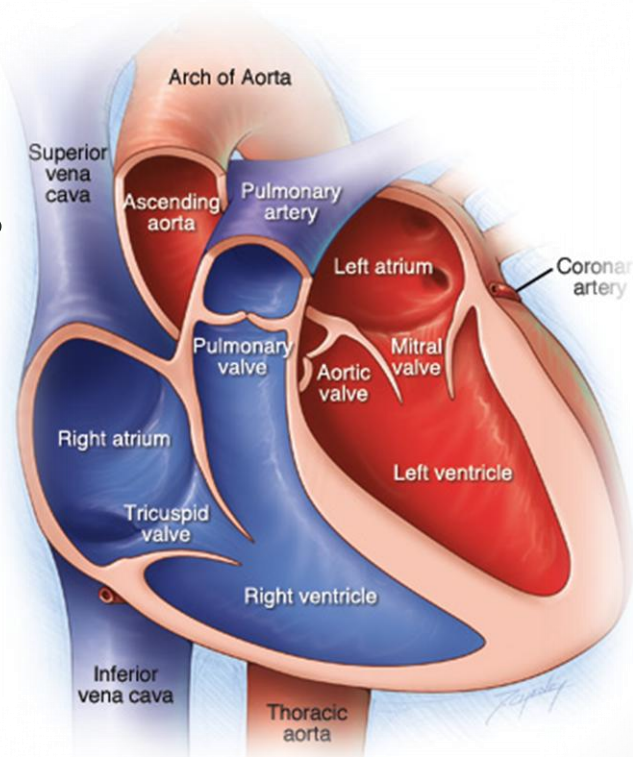
They have thick walls.

الجدار تخين لأجل إتمام
عملية الضخ الآمن

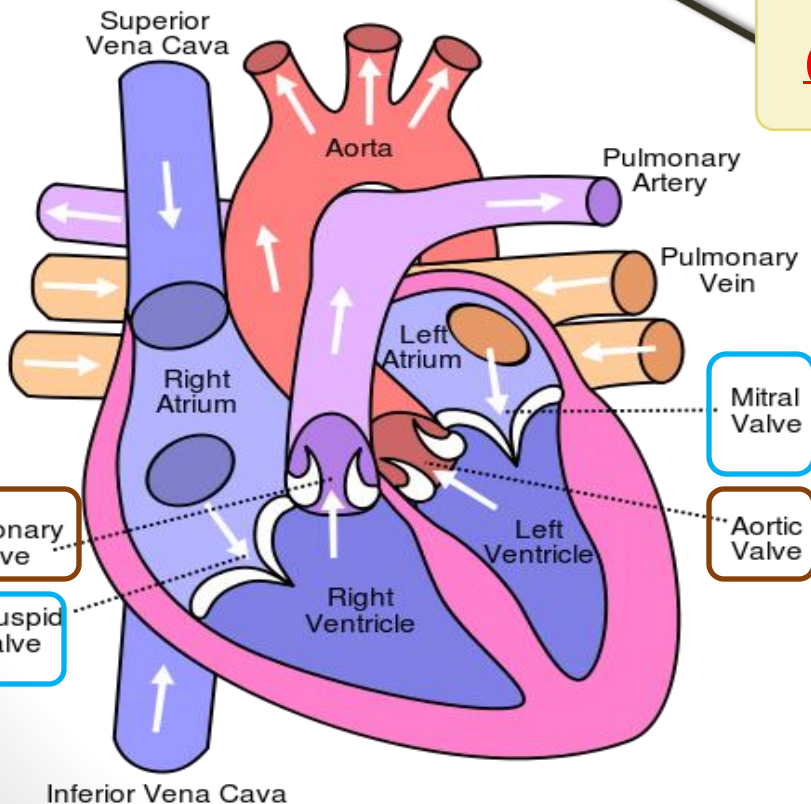
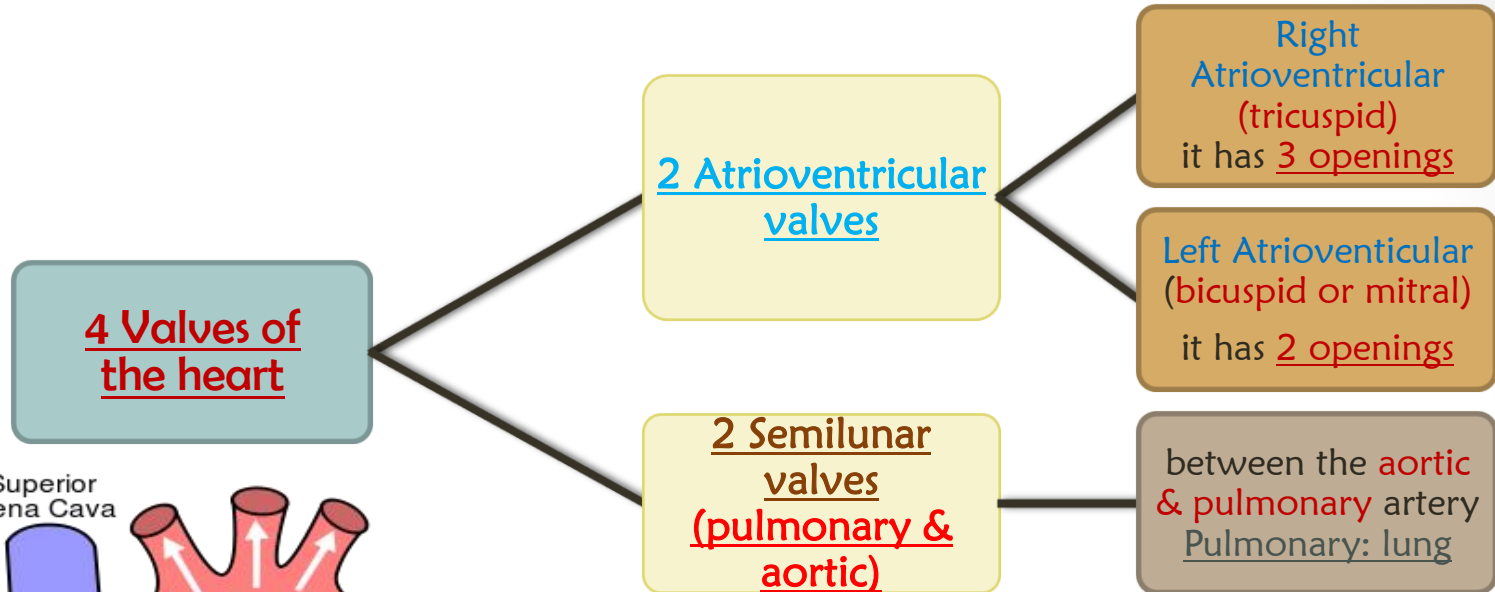
They are the discharging chambers (actual pumps).

