

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Major Blood Veins

OBJECTIVES

Define veins and understand the general principle of venous system.

Describe the superior & inferior Vena Cava.

- Formation and their tributaries

List major veins and their tributaries in;

- Head & neck

- Thorax & abdomen

- Upper & lower limbs

Describe the Portal Vein.

- Formation & tributaries.

New terms

- **Tunica** : an enveloping membrane or layer of body tissue
- **Intima** : inner most
- **Media** : middle layer
- **Adventitia** : an external chiefly connective tissue covering of an organ; *especially* : the external coat of a blood vessel.
- **Azygous** : not part of a pair ; alone.

Review

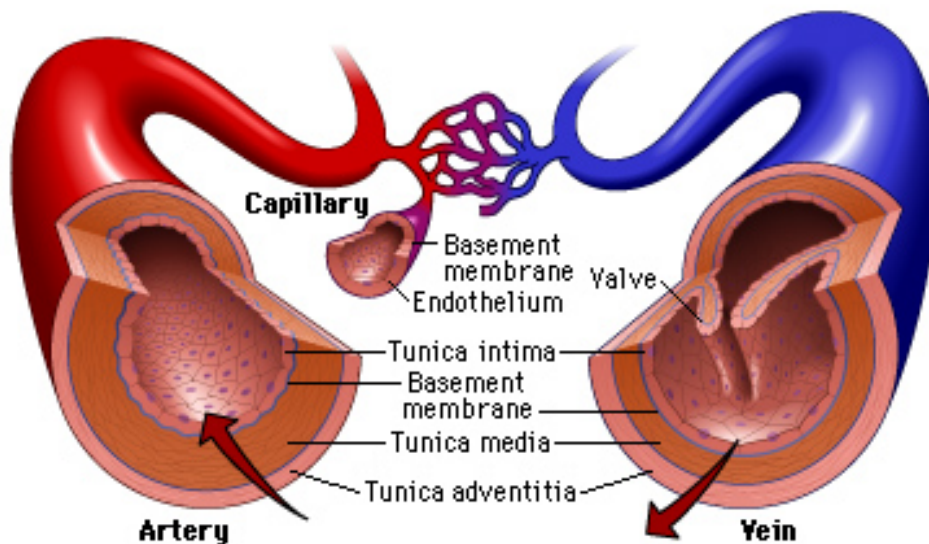
Blood vessels (vascular) are the part of the circulatory system that transport blood throughout body. Note Avascular means without blood vessels.

There are three major types of blood vessels :-

1-**Arteries**: which carry the blood away from the heart.

2-**Capillaries**: which enable the actual exchange of water and chemicals between the blood and the tissues.

3-**Veins**: which carry blood from the capillaries back toward the heart.



Veins

All veins carry deoxygenated blood with the exception of the pulmonary veins and umbilical veins

There are two types of veins:-

- 1- Superficial veins: close to the surface of the body NO corresponding arteries.
- 2- Deep veins: found deeper in the body with corresponding arteries.

Veins of the systemic circulation: Superior and inferior vena cava with their tributaries.

Veins of the portal circulation: Portal vein.

