



Major Body Veins

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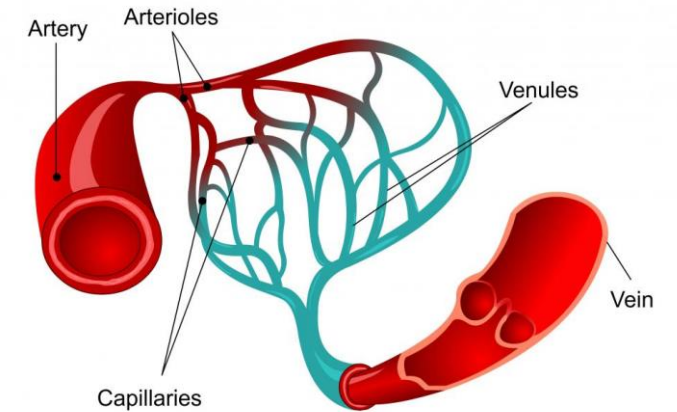


Objectives

- 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.
- Describe the Portocaval Anastomosis.
 - formation, sites and importance

Introduction

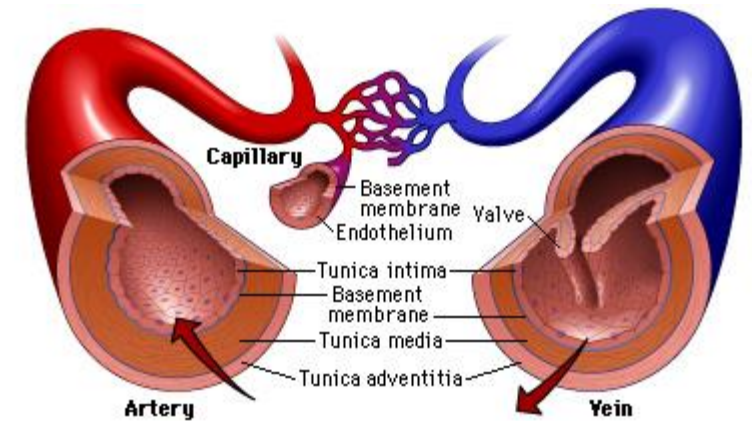
- Blood vessels are the part of the circulatory system that transports blood throughout the human body.
- There are three major types of blood vessels:
 - Arteries, which carry the blood away from the heart.
 - Capillaries, which enable the actual exchange of water and chemicals between the blood and the tissues.
 - Veins, which carry blood from the capillaries back toward the heart.
- The word vascular, meaning relating to the blood vessels, is derived from the Latin vas, meaning vessel.
 - Avascular refers to being without (blood) vessels.



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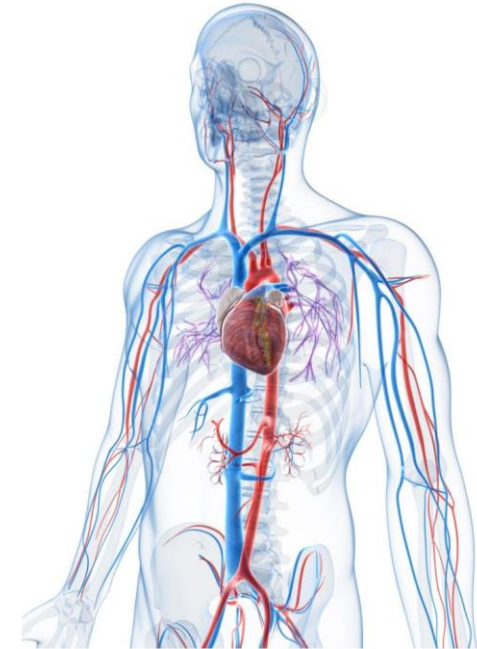
Microscopic Structure

- The arteries and veins have three layers, but the middle layer is thicker in the arteries than it is in the veins:
 - **Tunica Intima** (the thinnest layer): a single layer of simple squamous endothelial cells.
 - **Tunica Media** (the thickest layer in arteries): is made up of smooth muscle cells and elastic tissue.
 - **Tunica Adventitia** (the thickest layer in veins) entirely made of connective tissue.
- Capillaries consist of little more than a layer of endothelium and occasional connective tissue.