Their contraction propels blood out of the heart into the circulation.

- left ventricle is thicker because it's receiving blood from the artery.
- Heart-beat can be heard clearly from L. ventricle



Valves of the heart

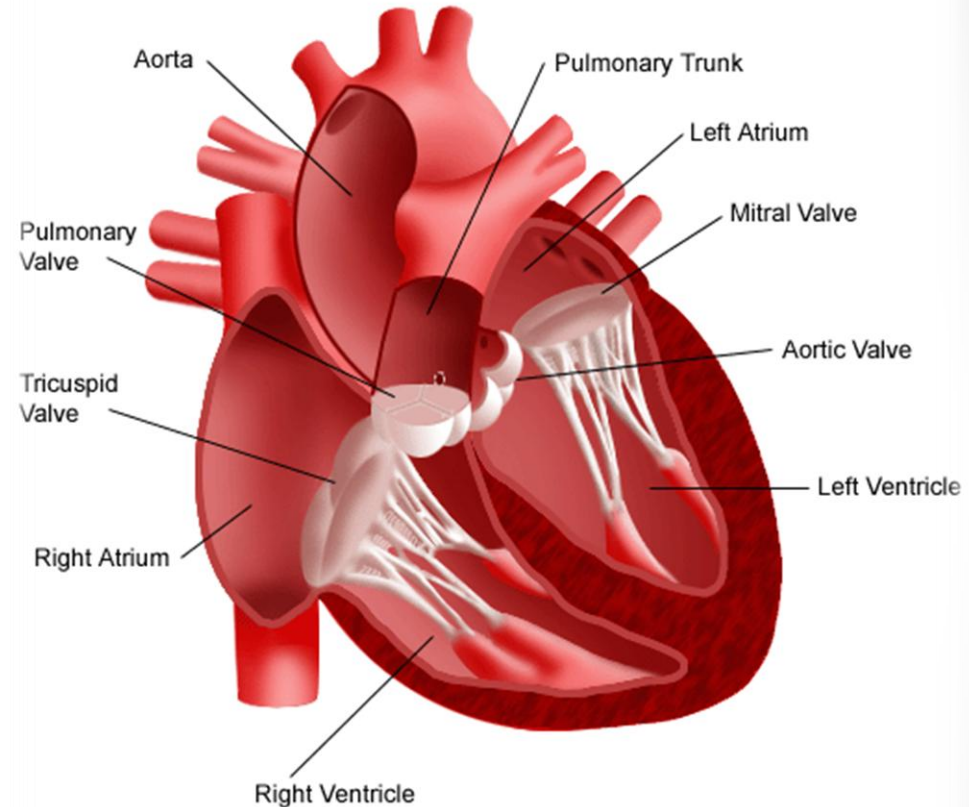


NOTE:-

Between the right atrium and the right ventricle a valve & between the left atrium and the left ventricle a valve

Valves of the heart

Valves of the Heart



EXPLANATIONS

وظيفة الصمام هنا هو الغلق إلى أن يتجمع كامل الدم ويرسله للبطين لكي يكون جاهزاً للدفع الكامل.

Atrioventricular Valves:

Valves between atria & ventricles.

They allow the blood to **flow in one direction** from the atria to the ventricles.

- Right AVV (Tricuspid).
- Left AVV (Bicuspid).

AVV = Atrioventricular Valves

Semilunar Valves (Aortic & Pulmonary):

Between the **right and left ventricles** and the **great arteries leaving the heart.**

They allow the flow of blood **from the ventricles to these arteries.**

Blood vessels

Arteries:

- Thick walls.
- Do not have valves.
- The smallest arteries are arterioles.

Veins:

- Thin walls.
- Many of them possess valves.
- The smallest veins are venules.