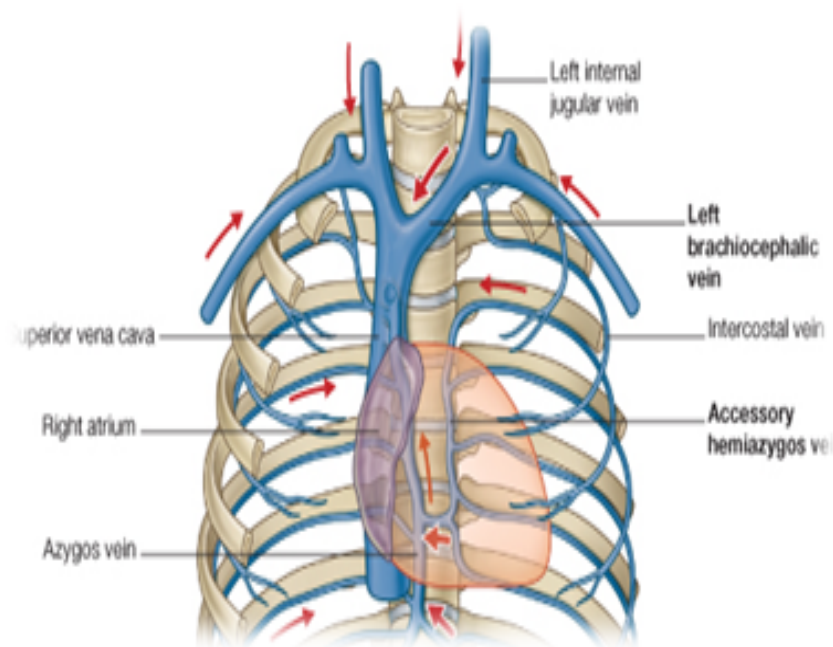
Superior Vena Cava

Formed by the union of the right and left **Brachiocephalic veins**

Brachiocephalic veins are formed by the union of internal jugular and subclavian veins.

Drains venous blood from: Head, neck, thoracic wall & upper limbs.

It Passes downward and enter the right atrium and receives azygos vein on the posterior aspect just before it enters the heart.