Veins

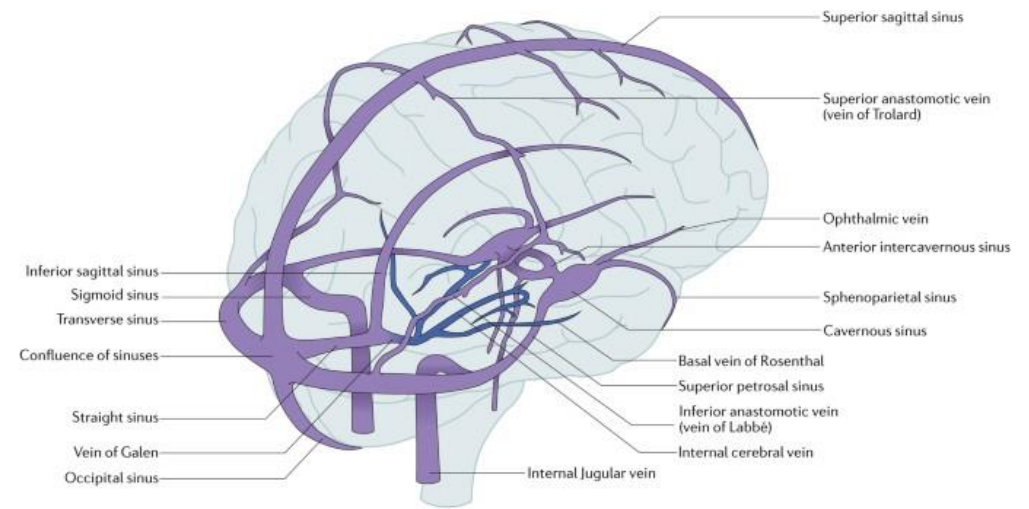
- Veins are blood vessels that bring blood back to the heart.
- All veins carry deoxygenated blood
 - With the exception of the pulmonary veins and umbilical veins.
- There are two types of veins:
 - Superficial veins: close to the surface of the body with NO corresponding arteries.
 - Deep veins: found 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.



VEINS OF HEAD & NECK

Veins of Head

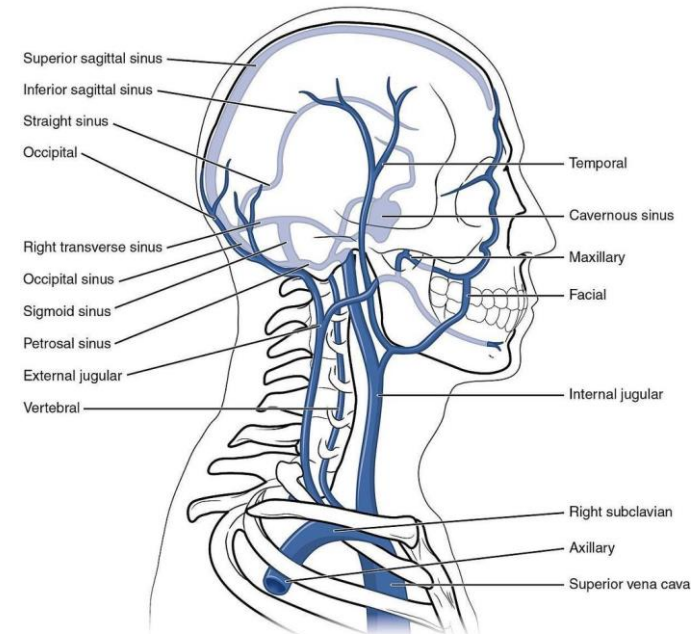
- Dural Venous Sinuses:
 - Superior Sagittal Sinus
 - The Superior Sagittal Sinus
 - Transverse Sinuses
 - Confluence of Sinuses
 - Sigmoid Sinuses



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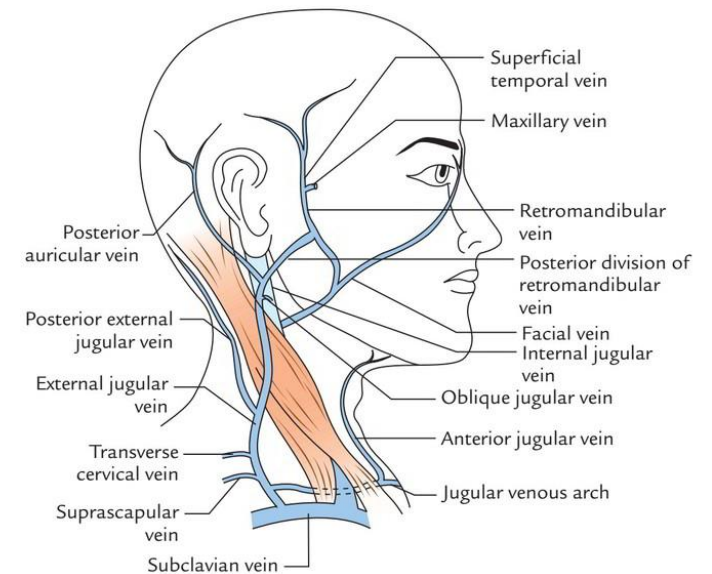
Veins of Neck

