

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Anatomy: Lecture 5 Girls/Lecture 4 Boys

Cardiovascular system

(رَبَّنَا لَا تُزِغْ قُلُوبَنَا بَعْدَ إِذْ هَدَيْتَنَا وَهَبْ لَنَا مِنْ لَدُنْكَ رَحْمَةً إِنَّكَ أَنْتَ الْوَهَّابُ)

- Important
- Term
- Female notes
- Male notes
- Extra explanation

Objectives:



◎ At the end of the lecture, students should be able to:

- *Identify the components of the cardiovascular system.*
- *Describe the Heart as regards (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.*



Cardiovascular system

Heart *Vessels*

Consists of

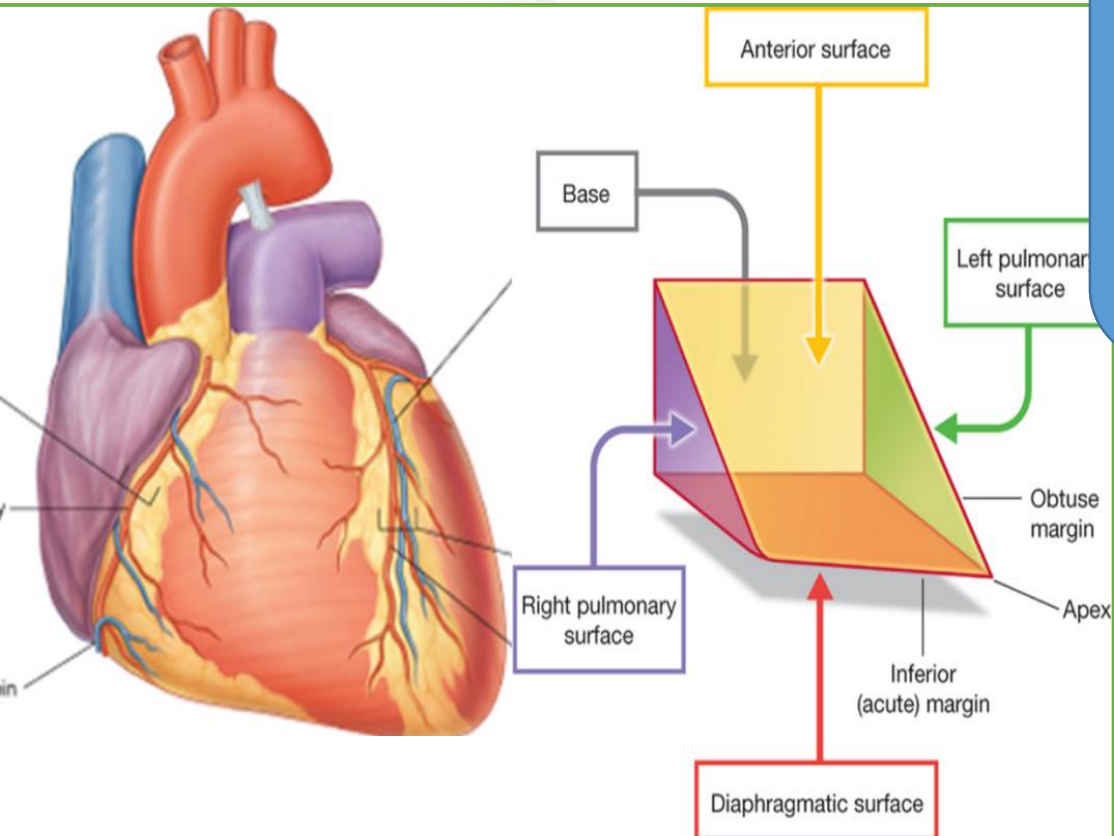
Heart
Pumps blood throughout the body

Functions:

- It transports oxygen, nutrients, cell wastes and hormones through blood.
- Maintains homeostasis.

Blood Vessels
A network of tubules.

Structure



Besides the double layer of pericardium, The outer wall of the heart is made up of three layers:
1-Epicardium.
2-Myocardium (muscle of the heart).
3-Endocardium.

Structure

- The heart is a hollow cone-shaped muscle that pumps blood to circulate blood.
- Your heart is the size of your fist.
- It has an apex, a base, surfaces (diaphragmatic & sternocostal) and right, left and inferior borders.