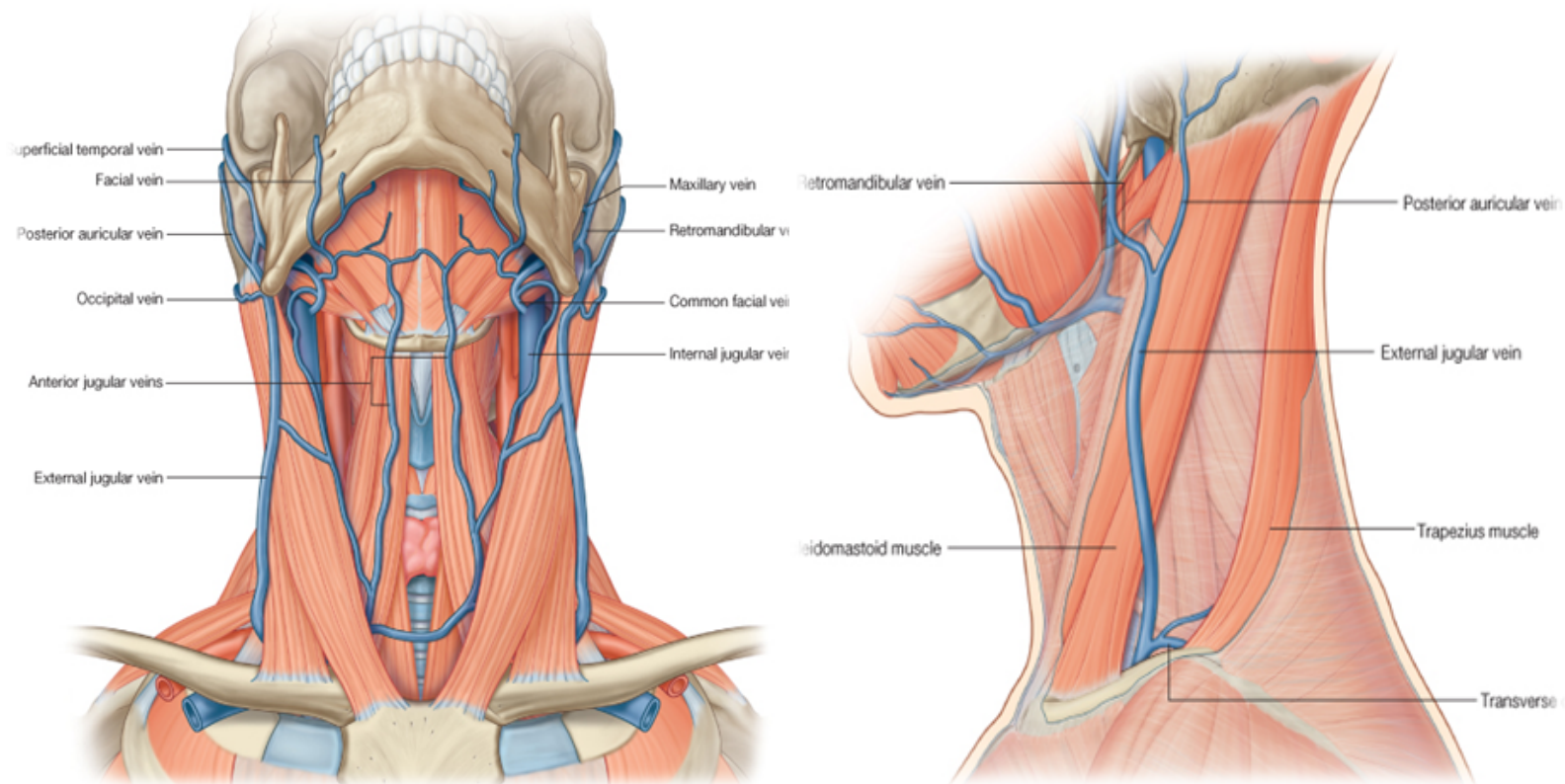


Superficial Veins of Head & Neck

1- **External Jugular Veins:** Lies superficial to the *sternomastoid muscle* and it passes down the neck and it is the only tributary of the subclavian vein.

It drains blood from: Outside of the skull and deep parts of the face.

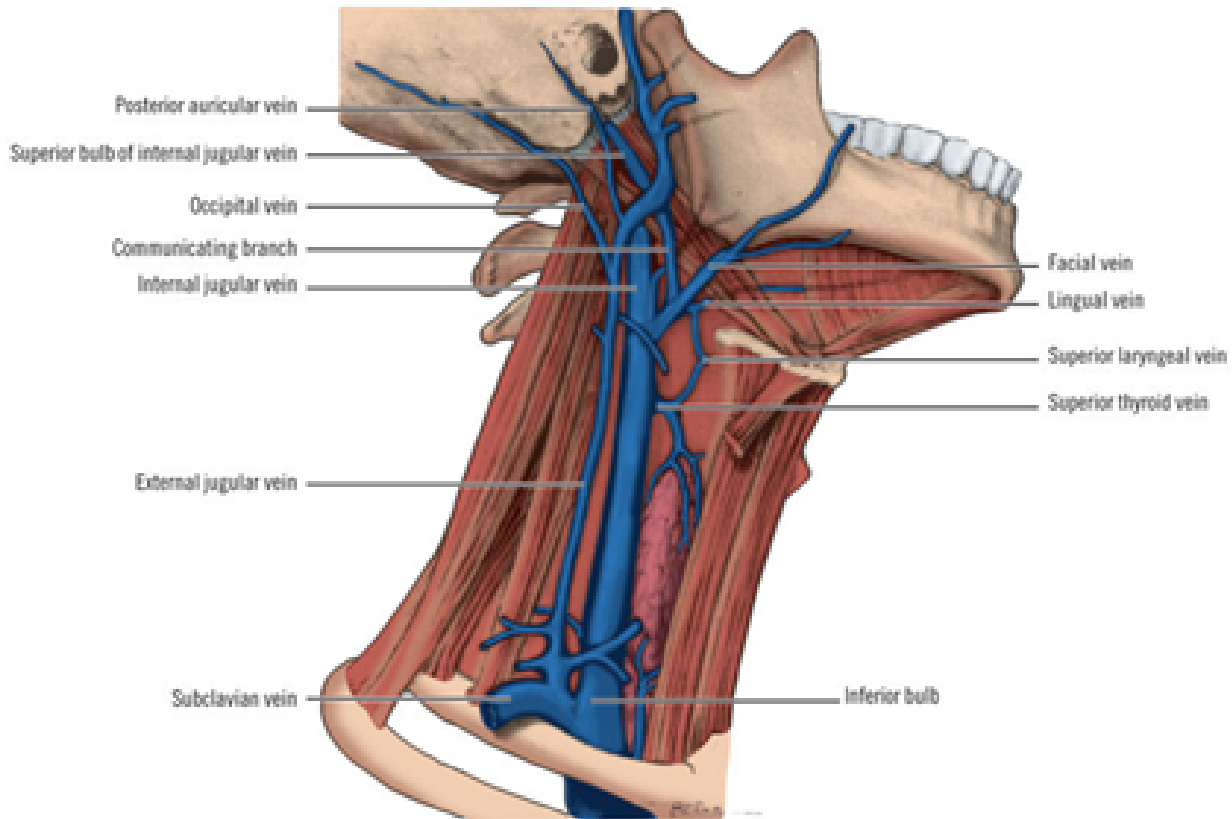
2- **Anterior Jugular Veins:** It begins in the upper part of the neck by the union of the submental veins. It descends close to the median line of the neck, medial to the *sternomastoid muscle*. At the lower part of the neck, it passes laterally beneath that muscle to drain into the external jugular vein. Just above the sternum the two anterior jugular veins communicate by a transverse vein to form the jugular arch.



