Major Blood Vessels-Veins

By : Associate Prof.Sanaa Alshaarawy

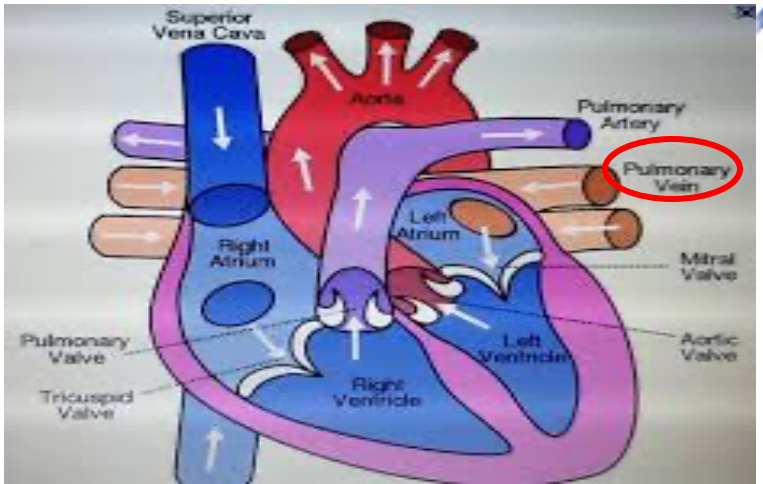
Objectives

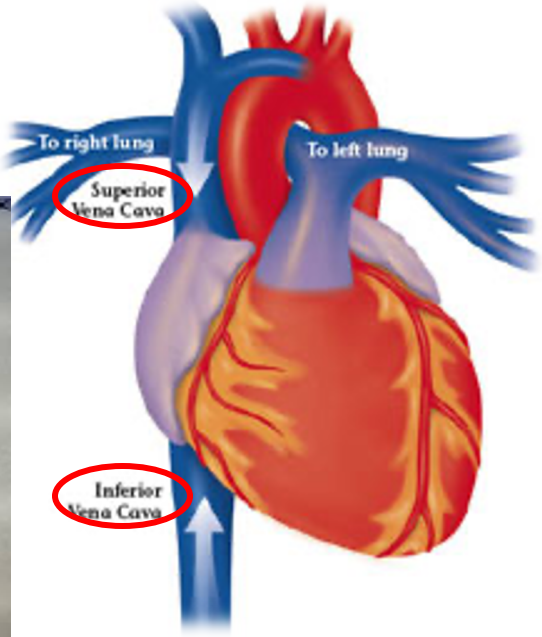
At the end of the lecture, the student should be able to:

- **Define the veins**, and understand the **general principle** of the venous system.
- Describe the **superior & inferior Vena Cava** and their **tributaries.**
- List **major veins** and their **tributaries in the body.**
- Describe the **Portal Vein.**
- Describe the **Portocaval Anastomosis.**

Veins

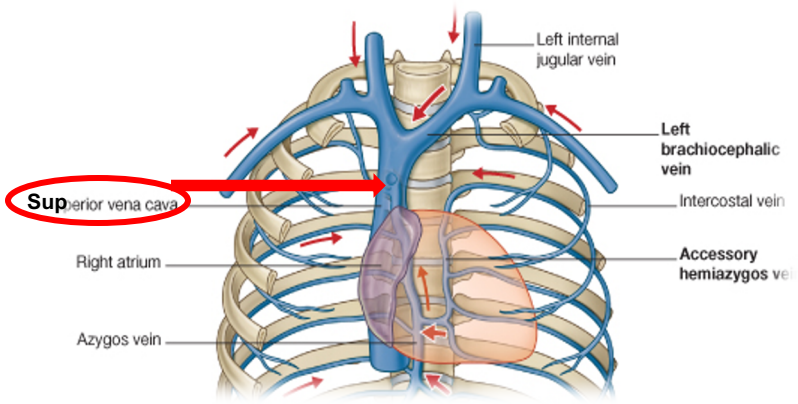
- Veins are blood vessels that bring blood back to the heart.
- All veins **carry deoxygenated blood**
  - with the exception of the **pulmonary veins** and **umbilical vein** (during fetal development).
- **There are two types of veins:**
  - Superficial veins: close to the surface of the body
    - ✓ NO corresponding arteries
  - 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**

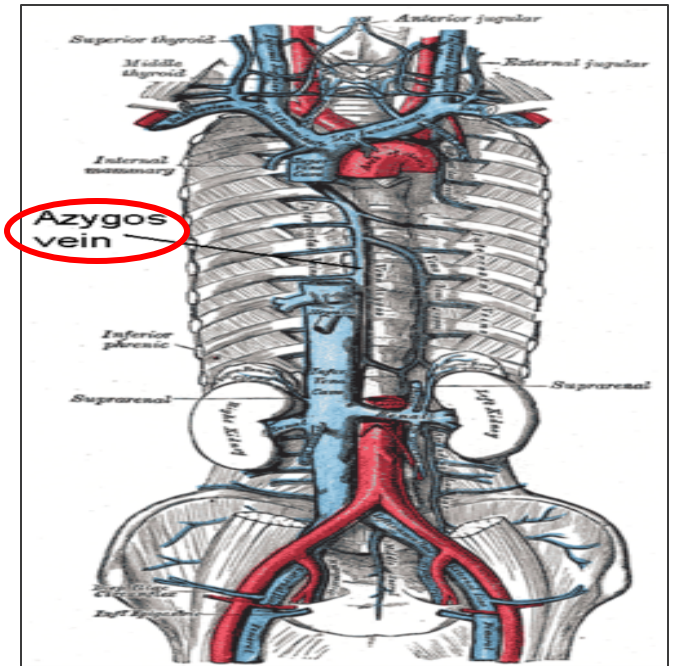




Superior Vena Cava

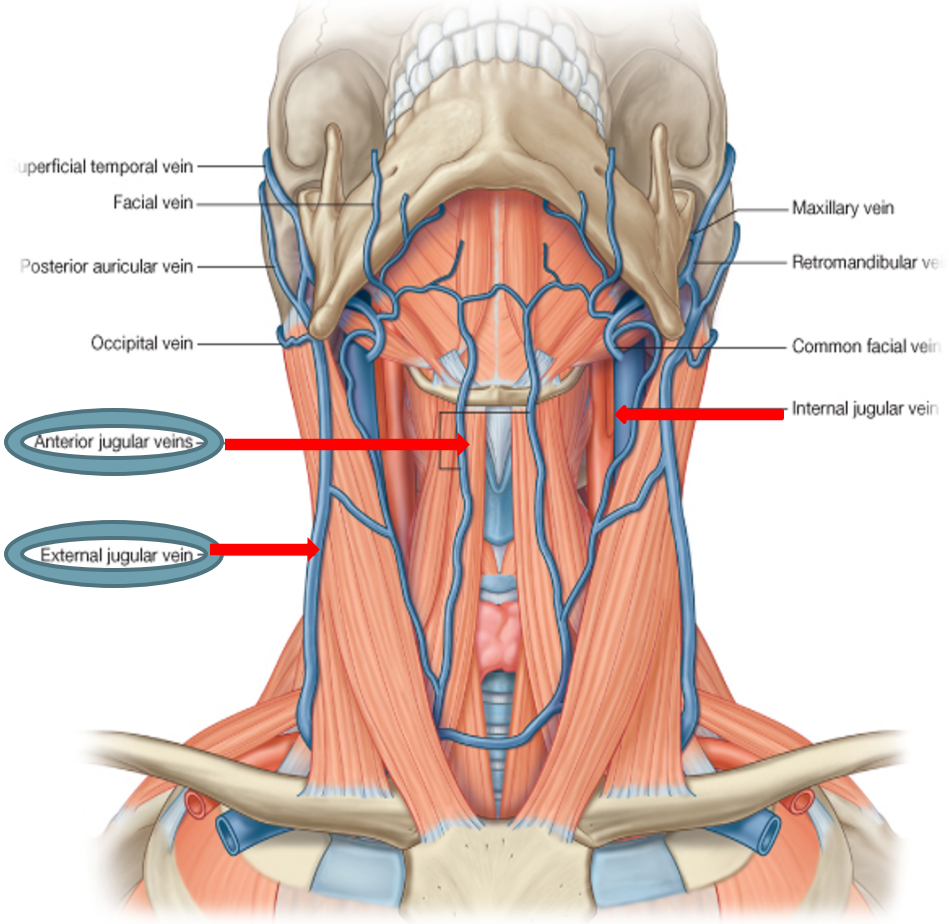
- **Formed by** the union of the **right and left Brachiocephalic veins.**
  - **Brachiocephalic veins** are formed by the union of **internal jugular and subclavian veins**.
- **Drains venous blood from :**
  - Head &neck
  - Thoracic wall
  - Upper limbs
- **It Passes** downward and **enter** the **right atrium.**
- **Receives azygos vein** on its posterior aspect just before it enters the heart.





Veins of Head & Neck

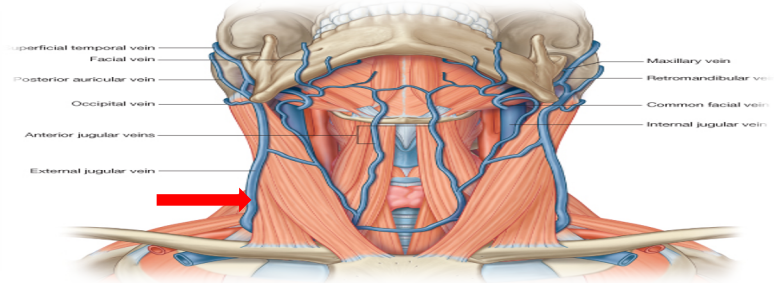
- **Two divisions:**
  - **Superficial Veins**
    - ✓ External Jugular veins
    - ✓ Anterior jugular veins
  - **Deep Veins**
    - ✓ Internal Jugulars veins.