Capillaries

- Connect arterioles and venules.
- Help to enable the exchange of water and other nutrients between blood and the tissue.

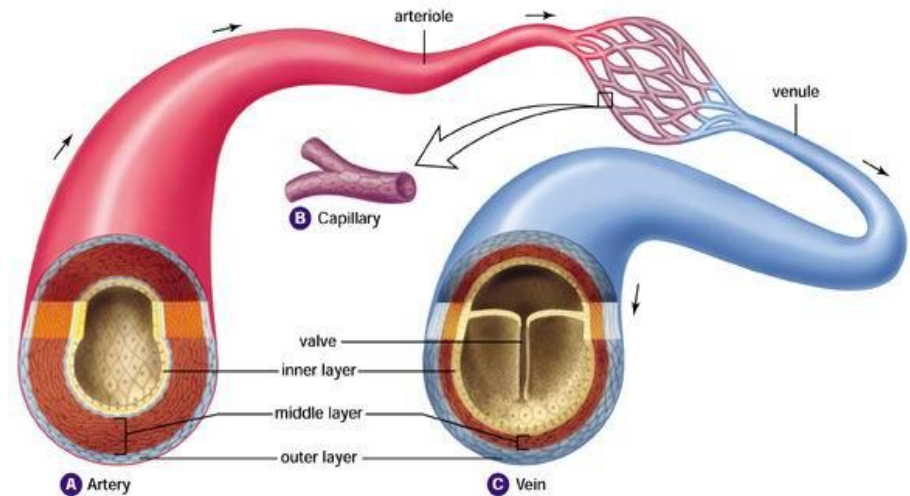


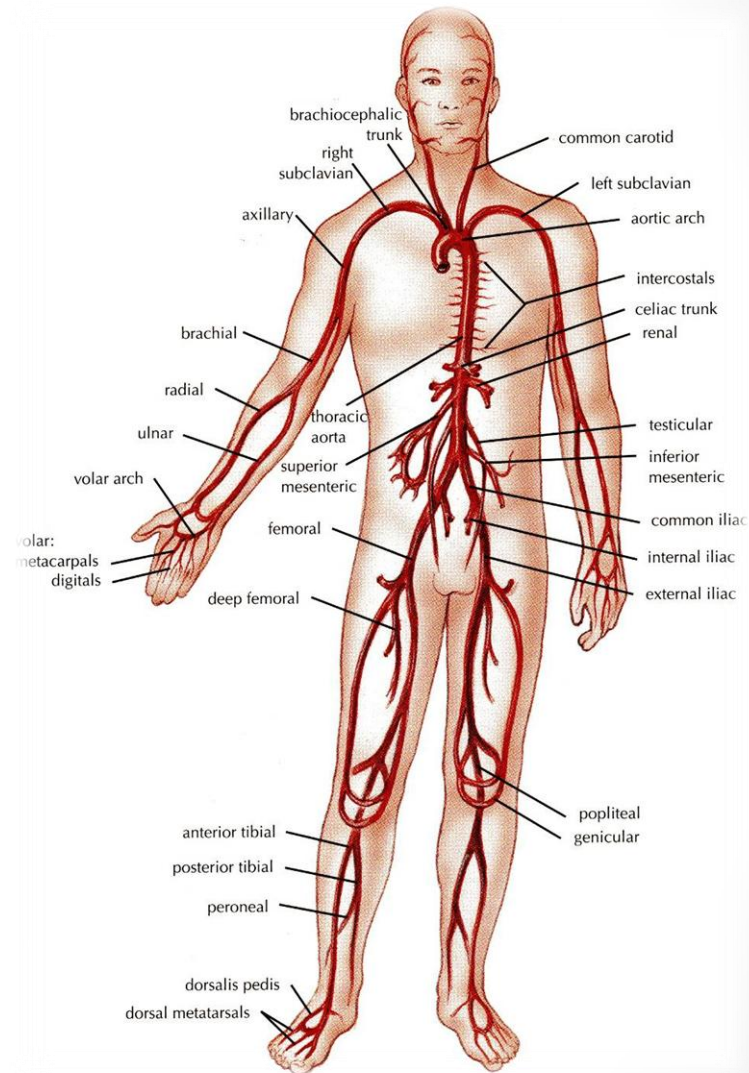
Figure 9.12. Sections through an artery, capillary, and vein. At any given moment, about 30% of the blood in your systemic circulation will be found in the arteries, 5% in the capillaries, and 65% in the veins.

- The artery begins large and ends small.
- Intravenous begins small and ends at a large heart.

Arteries

- They transport oxygenated blood from the heart and distribute it to the various tissues of the body through their branches.