Location

- It's located in the Middle Mediastinum, the center of the thoracic cavity.
- It lies between the two pleural sacs of lungs.
- 2/3 of the heart is to the left of median plane.
- Enclosed by a double sac of serous membrane (Pericardium).

Chambers of the Heart

The human heart has 4 chambers:

Ventricles

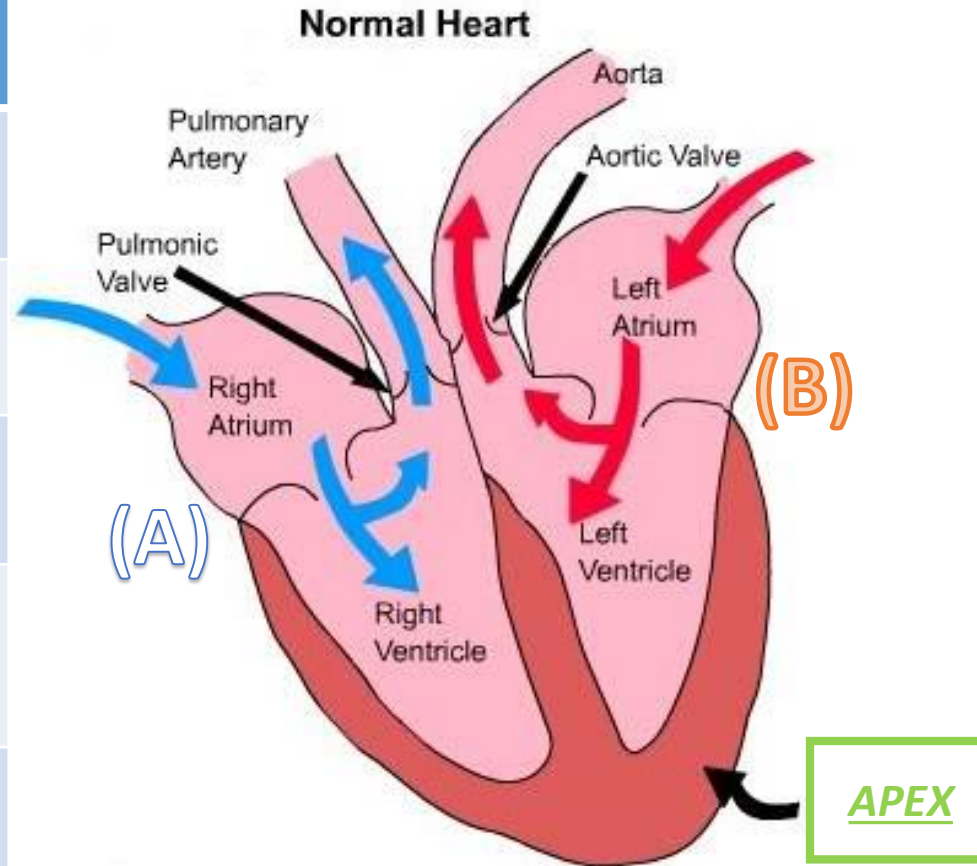
Inferior (left and Right)

Discharging Chambers (pumps)

Thick Walls

Left Ventricle forms the APEX

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



* Picture of Auricle → Next Slide

Atria

Superior (Left and Right)