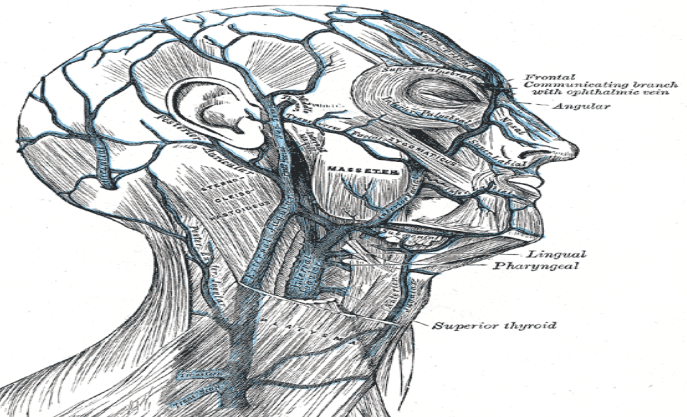


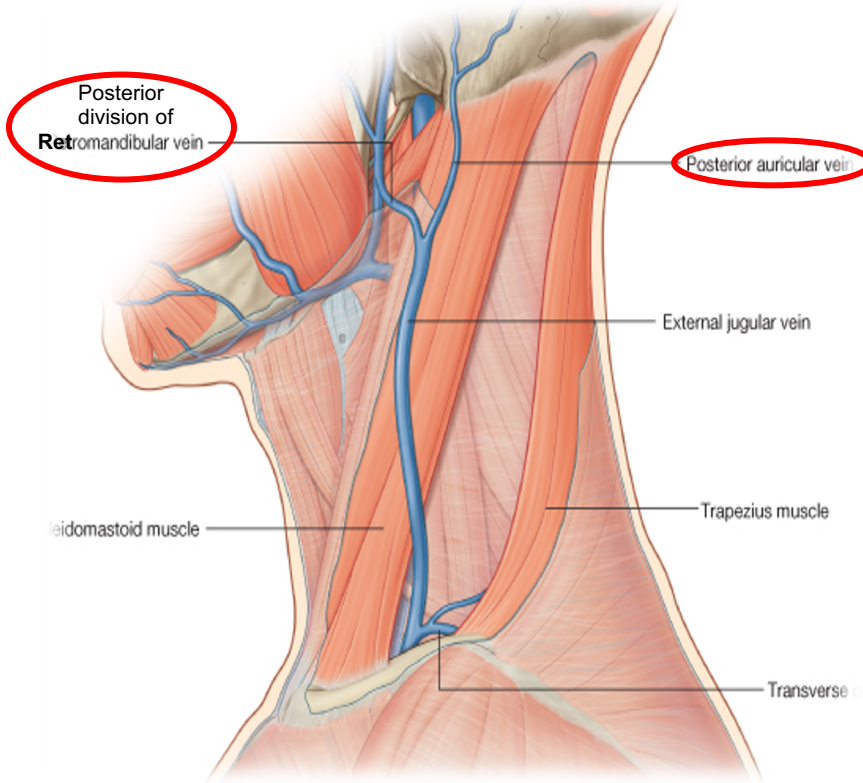
Superficial Veins of Head & Neck

❖ External Jugular Vein:

- ➢ **Lies superficial** to the **sternomastoid** muscle
- ➢ **Begins** just behind the angle of mandible **by union of** posterior auricular vein with the posterior division of retromandibular vein.
- ➢ It passes down the neck and it is the **only tributary of the subclavian vein**.
- ➢ **It drains** blood from:
  - ✓ **Outside of the skull**
  - ✓ **Deep** parts of the **face.**



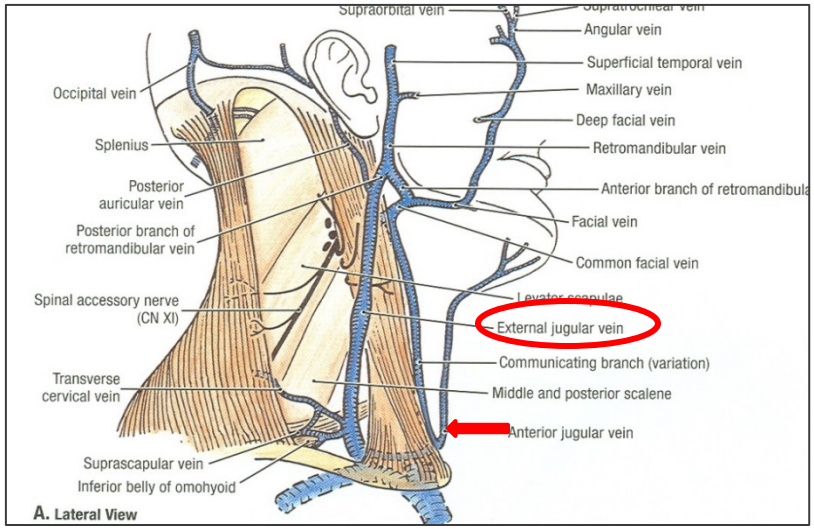


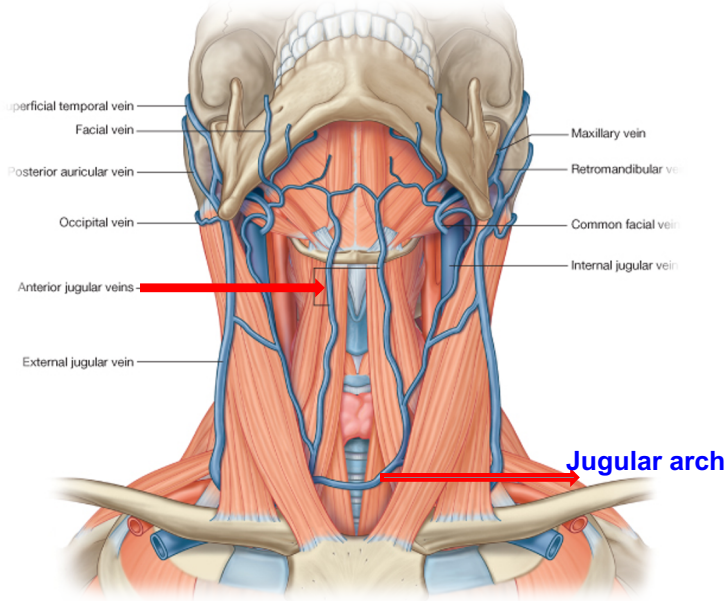


Superficial Veins of Head & Neck

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**.
- **At the lower part of the neck, it** passes laterally **beneath (deep to) sternomastoid 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.**

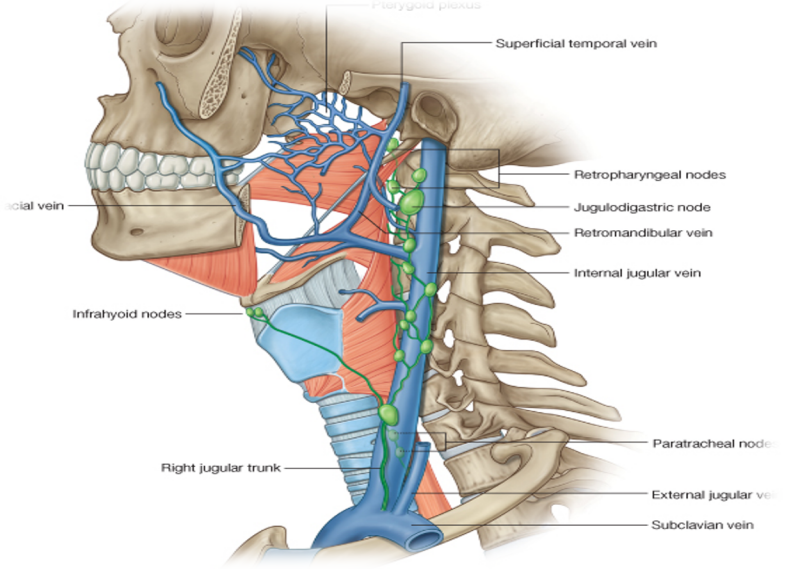


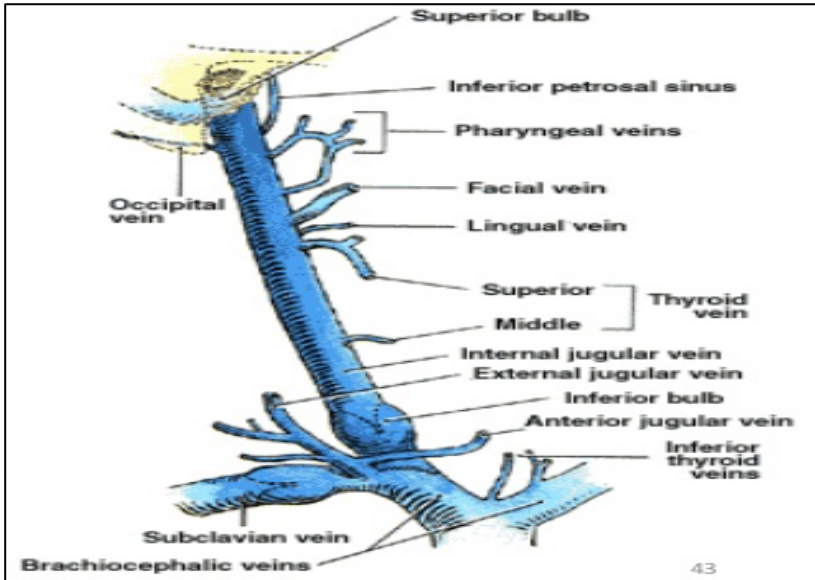


Deep Veins of Head & Neck

Internal Jugulars vein:

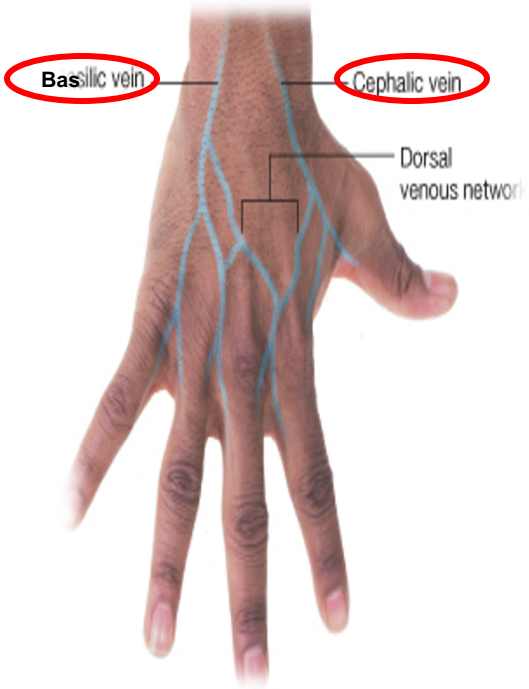
- **Drains** blood from the brain,face, head & neck.
- **It descends in the neck** along **with** the **internal** and **common carotid** arteries and **vagus nerve**, within the **carotid sheath**.
- **Joins** the **subclavian vein** to form the **brachiocephalic vein.**
- **Tributaries:**
  - ✓ Superior &middle thyroid.
  - ✓ Lingual
  - ✓ Facial
  - ✓ Pharyngeal.
  - ✓ Occipital veins
  - ✓ Dural venous sinuses (inferior petrosal sinus).