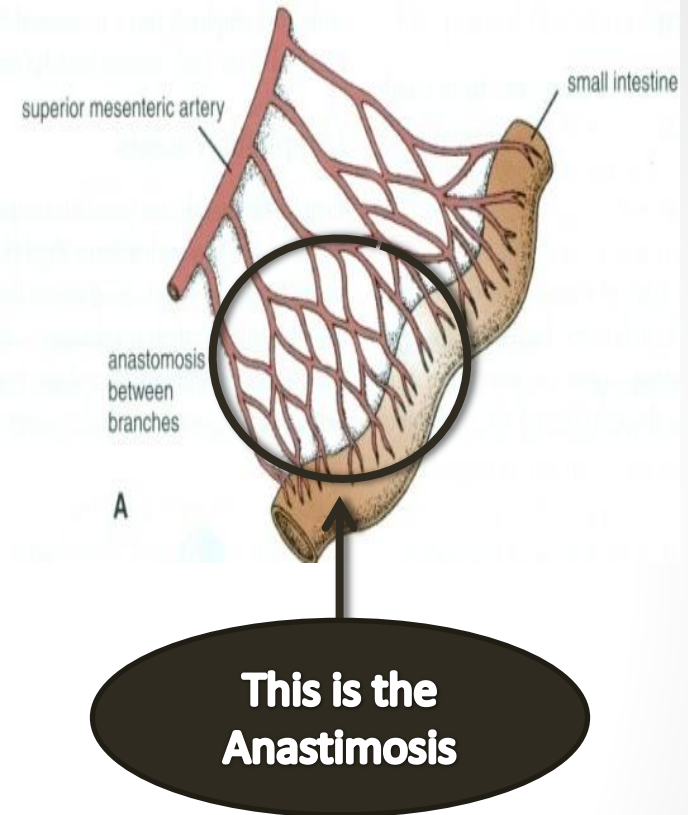
#Two exceptions :
(The Pulmonary and the Umbilical arteries.)



موضع سؤال بالاختبار

ANASTOMOSIS

- It is the connection of two structures.
- It is the joining of terminal branches of the arteries.
- It's responsible for supplying important areas.
- Mostly found in small intestines, patella and scapula.



★ Why there is anastomosis in those arteries?

Because if the artery got cut, the other arteries will help in completing its function

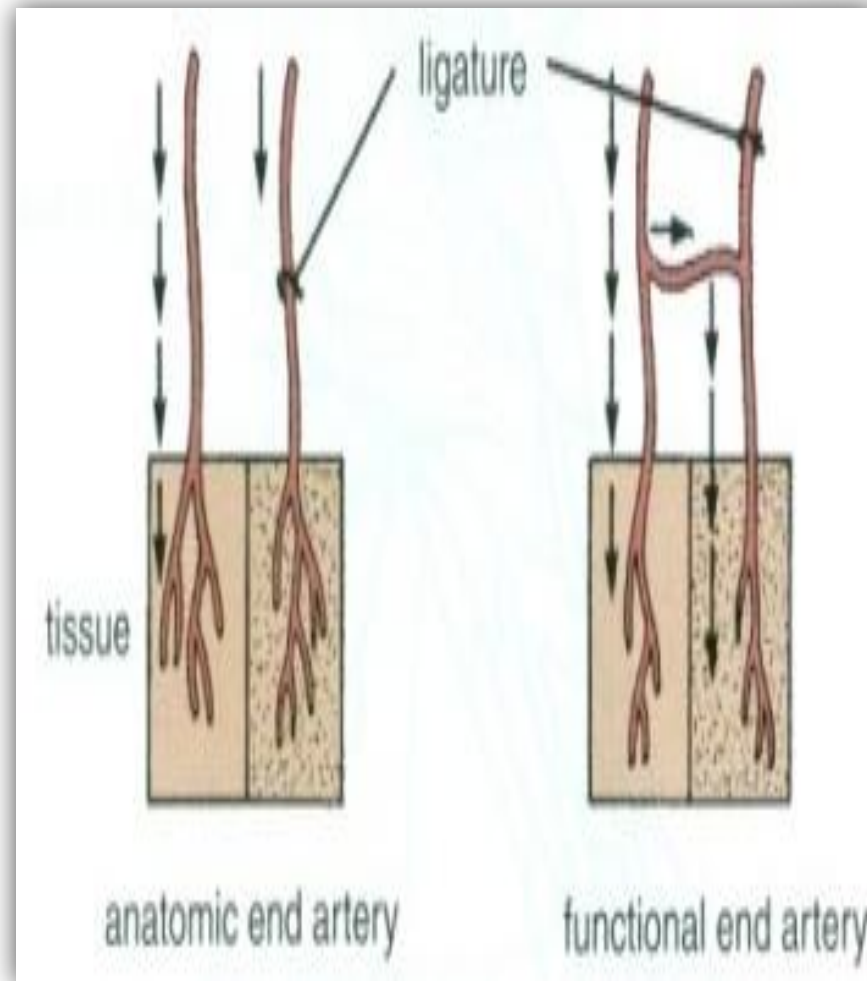
END ARTERIES

- It is the artery that is the only supply of oxygenated blood to a portion of tissue.