Receiving Chambers

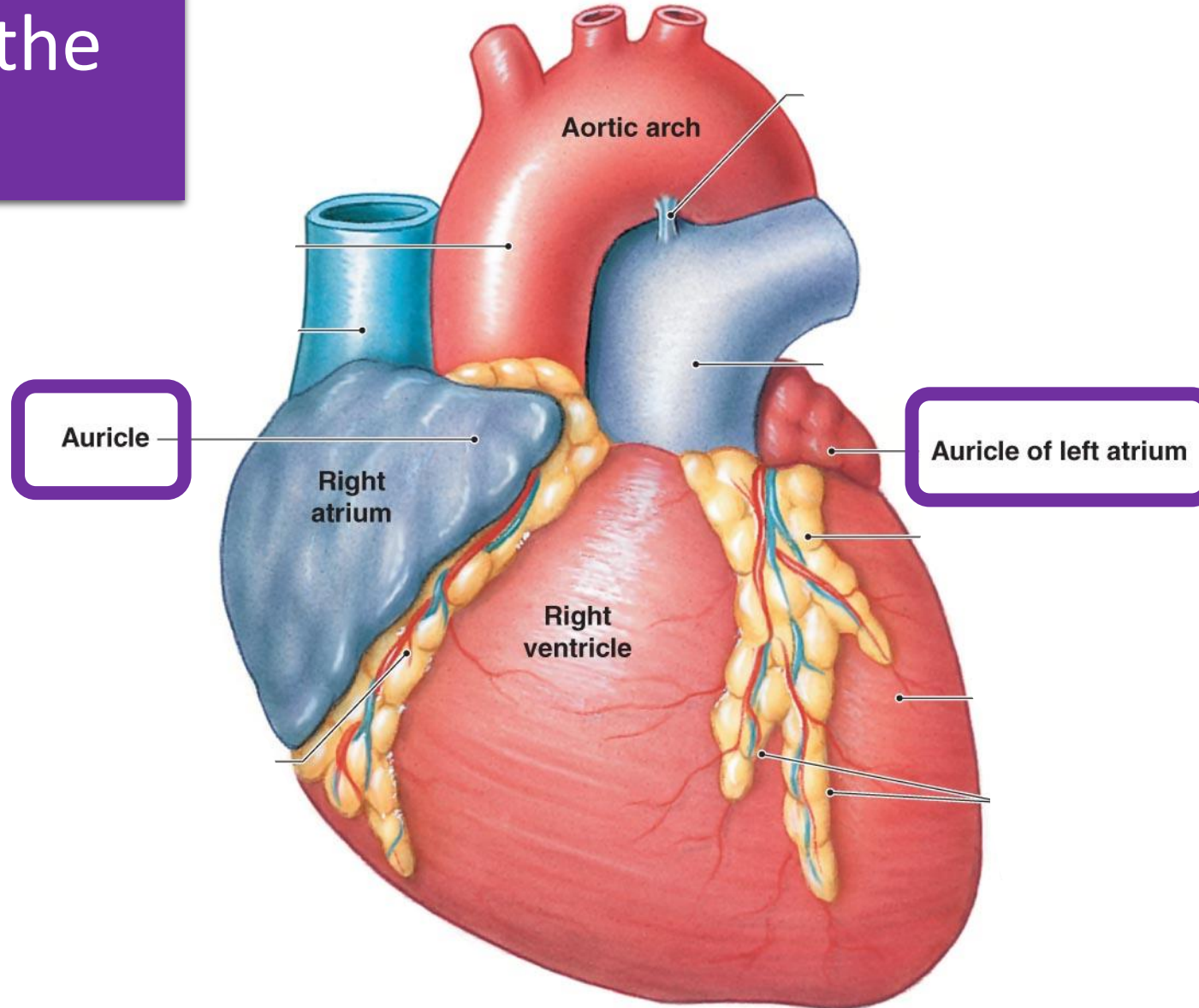
Thin Walls

Upper part of each atrium is called AURICLE*

(A) Right Atrium receives venous blood FROM the body

(B) Left Atrium receives arterial blood FROM the lungs

Auricle of the Heart



Valves of the Heart

The human heart has 4 valves:

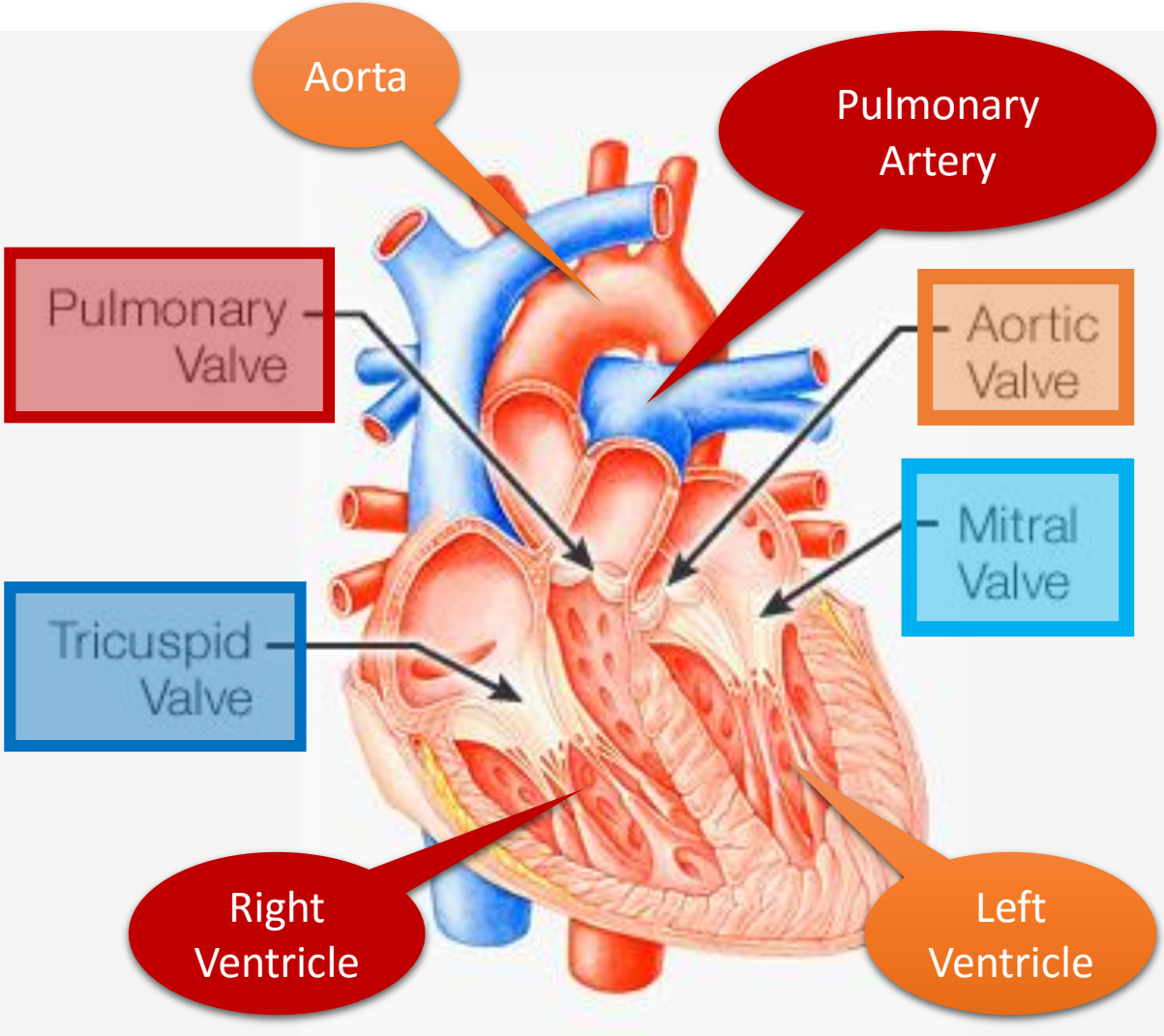
Atrioventricular

Function: Blood flow in one direction from the atria to the ventricles.

Location: Between ATRIA and VENTRICLES

Right AVV: Tricuspid

Left AVV: Mitral (Bicuspid)



Semilunar *

Function: Blood flow from ventricles to arteries

Location: **Between Pulmonary Artery and Right Ventricle**
Between Aorta and Left Ventricle

Pulmonary Valve

Aortic Valve

* Semilunar means crescent-like, because it looks like half a moon.

Blood Vessels:

Blood Vessels	
Arteries	Veins
Thick walls	Thin walls
Do not have valves	Many of them possess valves
The smallest arteries are arterioles	The smallest veins are venules
Capillaries	
<ul style="list-style-type: none"> ➤ Connect arterioles and venules. ➤ Help to enable the exchange of water, oxygen and other nutrients between blood and the tissues. 	