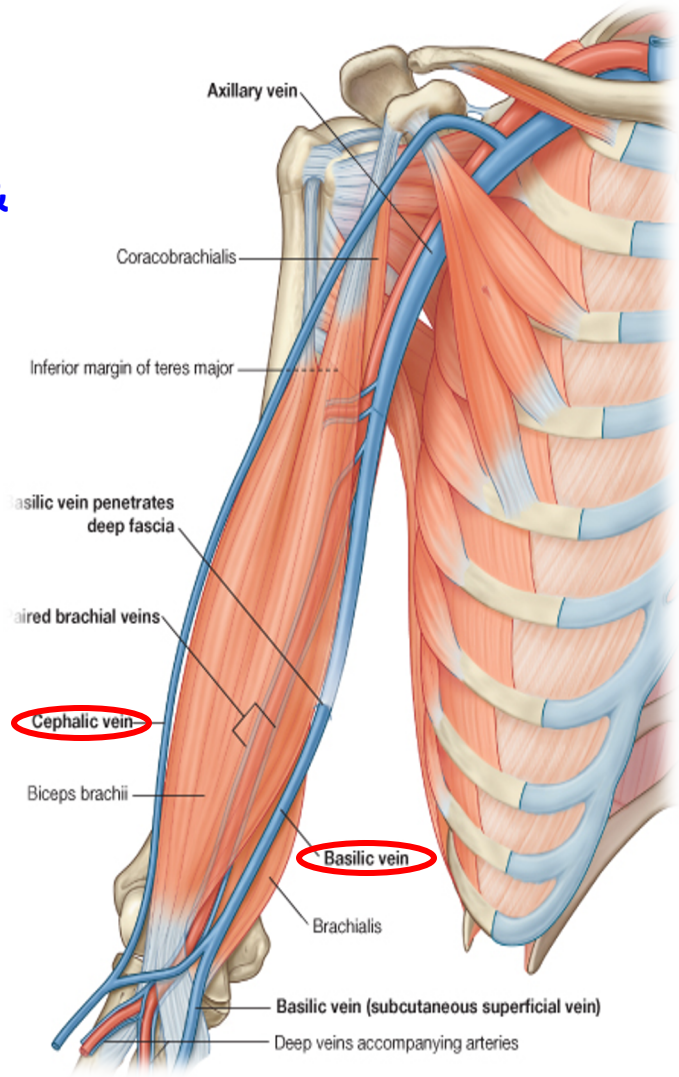




Veins of Upper Limbs

- Two divisions:
  - Superficial Veins: Cephalic & Basilic
  - Deep Veins: Venae commitantes & Axillary.





Veins of Upper Limbs

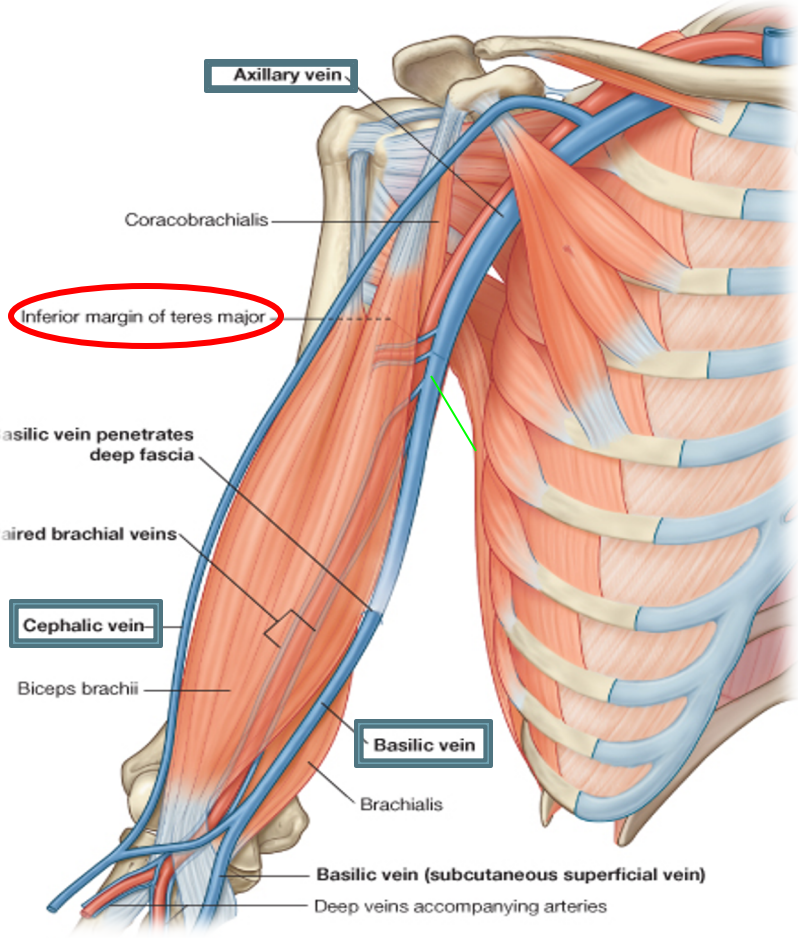
Superficial Veins

Cephalic vein

- **Ascends** in the **superficial fascia** on the **lateral side** of the **biceps.**
- **Drains into** the **Axillary vein.**

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 **teres major; it joins** the **venae comitantes** of the **brachial artery to form** the **Axillary vein.**