(Splenic artery & Renal artery)

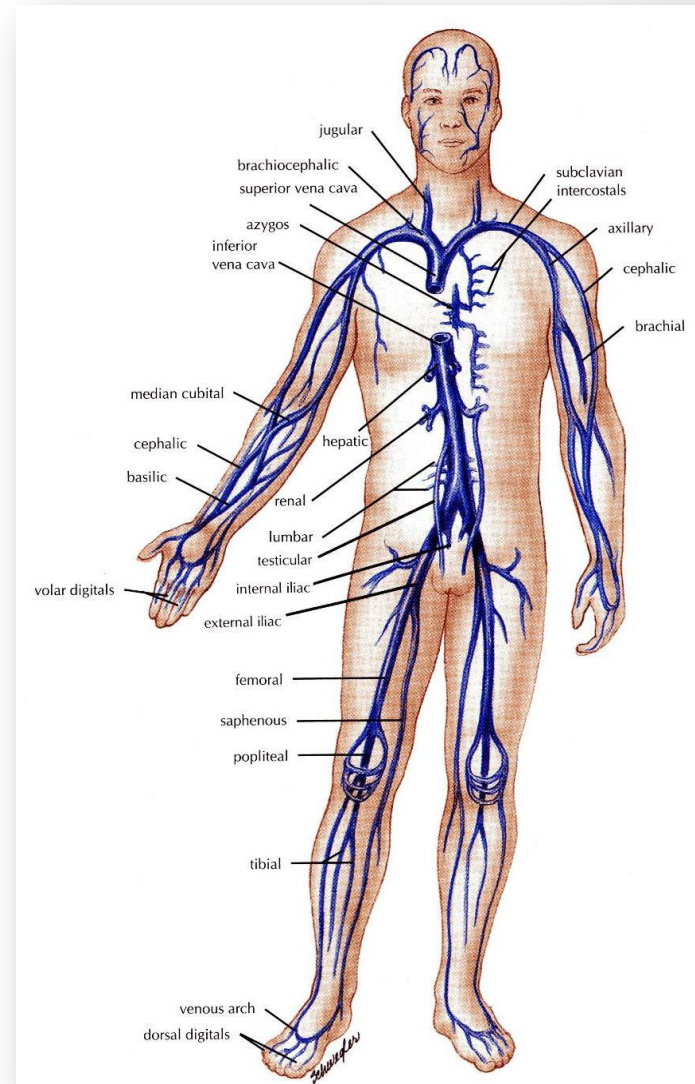
Two types of end arteries are:

- 1 Anatomic (True) End Artery (No anastomosis)
- 2 Functional End Artery (Ineffectual anastomosis)



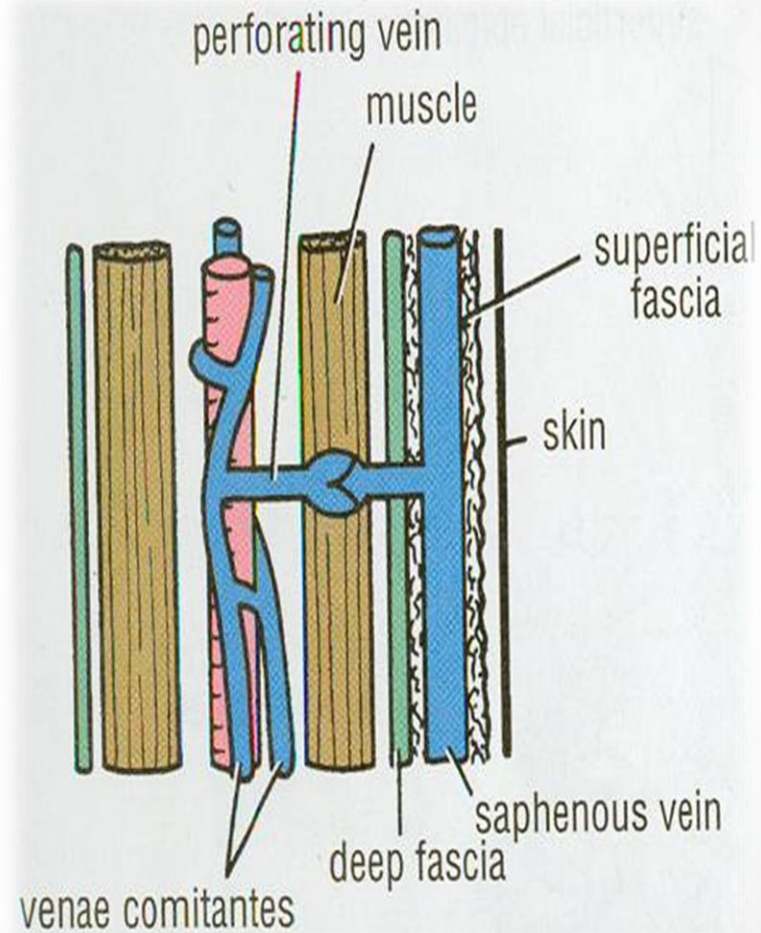
VEINS

- They transport blood back to the heart.
 - The smaller veins (Tributaries) unite to form larger veins which commonly join with one another to form Venous Plexuses.
 - Carry deoxygenated blood toward the heart.
- #two exceptions:
the pulmonary and the umbilical veins.



DEEP VEINS (VENAE COMITANTES)

- Two veins that accompany **medium sized** deep arteries.
- Venae comitantes is Latin for accompanying vein.
- They are found **close to arteries** so that the pulsations of the artery aid in venous return.
- Venae comitantes are usually found with **smaller arteries**, especially those in the extremities.
- ★ **Larger arteries** do not have venae comitantes. They usually have a single, similarly sized vein.