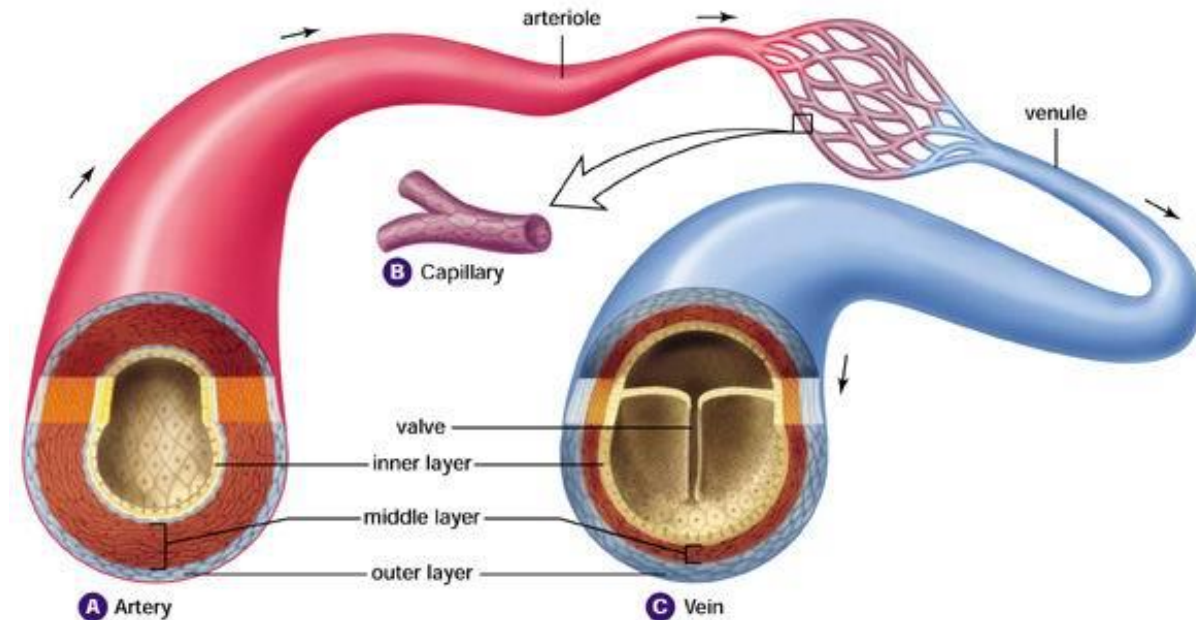


Figure 9.12. Sections through an artery, capillary, and vein. At any given moment, about 30% of the blood in your systemic circulation will be found in the arteries, 5% in the capillaries, and 65% in the veins.

ARTIERIES

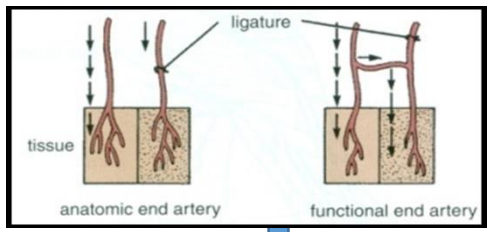
They transport blood from the **heart** and distribute it to the various tissues of the body through their branches. *(mainly that which has been oxygenated)*

Two Exceptions where arteries transport **deoxygenated** blood:

- The pulmonary arteries:** Carries deoxygenated blood from the heart to the lungs.
- The umbilical arteries:** Supplies deoxygenated blood from the fetus to the placenta in the umbilical cord.

Examples:
-Renal artery
-Splenic artery

END ARTERIES



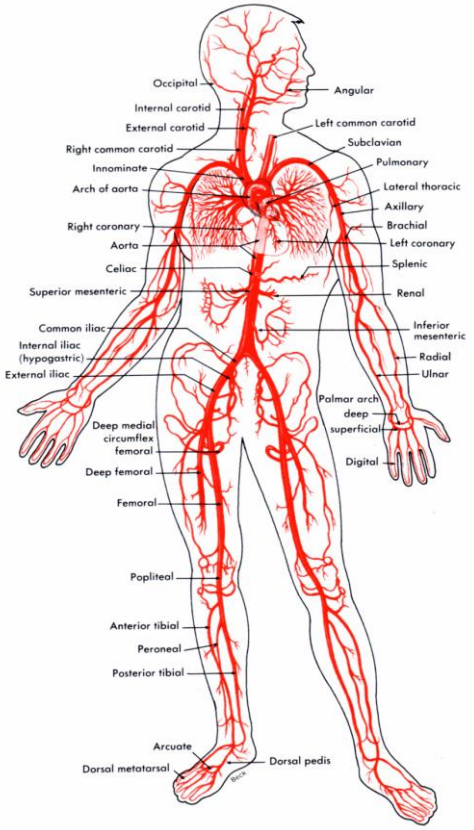
Anatomic End Arteries

Arteries which do not anastomose with their neighbors

- 1-Vessels whose terminal branches **do not anastomose** with branches of arteries
- 2-supplying adjacent areas.