Veins of Upper Limbs

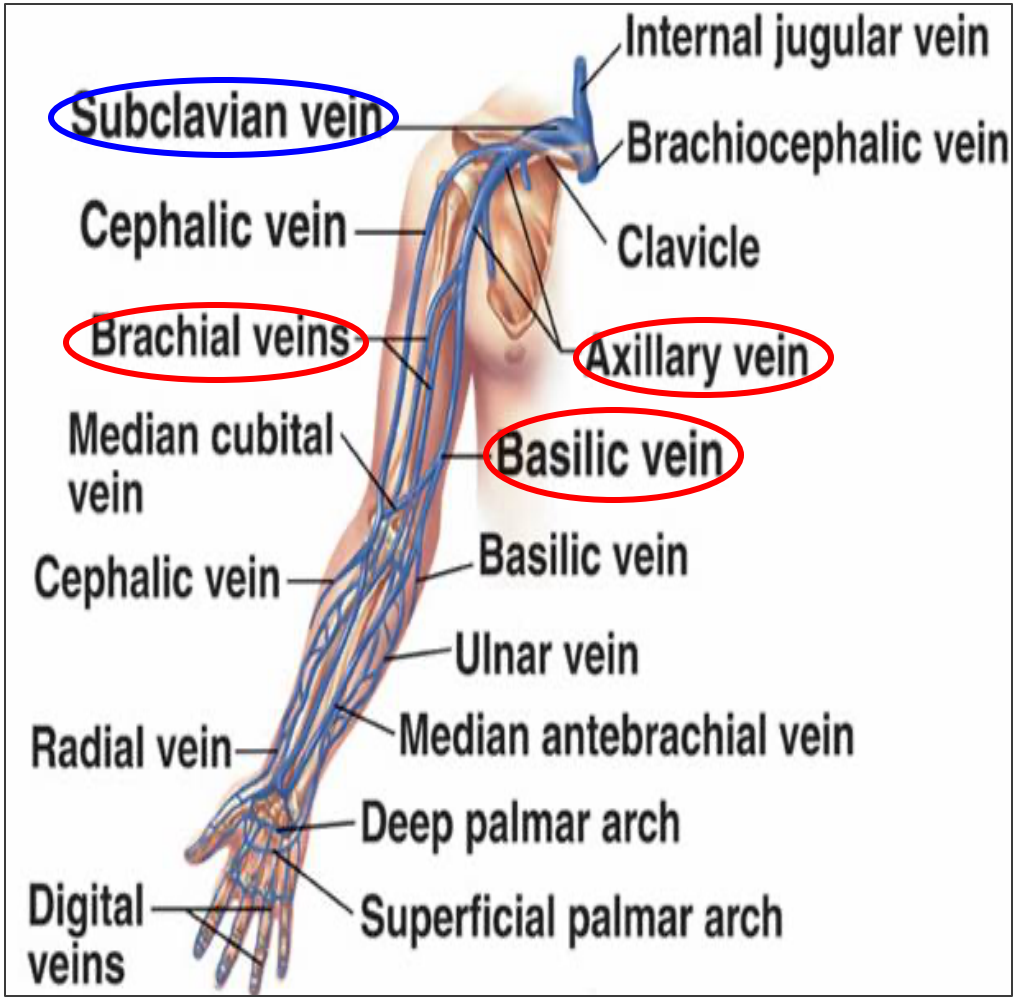
Deep Veins

Venae commitantes

- Which **accompany** all the **large arteries, usually in pairs.**

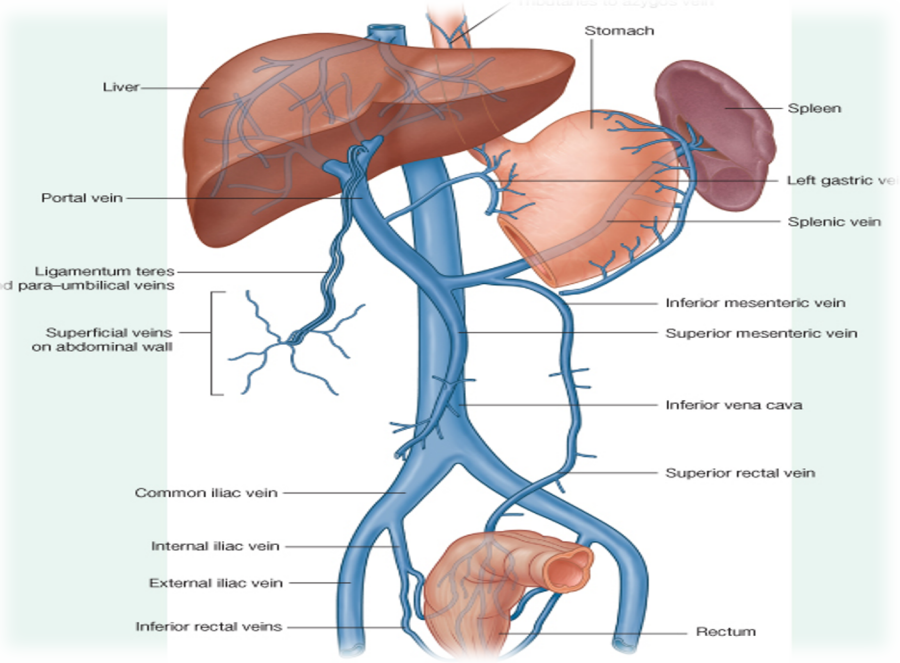
Axillary vein

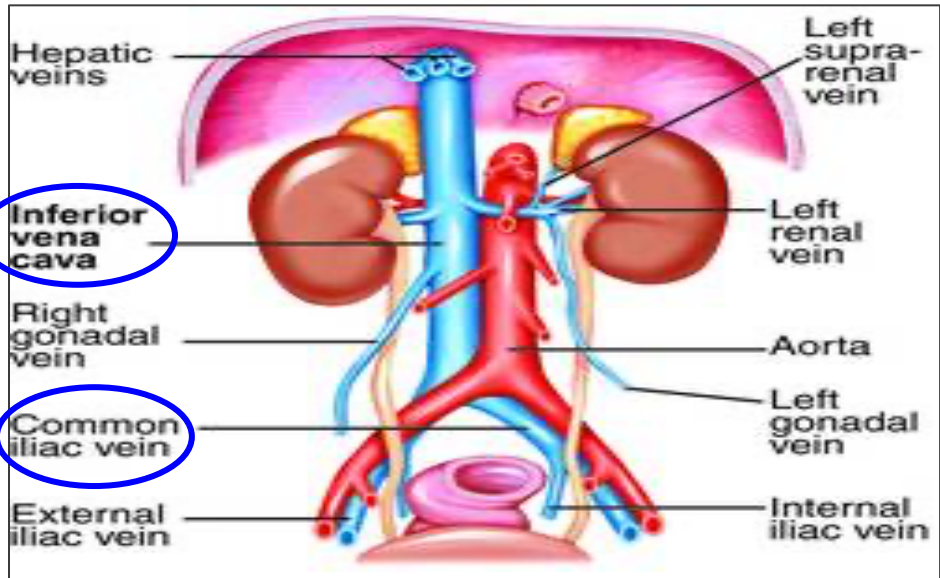
- **Formed by** the union of **basilic vein** and the **venae comitantes(brachial veins)** of the **brachial artery.**
- **It drains finally into the subclavian vein.**



Inferior Vena Cava

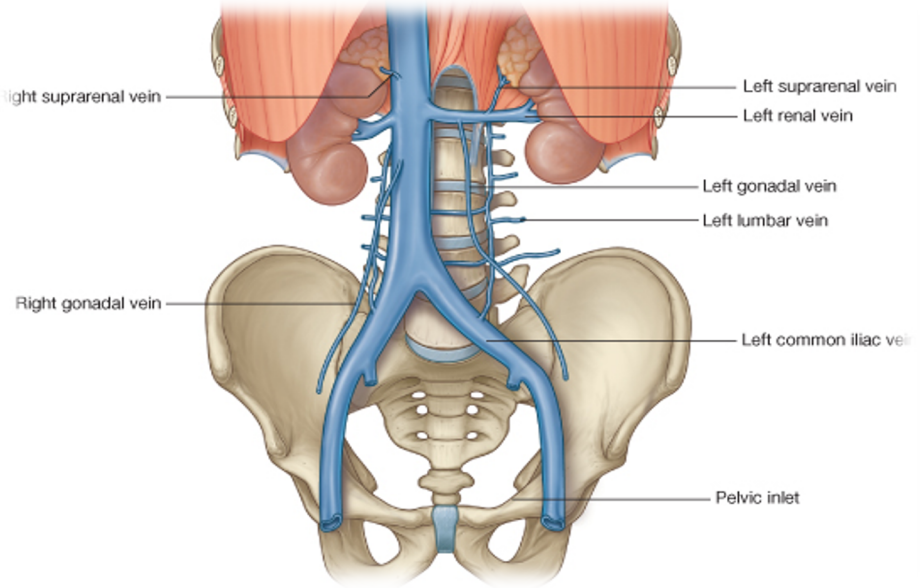
- **Drains** most of the blood from the body below the diaphragm to the right atrium.
- **Formed by** the **union of** the **2 common iliac veins behind** the **right common iliac artery at the level** of the **5th lumbar vertebra (L5).**
- **Ascends** on the **right side** of **aorta.**
- **Pierces** the central tendon of **diaphragm** at the **level of** the **8th thoracic vertebra (T8).**

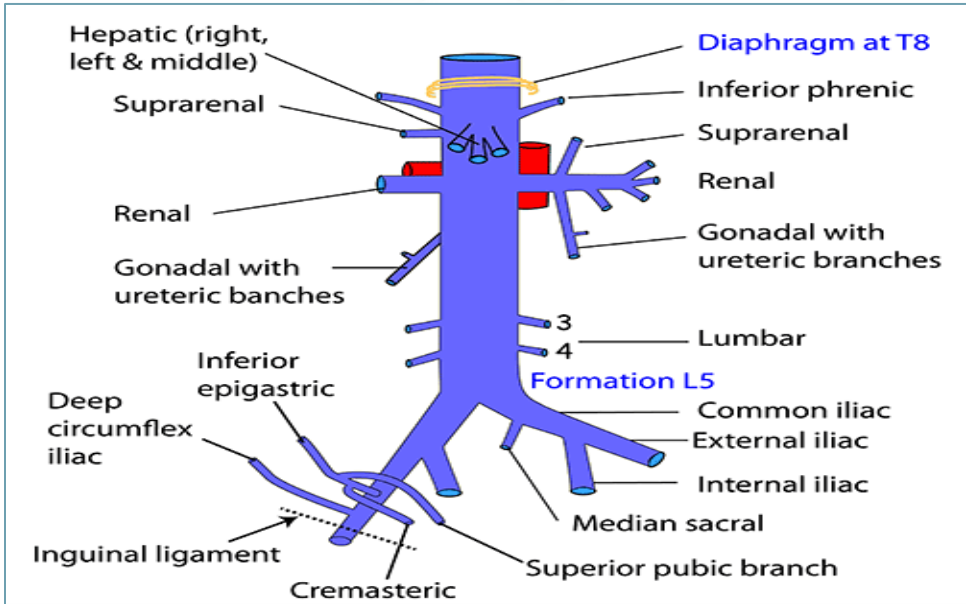




Tributaries of Inferior Vena Cava

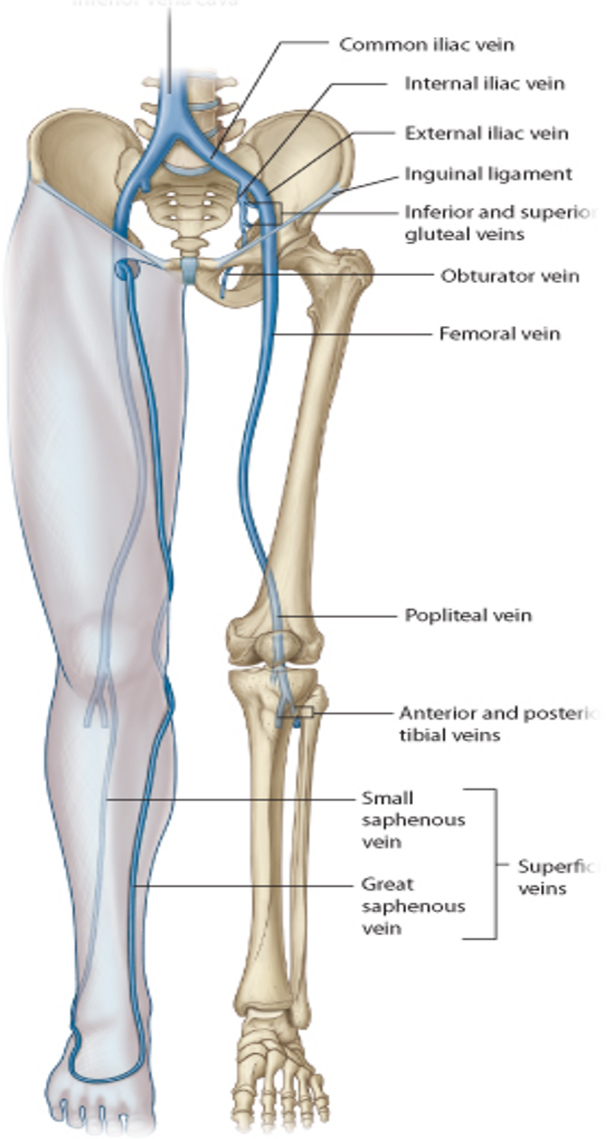
- Two common iliac veins
- Median sacral vein
- Four paired lumbar veins
- Right gonadal vein
  - the left vein drains into the left renal vein
- Paired renal veins
- Right suprarenal vein
  - the left vein drains into the left renal vein
- Hepatic veins
- Paired inferior phrenic veins.