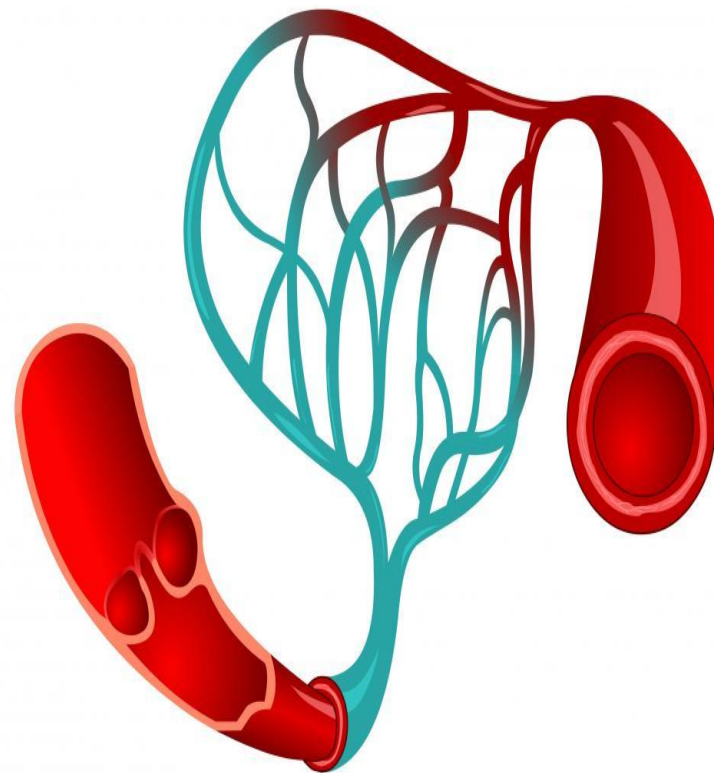


CAPILLARIES

- Microscopic vessels in the form of a **network**.
- They **connect** the Arterioles to the Venules.
- they **help** to enable the **exchange** of water, oxygen and many other nutrients between **blood** and **the tissues**.

#Tissue supplies from arteriole side of capillaries.

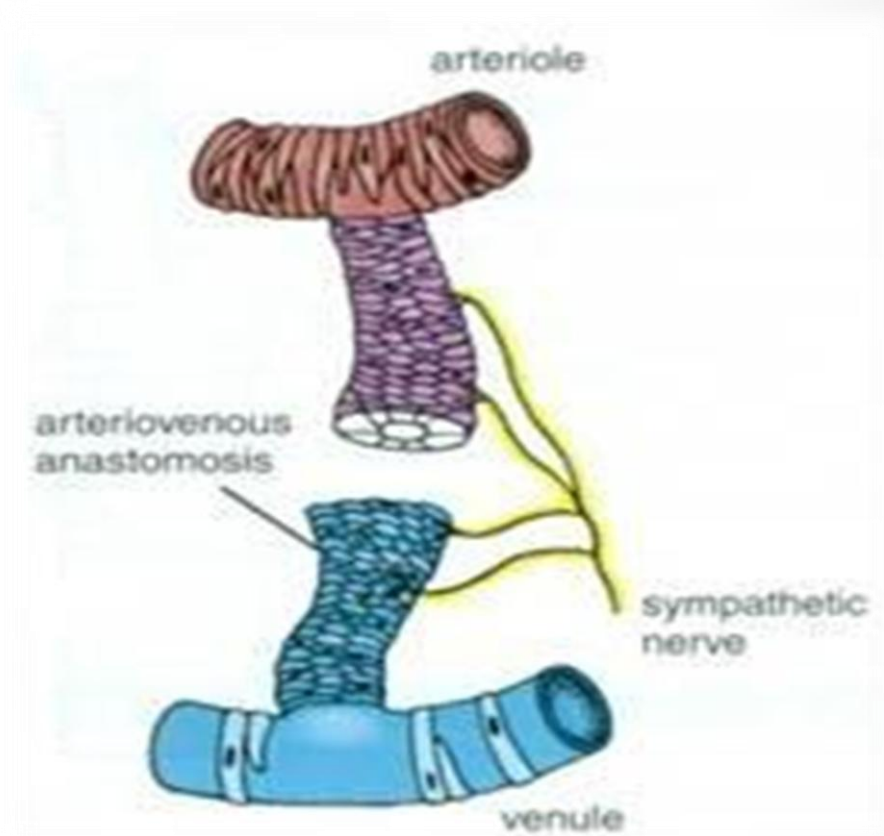
Note: The capillaries are located only in tissues.