Functional End Arteries

The terminal branches do anastomose with those of adjacent arteries but the **anastomosis is insufficient** to keep the tissue alive if one of the arteries is occluded.

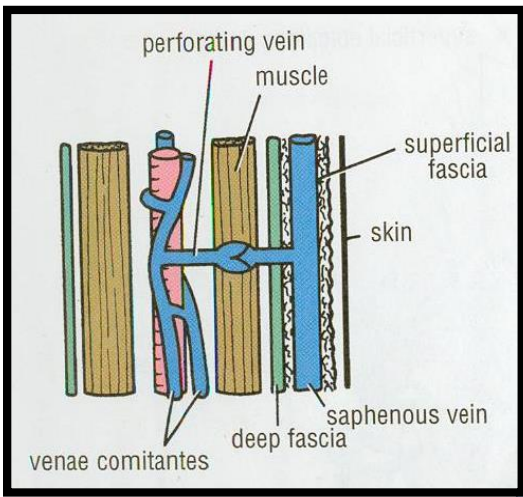


ARTERIAL ANASTOMOSIS*:

It is the joining of terminal branches of the arteries.



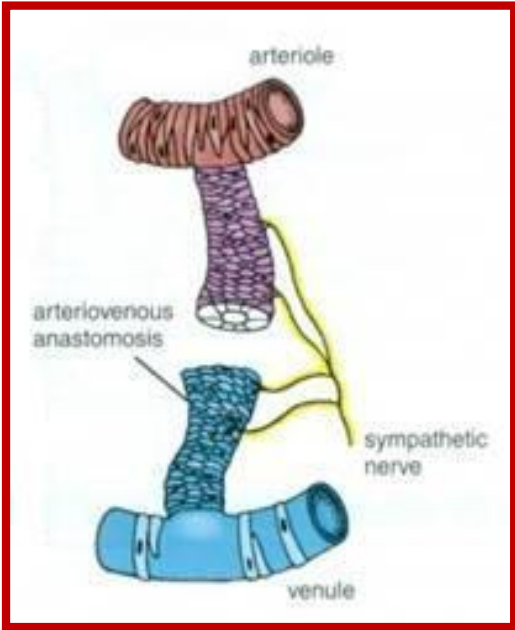
*anastomosis is a connection between two structures



Deep Veins
(Venae Comitantes)
accompanying vein.

- *They are two veins that accompany medium sized deep arteries.
- *They are found in close to arteries so that the pulsations of the artery aid venous return.
- *Venae comitantes are usually found with smaller arteries, especially those in the limbs.

Larger arteries do not have venae comitantes. They usually have a single, similarly sized vein.



- * Direct connections between the arteries and veins **without the intervention of capillaries.**
- * Found in:
- * **Tips of the Fingers and Toes.**

Arteriovenous Anastomosis

Carry deoxygenated blood toward the heart.
Two Exceptions:
the pulmonary veins.
receive oxygenated blood from the lungs and drain into the left atrium of the heart.
the umbilical veins.
carry oxygenated blood from the placenta to the growing fetus.

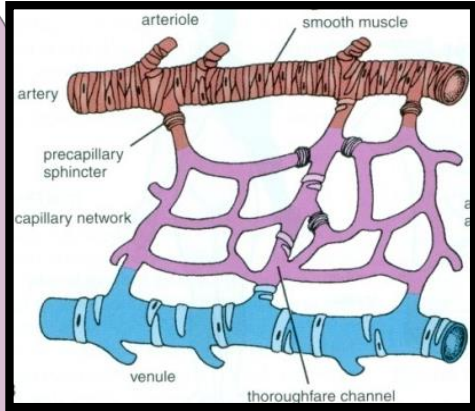
Veins

They transport blood back to the heart.

The smaller venules (**Tributaries**) unite to form larger veins which commonly join with one another to form **Venous Plexuses.**

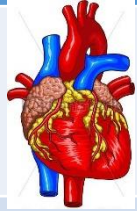
Capillaries

- * 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.



BLOOD CIRCULATIONS

CARDIOPULMONAR



between



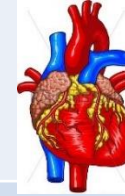
The **Right side** of the heart (Right atrium & ventricle) receive **oxygen poor blood**

blood is pumped from the heart through the Pulmonary Trunk to the lungs.