Deep Veins of Head & Neck

Internal Jugular Veins: Drains blood from the head, brain, face & neck. It descends in the neck along with the internal and common carotid arteries and vagus nerve, within the carotid sheath. Joins the subclavian vein to form the brachiocephalic vein.

Tributaries: Superior thyroid, Lingual, Facial, Occipital veins and Dural venous sinuses.



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Veins of Upper Limbs

Superficial Veins :-

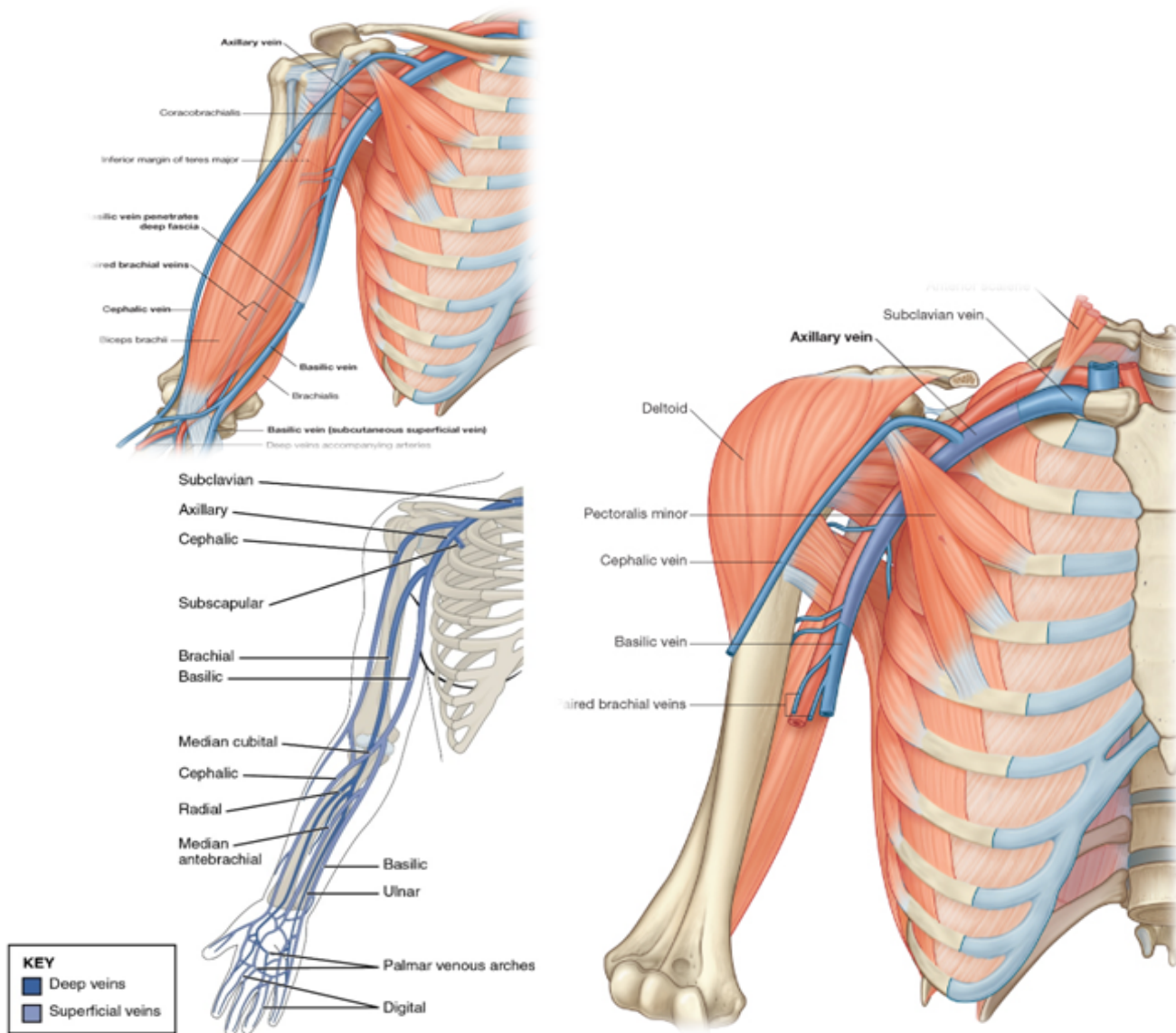
1- Cephalic Vein : Ascends in the superficial fascia on the lateral side of the biceps. Drains into the Axillary vein.