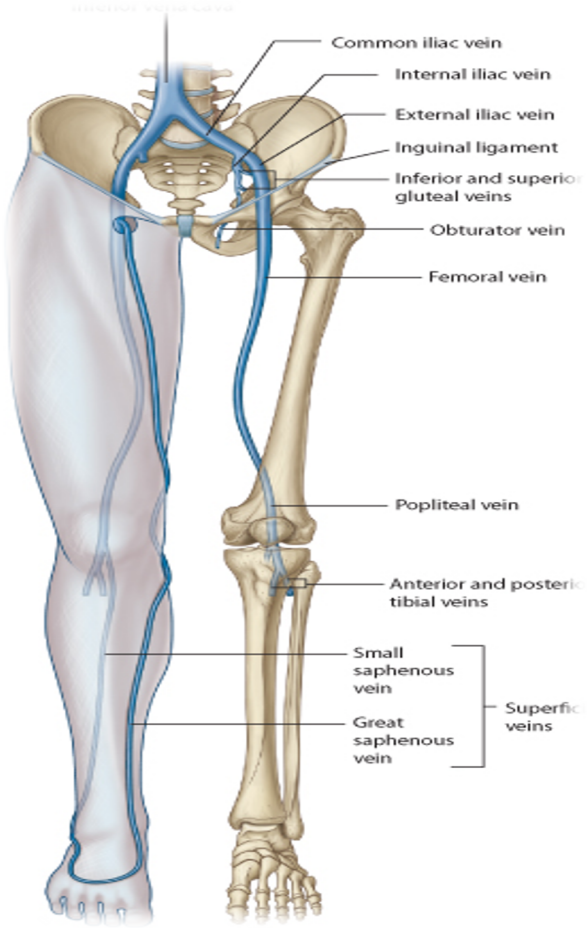
Veins of Lower Limbs

- Two divisions:
  - Superficial Veins
  - Deep Veins



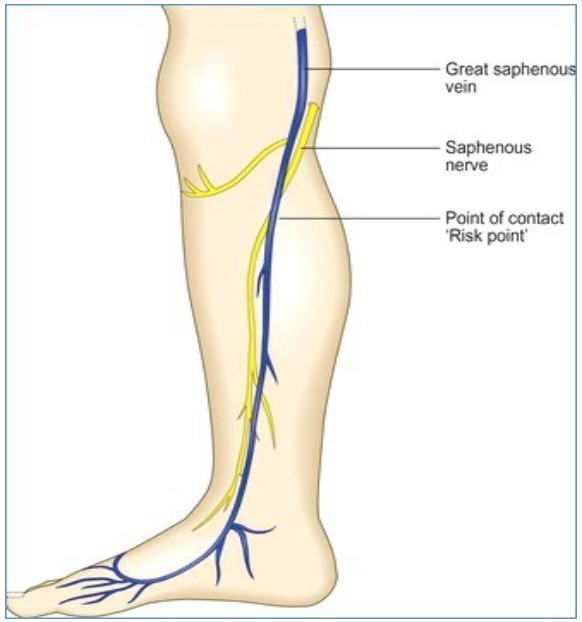
Veins of Lower Limbs

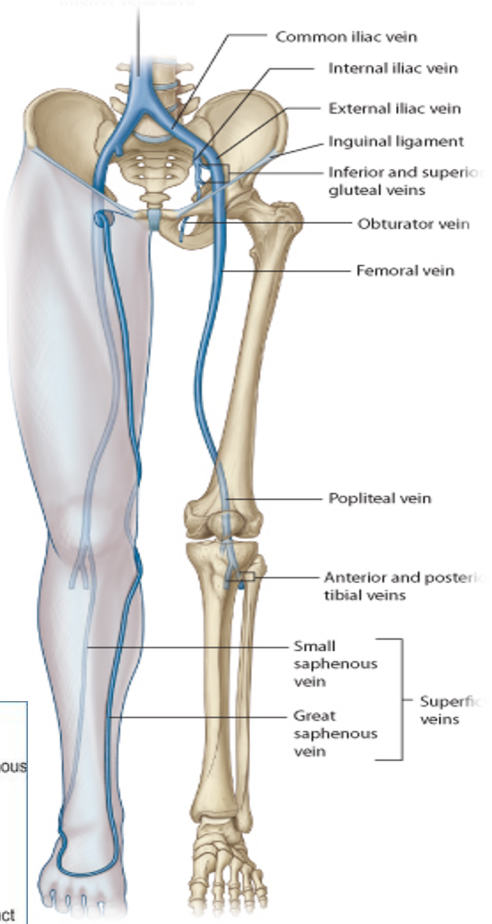
- **Superficial Veins**
  - lying in the **subcutaneous tissue.**
  - **They are** :
    - **Great (long) saphenous vein**
    - **Small (short) saphenous vein**



Great Saphenous Vein

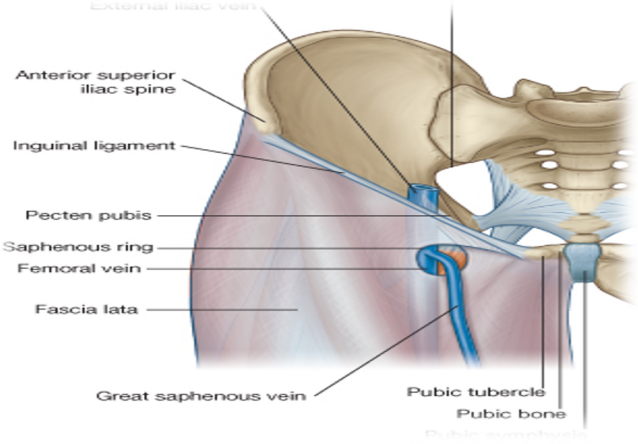
- **The longest vein**
- **Begins** from the **medial end** of the **dorsal venous arch of the foot.**
- Passes upward **in front** of the **medial malleolus** with the **saphenous nerve.**
- Then it **ascends** in accompany with the **saphenous nerve** **in the superficial fascia** over the **medial side of the leg.**

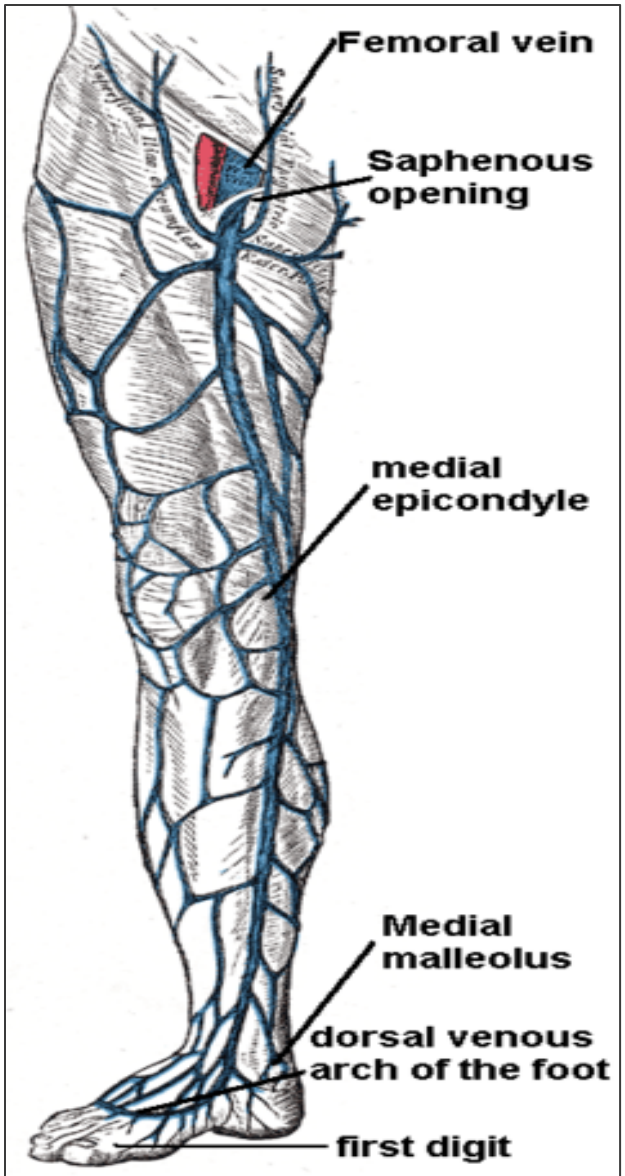




Great Saphenous Vein

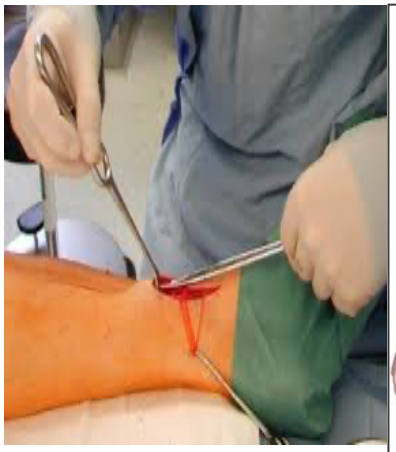
- **Ascends** obliquely upwards, passing **behind the knee** and curves forward around the **medial side of the thigh.**
- **Hooks** through the lower part of the **saphenous opening** in the **deep fascia** to **join the femoral vein** about 1.5 in. (4 cm) **below and lateral** to the **pubic tubercle.**