Gas exchange takes place in **the lungs**.

It returned to the left side of the heart (left atrium & ventricle) through 4 Pulmonary Veins

SYSTEMIC



between



The **Left side** of the heart (Left atrium & ventricle) receive **oxygen rich blood**

Blood is pumped from the left ventricle to all body tissues through the Aorta and its systemic arteries

The blood ultimately terminates in **capillaries**

Oxygen poor blood circulates from the tissues to the capillaries, venules & veins back to the right atrium through the Systemic Veins.

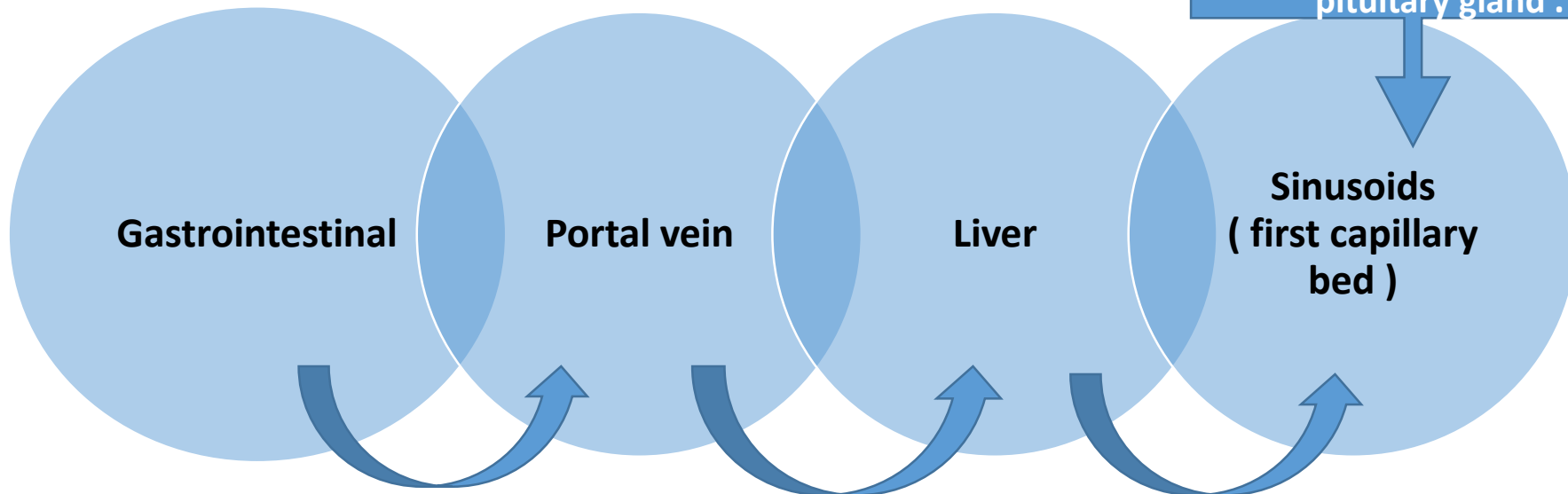
Portal Venous

System occurs when a capillary bed pools into another capillary bed through veins, without first going through the heart.

Portal circulation

- It's system of vessels interposed between Two Capillary Beds .
- It takes place in the
 ↗ Liver
 ↘ Endocrine glands (pituitary gland)