2- Basilic Vein : Ascends in the superficial fascia on the medial side of the biceps. Halfway up the arm, it pierces the deep fascia. At the lower border of the teres major it joins the venae comitantes of the brachial artery to form the Axillary vein.

Deep Veins :-

Venae Comitantes : Which accompany all the large arteries, usually in pairs (e.g brachial vein)

Axillary Vein : Formed by the union of basilic vein and the venae comitantes of the brachial artery.



Inferior Vena Cava

- Drains most of the blood from the body below the diaphragm to the *right atrium*.
- Formed by the union of the *two common iliac veins* behind the right common iliac artery at the level of the 5th lumbar vertebra.
- Ascends on the right side of the aorta.
- Pierces the central tendon of diaphragm at the level of the 8th thoracic vertebra.

Tributaries of Inferior Vena Cava

- Two common iliac veins
- Median sacral vein
- Four paired lumbar veins
- Right gonadal vein: The left vein drains into the left renal vein

- Paired renal veins
- Right suprarenal vein: The left vein drains into the left renal vein
- Hepatic veins
- Paired inferior phrenic vein

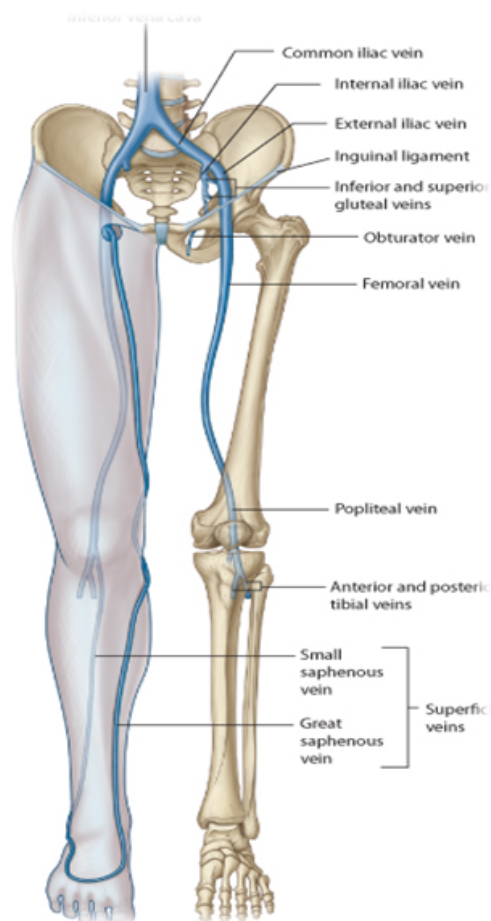
Veins of Lower Limbs

Superficial Veins:-

- Form a network in the subcutaneous tissue
- Pattern is variable

They are the tributaries of the:

- Great (long) saphenous vein
- Small (short) saphenous vein



Great Saphenous Vein

- The longest vein
- Begins from the medial end of the dorsal venous arch of the foot.
- Passes upward in front of the medial malleolus with the saphenous nerve.
- Then it ascends in accompany with the saphenous nerve in the superficial fascia over the medial side of the leg.
- Ascends obliquely upwards, and lies behind the medial border of the patella.
- Passes behind the knee and curves forward around the medial side of the thigh.
- Hooks through the lower part of the saphenous opening in the deep fascia to joins the femoral vein about 1.5 in. (4 cm) below and *lateral to the pubic tubercle*.
- It is connected to the small saphenous vein by one or two branches that pass behind the knee.
- Numerous perforating veins connect the great saphenous vein with the deep veins.
- *The perforating veins* have valves which allow blood flow from **superficial to deep** veins.