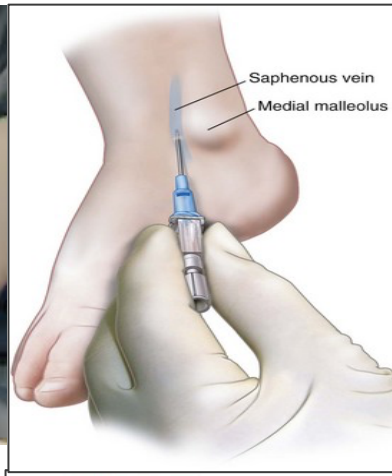


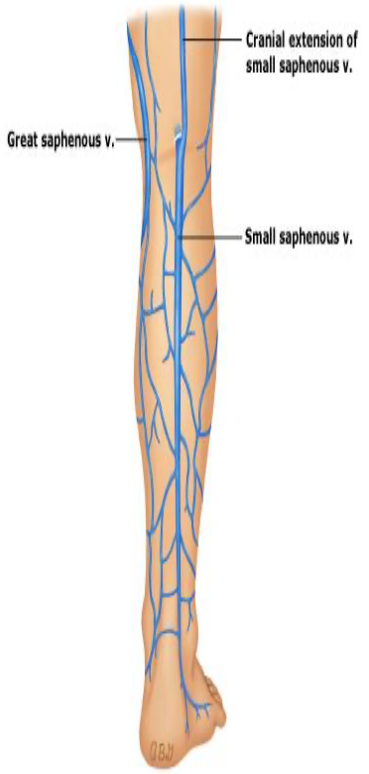


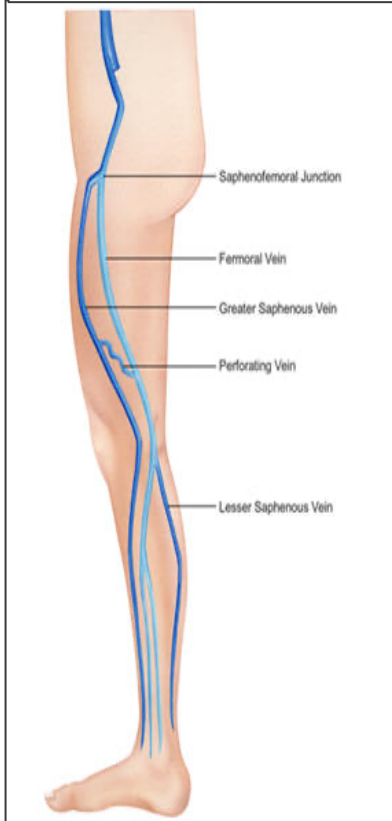
Great Saphenous Vein

- It is **connected to** the **small saphenous vein by one or two branches** that pass **behind the knee.**
- It is **connected to the deep veins by** numerous **perforating veins.**
- The **perforating veins** have **valves** which allow blood flow **from superficial** to **deep veins.**
- It is clinically significant in coronary bypass surgery and in intravenous delivery of fluids due to other venous collapse.
- So, **The great saphenous vein** is **used in venous grafting** and **saphenous vein cutdown** may be necessary for inserting the neddle or canula (take care of the **saphenous nerve**).



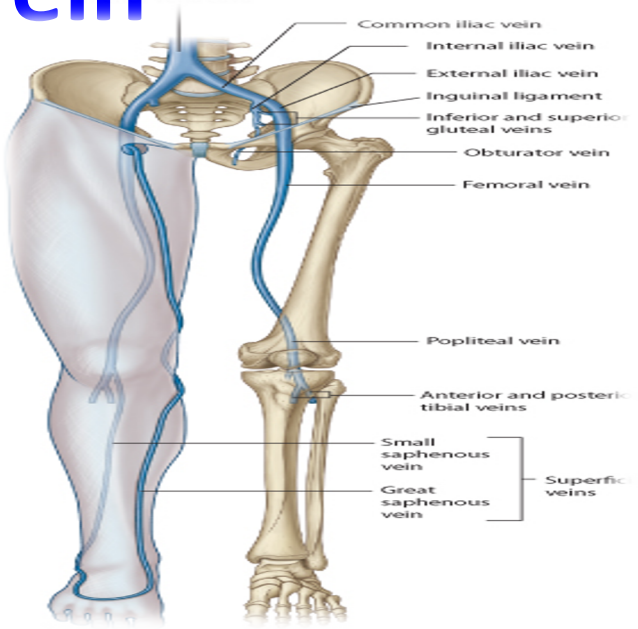


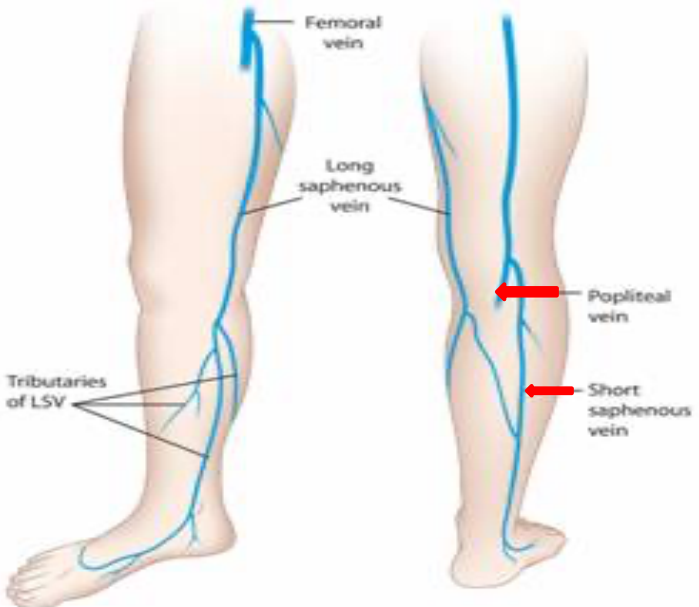




Small Saphenous Vein

- **Arises** from the **lateral end** of the **dorsal venous arch.**
- **Ascends behind** the **lateral malleolus** in company with the **sural nerve.**
- **Ascends** along the lateral border of the **tendocalcaneus** and then **runs up** to 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.

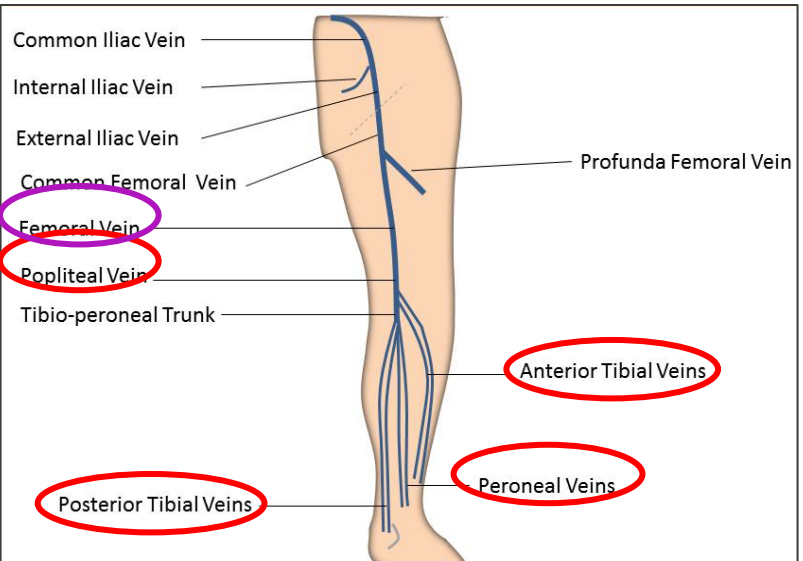


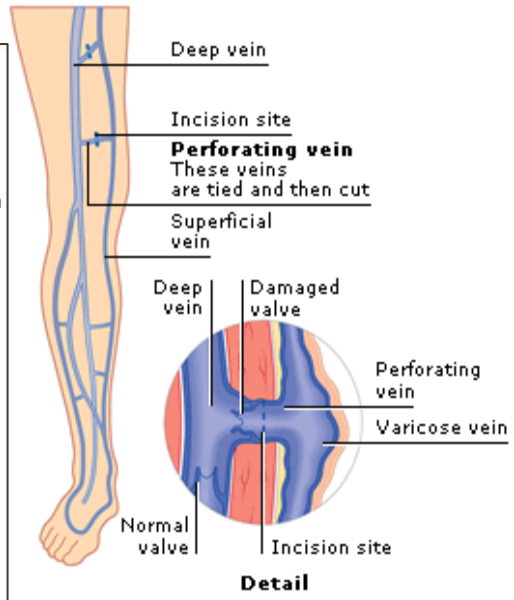


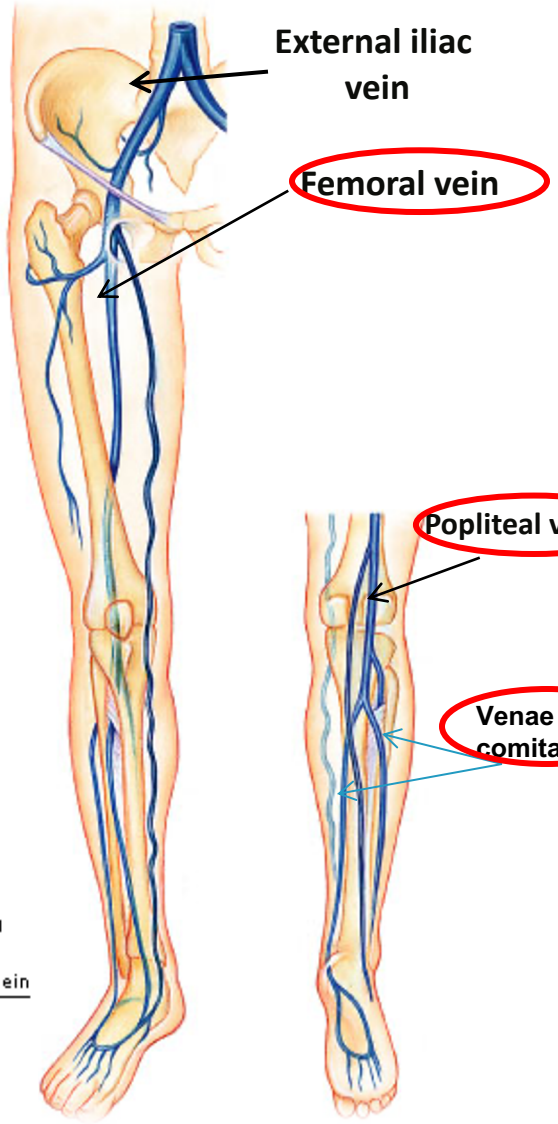
Veins of Lower Limbs

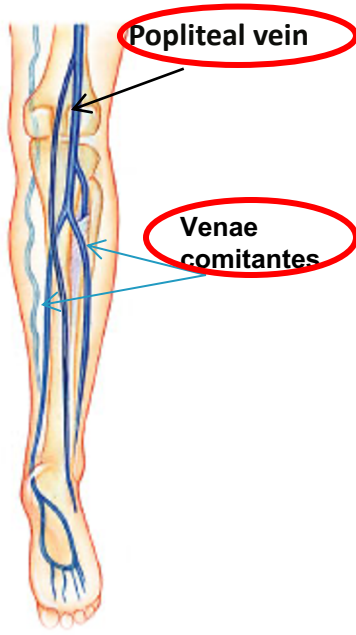
Deep Veins

- 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.**
- **Deep veins Receive** blood from **superficial veins** through **perforating veins.**