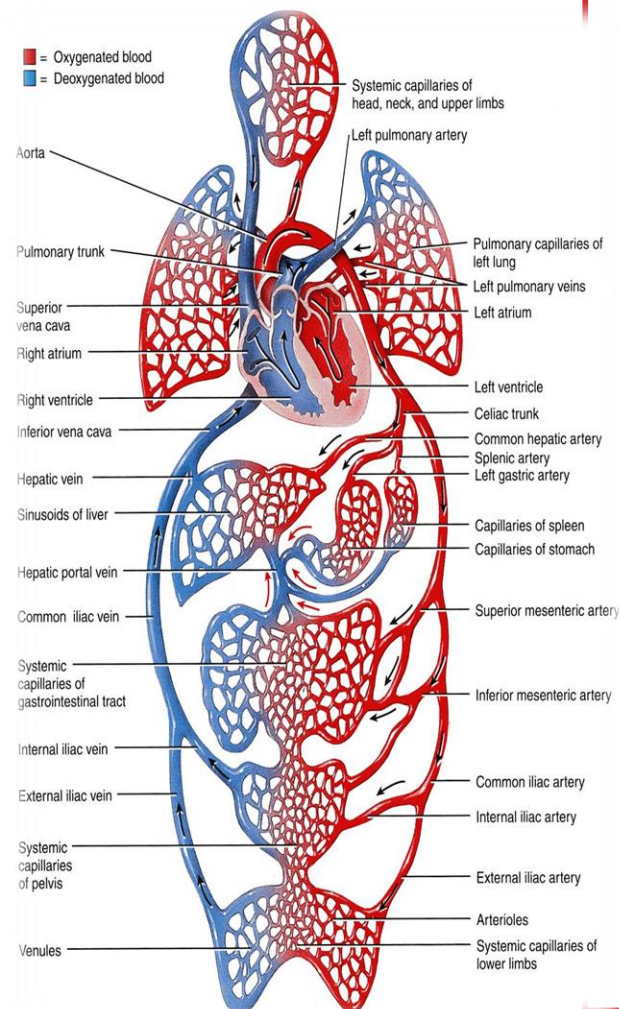
- Thin walled blood vessels like capillaries.
- Wider with irregular cross diameter.
- Found in : liver, spleen, bone marrow, pituitary gland .

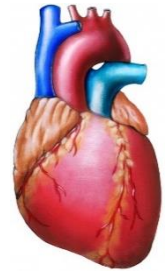


Veins
 (not direct to the heart) **Why? Because it contains food with venous blood (food can't go to the heart .**

Enter Breaks up into veins of diminishing size, **the sinusoids will get rid of the food by give it to the liver cells which is surrounded by them**

Venous bleed → **enter** → **second capillary bed** → **to** → **smaller veins**
 (that leave the liver through **hepatic veins**)

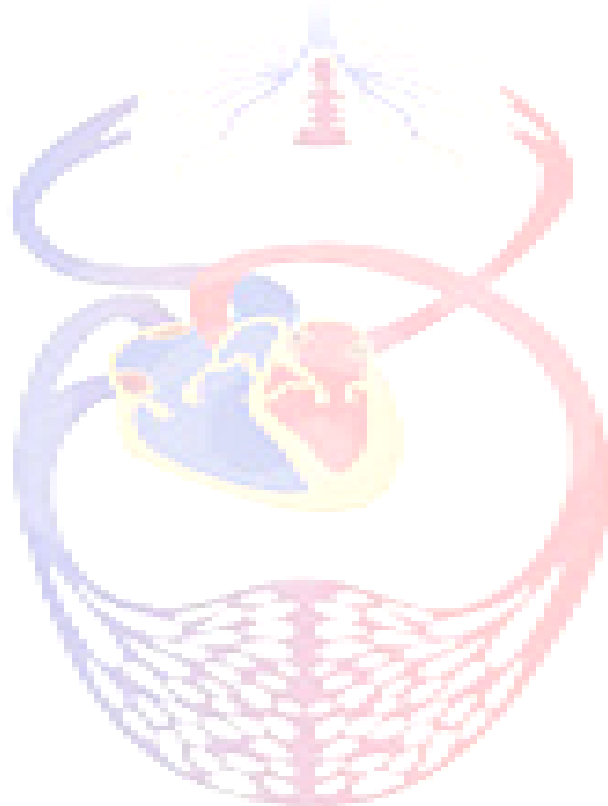




QUIZ



<https://www.onlineexambuilder.com/cardiovascular-system/exam-37019>



فريق العمل



ديمة الراجحي	سارة المطوع	غيداء الجميلي	عبدالله الفريح	عبدالوهاب سناري	فهد عبداللطيف
منيرة العُمري	فرح مندوزا	لمياء الصقهان	فهد الحميد	خالد الجديع	عبدالرحمن الشهري
ريم البهلال	سارة الحسين	منيرة السلولي	إبراهيم العسعوس	روضان النهدي	إبراهيم السحيم
شهد الدخيل	ربي السليمي	ديما الفارس	عبدالعزیز السيف		عبدالله المشوح
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