Small Saphenous Vein

- Arises from the lateral end of the dorsal venous arch.
- Ascends behind the *lateral malleolus* in company with the sural nerve.
- Follows the lateral border of the tendocalcaneus and then runs up to the middle of the back of the leg.
- Pierces the deep fascia in the lower part of the popliteal fossa
- Drains into the popliteal vein
- Has numerous valves along its course.
- Anastomosis freely with great saphenous vein.

Deep Veins :- (Veins of lower limbs)

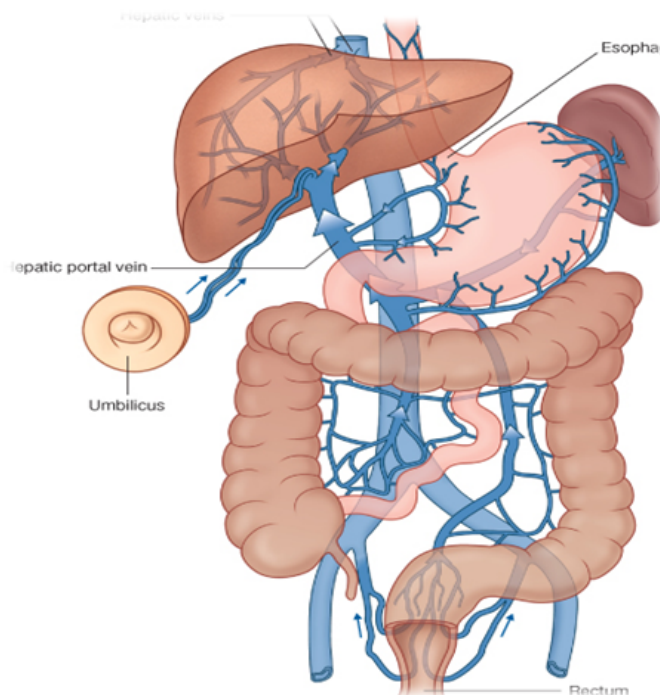
- Comprise the venae comitantes, which accompany all the large arteries, usually in pairs.
- Venae comitantes unite to form the popliteal vein, which continues as the femoral vein.
- Receive blood from superficial veins through perforating veins.

Mechanism of Venous Return from Lower Limb

- Venous return (VR) is the flow of blood back to the heart.
- Much of the saphenous blood passes from superficial to deep veins through the perforating veins
- The blood is pumped upwards in the deep veins by the **contraction of the calf muscles** (calf pump).
- This action of calf pump is assisted by the tight sleeve of deep fascia surrounding these muscles.
- **Varicose Veins:** If the valves in the perforating veins become incompetent, the direction of blood flow is reversed and the veins become varicosed. Most common in posterior & medial parts of the lower limb, particularly in old people.

Portal Circulation

- A portal venous system is a series of veins or venules that directly connect two capillary beds.
- Examples of such systems include the *hepatic portal vein* and *hypophseal portal system*.



Hepatic Portal Vein

- Drains blood from the *gastrointestinal tract* and *spleen*.
- It is formed by the union of the superior mesenteric and splenic veins.
- Immediately before reaching the liver, the portal vein divides into right and left that enter the liver.
- Tributaries: Gastric and cystic veins

Portocaval Anastomosis

- A portacaval anastomosis (also known as portal systemic anastomosis) is a specific type of anastomosis that occurs between the veins of portal circulation and those of systemic circulation.
- The anastomotic channels become dilated **varicosed in case of portal hypertension**.

MCQ

1- common iliac vein drain in:

- a- External iliac vein
- b- Inferior vena cava *
- c- superior vena cava
- d- phrenic vein

2- All those organs are drained in the superior vena cava except:

- a- lungs
- b- upper limb
- c- perineum *
- d- Neck

3- the superior vena cava is formed by the union of:

- a- two brachiocephalic vein *
- b- Azygus and pericardial vein
- c- internal jugular and subclavian vein
- d- none of the above

4- inferior vena cava is formed at the level of:

- a- T5
- b- T2
- c- L2
- d- L5 *

5- Deep vein of the head and neck are drained in the:

- a- external jugular vein
- b- internal carotid vein
- c- external carotid vein
- d- internal jugular vein *

****Done by Anatomy team****