ARTERIOVENOUS ANASTOMOSIS

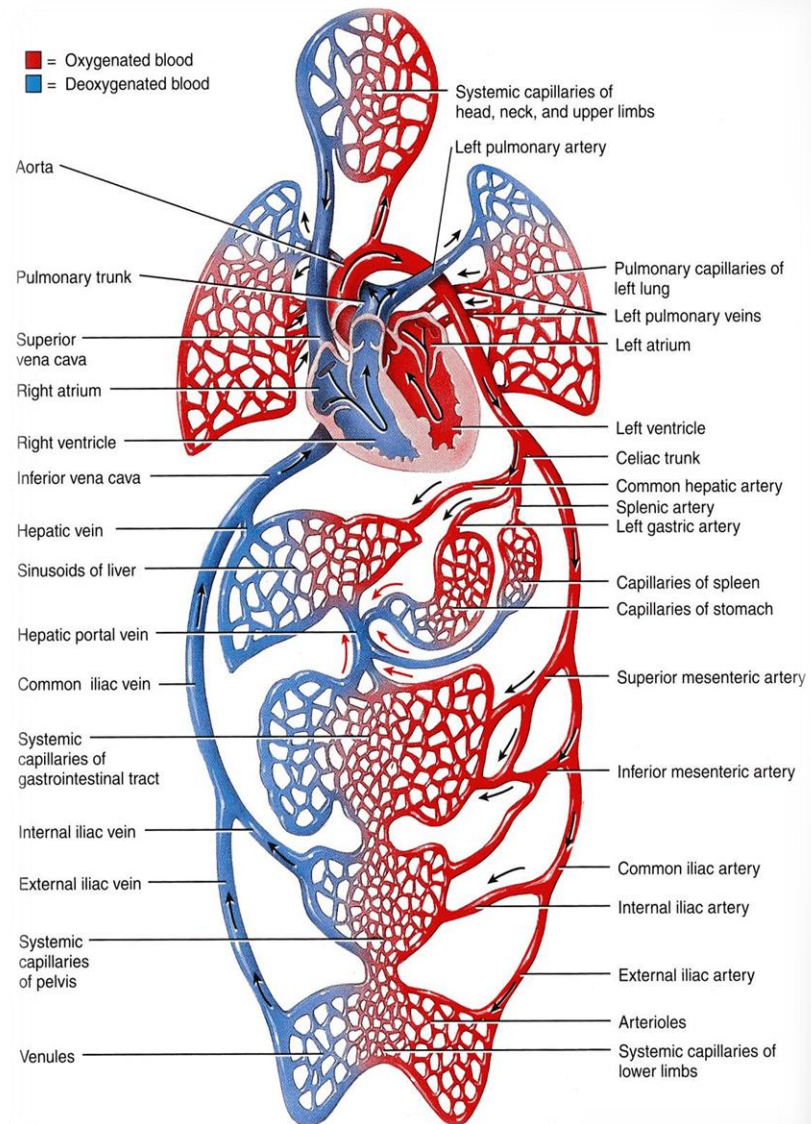
- Direct connections between the arteries and veins without the intervention of capillaries.
- Found in tips of the fingers and toes because these regions need rapid circulation.

#Note : there are some places that don't contain capillaries because their regions are narrow so the arterioles and venules are connected directly.



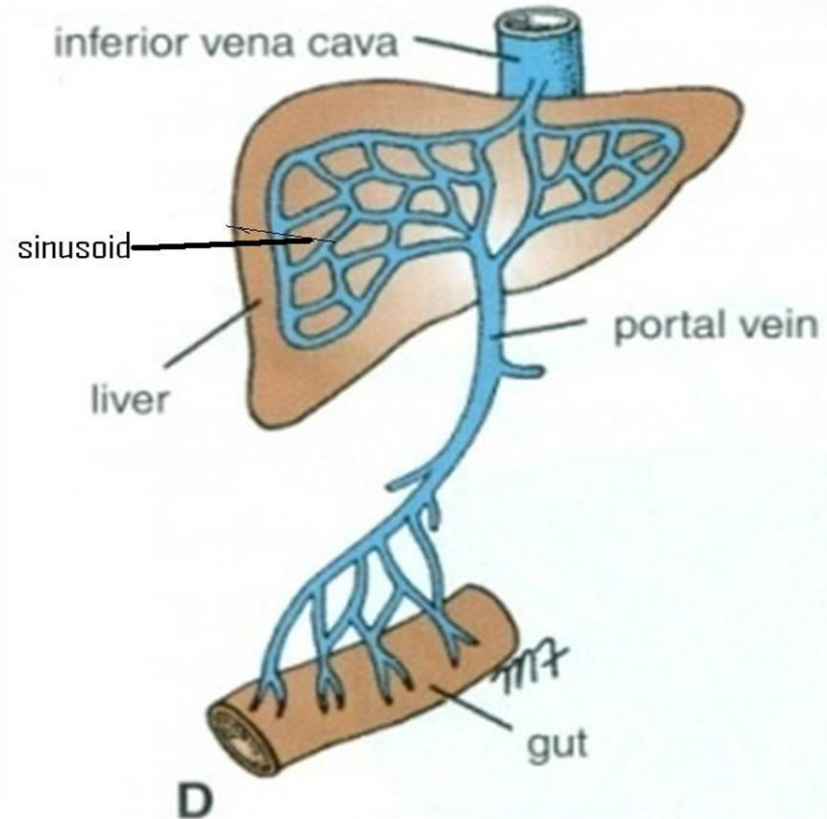
PORTAL CIRCULATION SYSTEM

- It is a system of vessels interposed between two capillary beds.
- Veins **leaving** the gastrointestinal tract do not go direct to the heart.
- They pass to the Portal Vein.
- This vein enters the liver and **breaks** up again **into veins** of diminishing size which **ultimately join capillary like vessels** (Sinusoids).