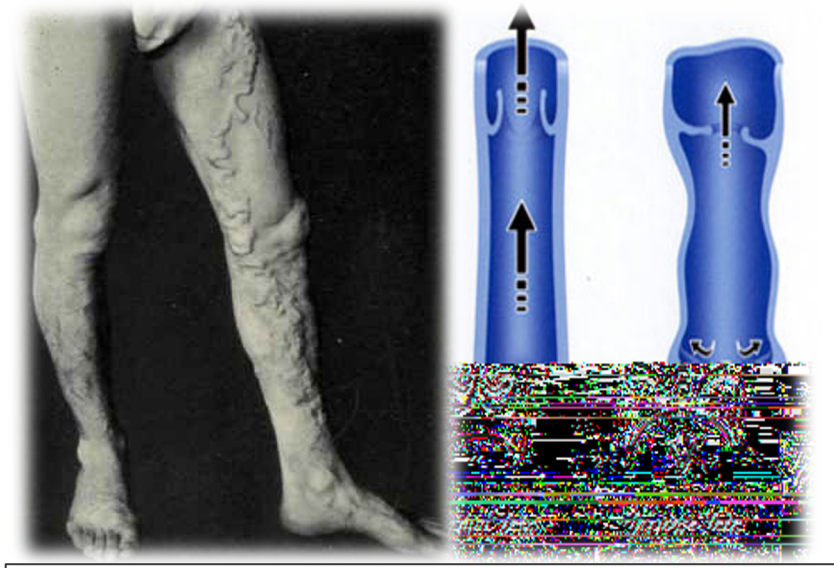


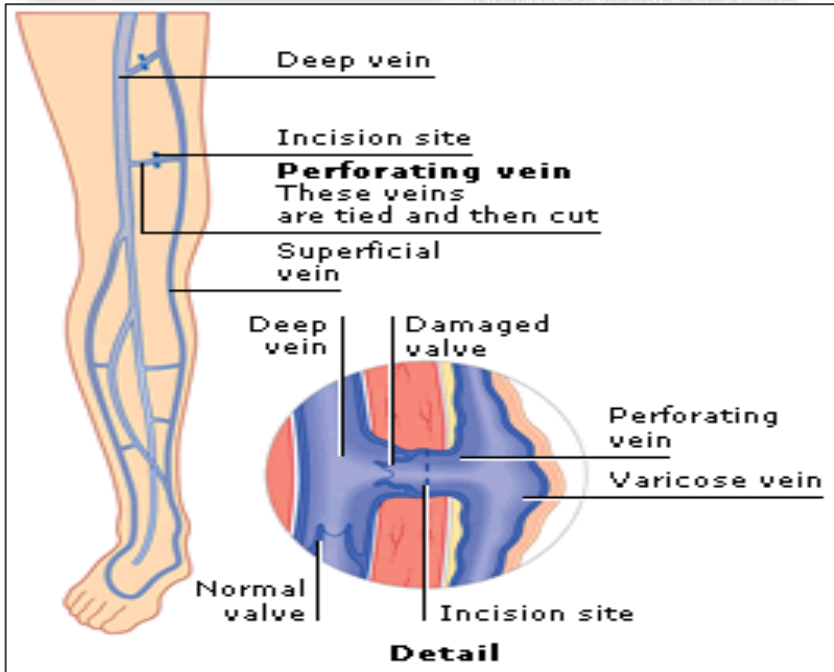




Mechanism of Venous Return from Lower Limb & Varicose Veins

- 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.
- **Vericose 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.**

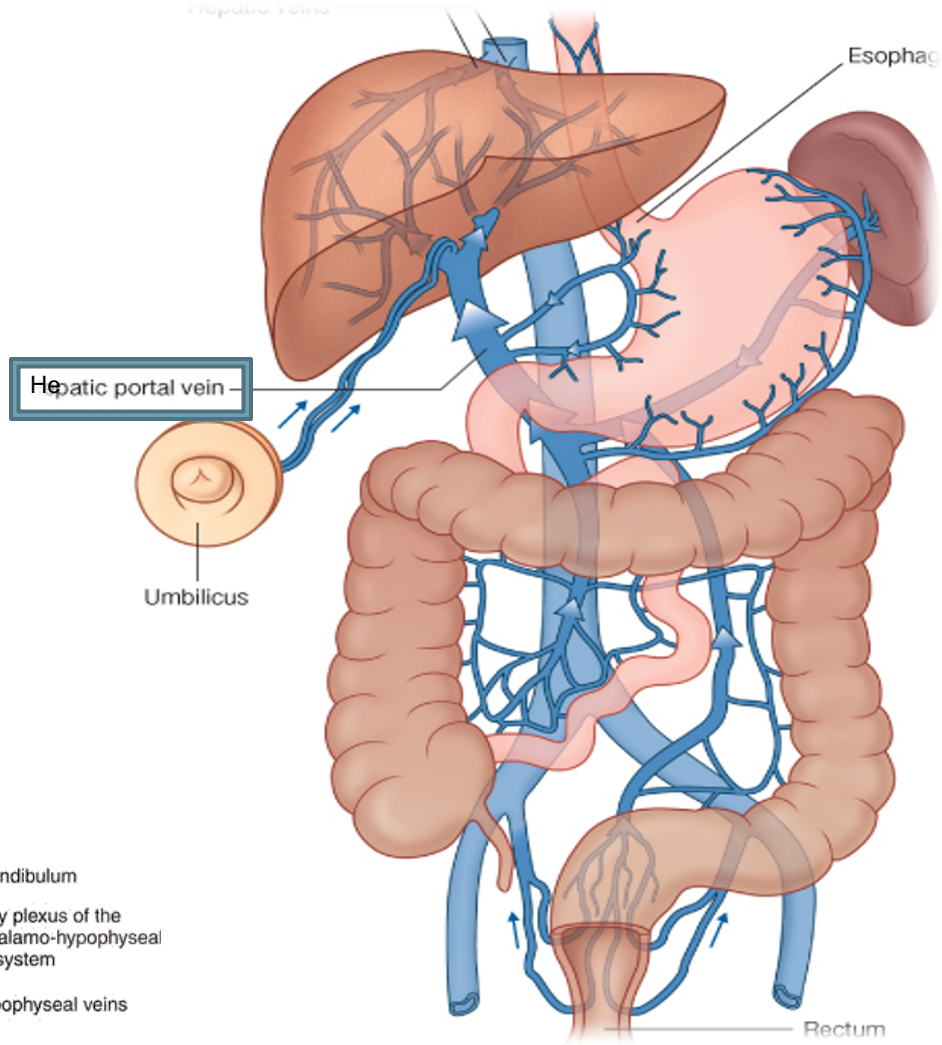


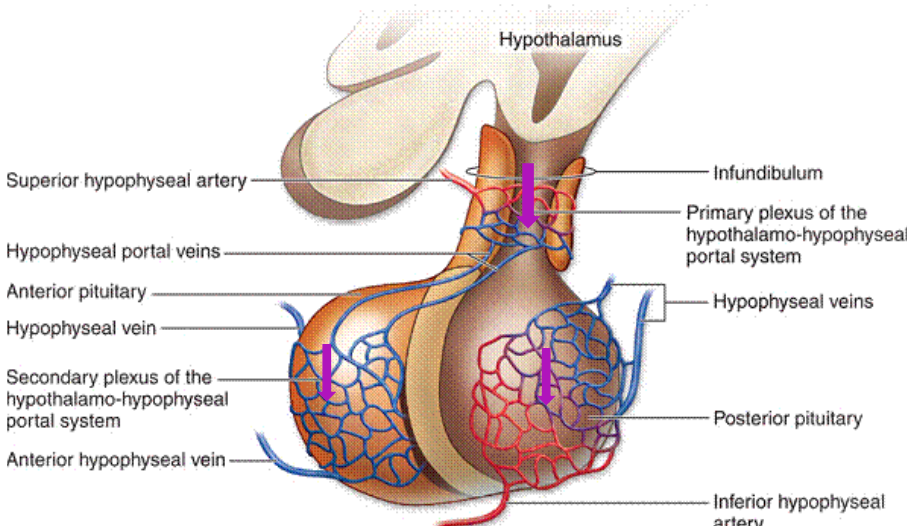


Portal Circulation

- **A portal venous system** is a series of veins or venules **that** directly **connect two capillary beds (of arteriole & venule).**

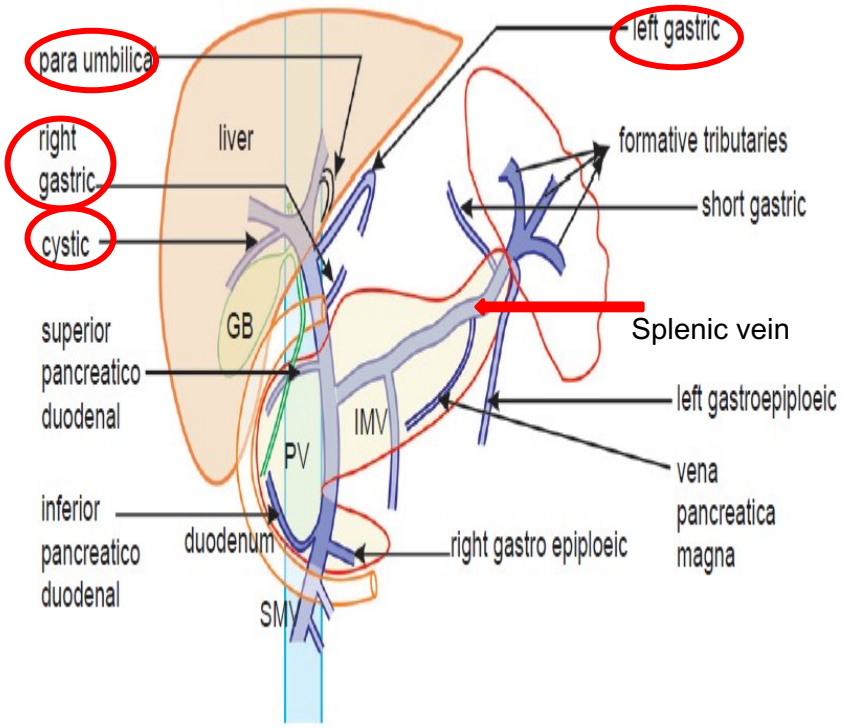
- **Examples** of such systems include the **hepatic portal vein** and **hypophyseal portal system.**





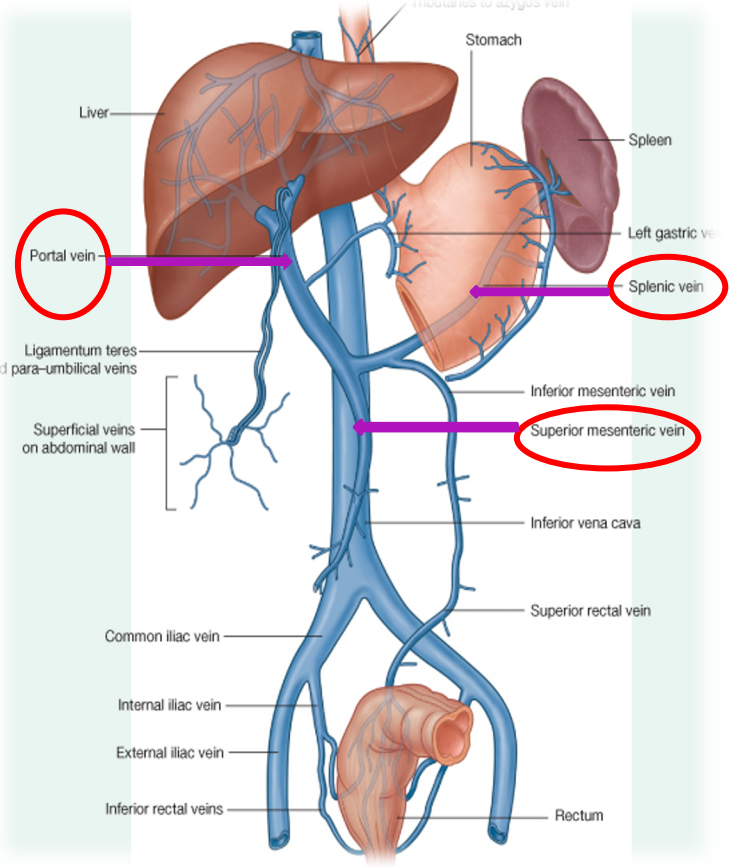
Hepatic Portal Vein

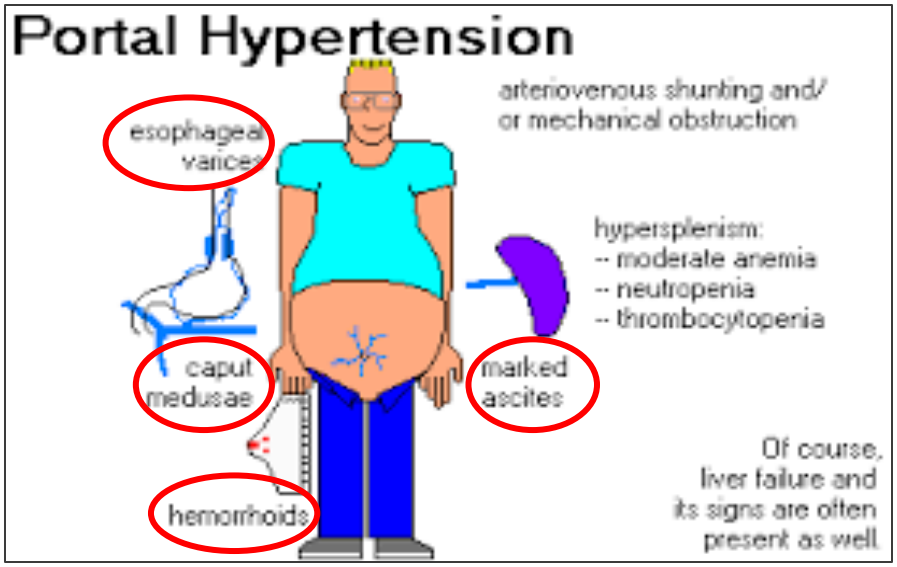
- **Drains blood** from the gastrointestinal tract and spleen **to the liver.**
- **It is formed by** the union of the **superior mesenteric** and **splenic veins behind the neck of pancreas.**
- Immediately before reaching the liver, the **portal vein divides** into **right** and **left** that **enter the liver.**
- **Tributaries:**
- Right and Left **Gastric veins.**
- **Cystic vein** from the gall bladder joins its right branch..
- **Para-umbilical veins** that drain veins from skin of anterior abdominal wall to the hepatic portal vein.



Portocaval Anastomosis

- **A portocaval 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 (IVC).**
- The anastomotic channels become **dilated (varicosed)** in case of **portal hypertension.**





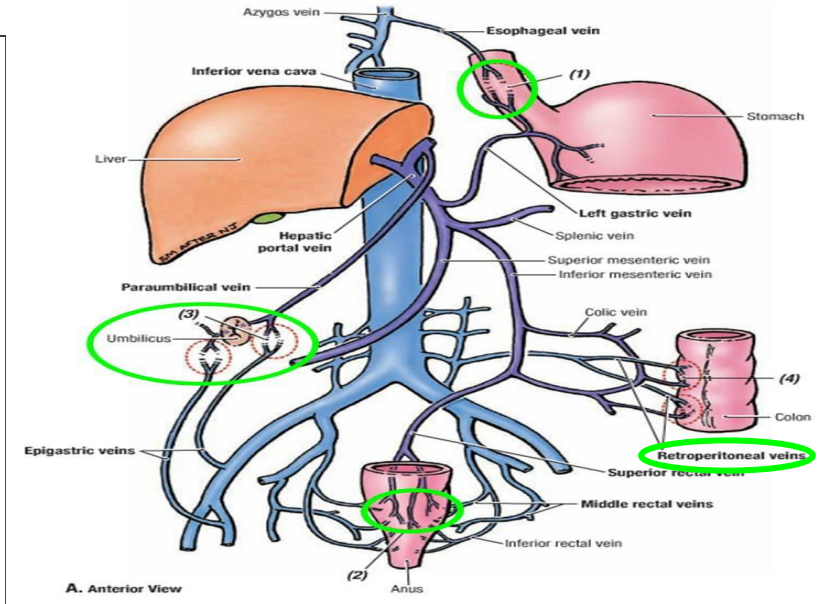
Sites of Portocaval Anastomosis

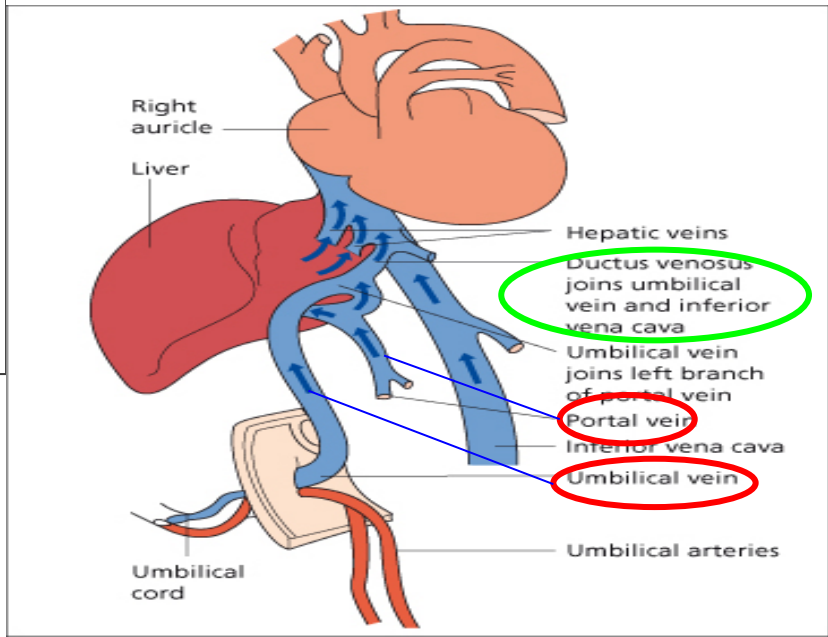
- **Lower end of esophagus: (esophageal varices)**
- **Lower part of rectum: (Hemorrhoids)**
- **Para umbilical region : (Caput Medusae)**
- **Retroperitoneal : without any clinical sign.**
- **Patent ductus venosus (intrahepatic portosystemic shunt) during fetal development :**

Portosystemic shunts may be **congenital** or may be **acquired** with diseases that cause portal hypertension.

Umbilical vein & portal vein shunt blood **via** patent ductus venosus **into** IVC.

(Hepatomegaly, ascitis and signs of portal hypertension).






THANK YOU