SINUSOIDS

- **Thin** walled blood vessels like capillaries.
- They help in filtration.
- They are **wider** with **irregular cross diameter**.
- They are found in:
 - 1 Liver
 - 2 Spleen
 - 3 Bone marrow
 - 4 Some endocrine glands



Summary

- The cardiovascular system is a transporting system.
- It is composed of the heart and blood vessels.
- The heart is **cone shaped**, covered by pericardium and composed of four chambers.
- The blood vessels are the arteries, veins and capillaries.
- Arteries transport the blood from the heart.
- The terminal branches of the arteries can anastomose with each other freely or by anatomic or functional end arteries.
- Veins transport blood back to the heart.
- Capillaries connect the arteries to the veins.
- Sinusoids are special type of capillaries.
- The portal system is composed of two sets of capillaries.
- The veins from the GIT go first to the liver through the portal vein.

Review Questions

Q1: Which one of the following is NOT true?

- * Right atria receives blood from the body.
- * The valve between right atrium and right ventricle is called “Bicuspid”.
- * Left ventricle discharges blood to the body.
- * Right ventricle receives blood from right atrium.
- * Valves allow blood to move in one way only.

Q2: Which statement of the following is **Not** TRUE?

- * Arteries transport blood from the heart to the body.
- * Arteriovenous anastomosis is found in tips of the fingers and toes.
- * Capillaries connect the Arterioles to the Venules.
- * Anastomosis is the joining of terminal branches of the vein.
- * Veins leaving the gastrointestinal tract do not go directly to the heart.

Q3: cavities which are found in spleen, and help in filtration, are called :

A: capillaries . B: veins . C: sinusoids . D: arteries .

Q4: veins which come from the GIT , before going to the heart should pass through:

A: spleen . B: Liver . C: Bone marrow . D: stomach .



*“A very useful & helpful video about cardiovascular system in general.
Time duration 4:04”*

www.youtube.com/watch?v=DAXa4eR1s0M

● **Re-Design & Coordination By:**

Abdulrahman Al-Bahkley

● **Main Design By:**

Sarah Al-Kharashi

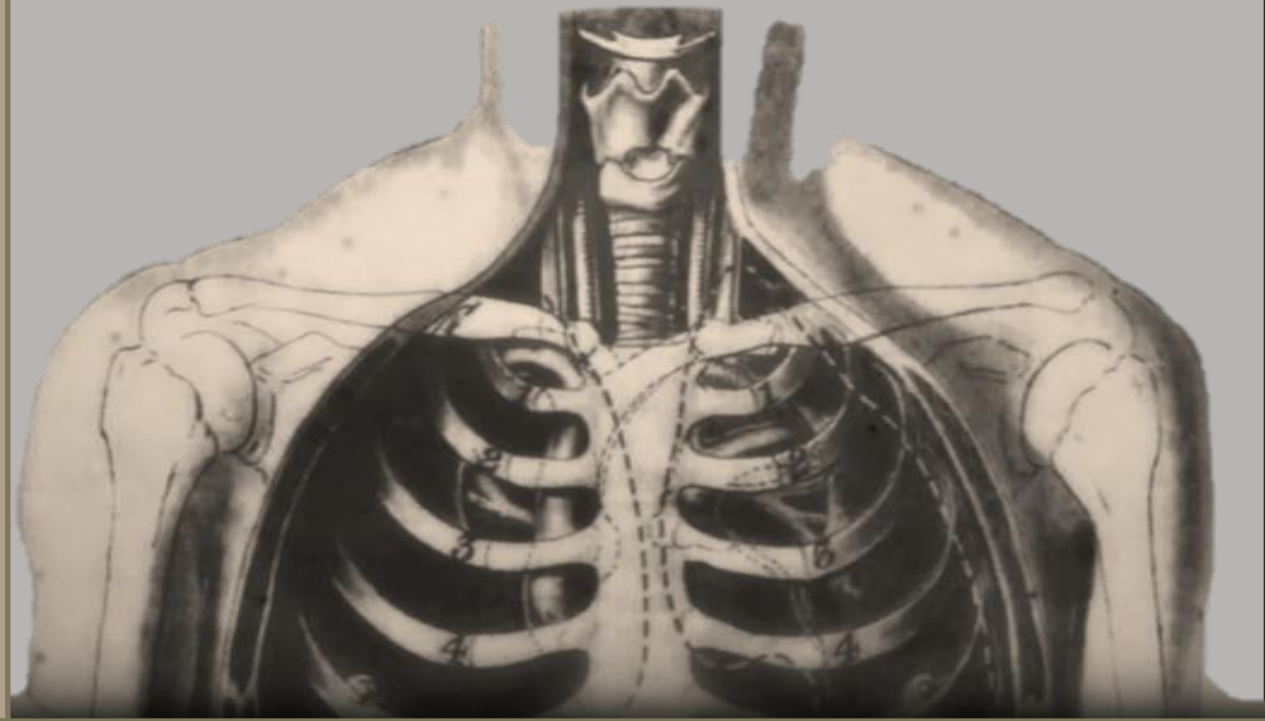
● **Done by:** JumanahAlbeeybe
RheemaAlfadhil, Farooq Walid ,
Othman Abid , Nawaf Al-Dousari ,
Abdulrahman Al-Fahadi , Abdullah
Al-Jorais , Abdulaziz Al-Masoud ,
Sulaiman Al-Sulaiman & Nasser
alqhtani

● **Team leaders:**

Omar Almutair & Waad Almanie

● **Reviewed By:**

Thamer Al-Sohaibani



Good luck 😊



Anatomy Team

433