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



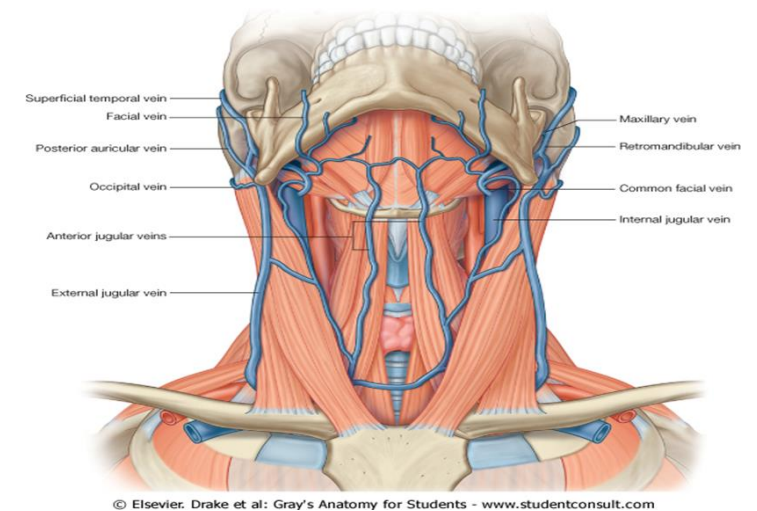
External Jugular Veins

- Lies superficial to the sternomastoid muscle
- Formed by the union of posterior auricular vein and 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



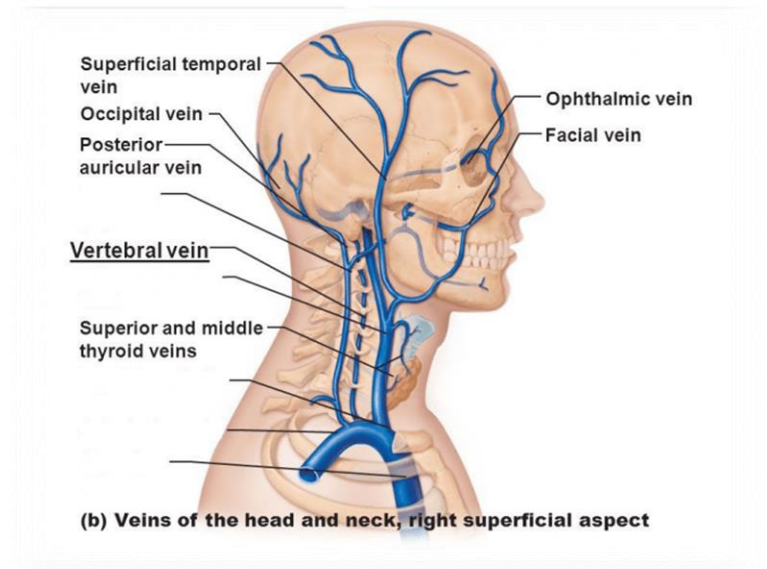
Anterior Jugular Veins

- 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.



Internal Jugular Veins

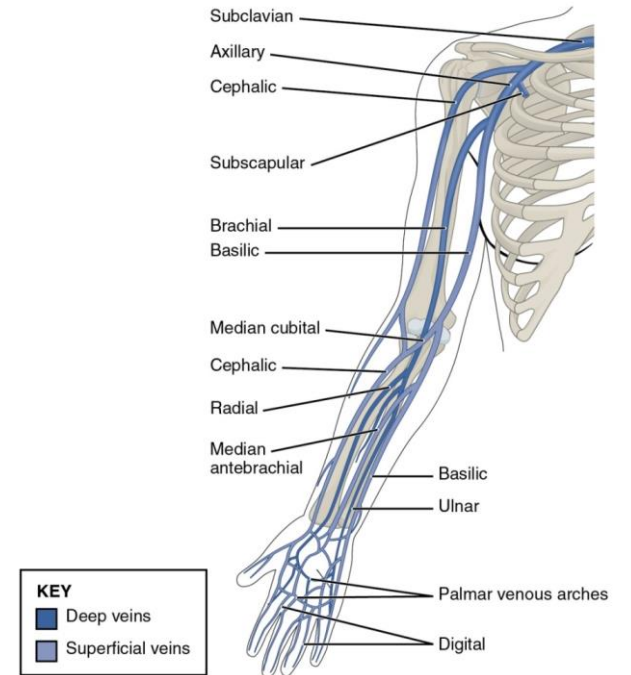
- Drains blood from the head, brain, face & neck.
- It descends in the neck along with the internal and common carotid arteries and vagus nerve, within the Carotid Sheath.
- Joins the subclavian vein to form the brachiocephalic vein.
- Tributaries:
 - Superior thyroid
 - Lingual
 - Facial
 - Occipital veins
 - Dural venous sinuses
- These veins drain blood from anterior face, trachea, thyroid, esophagus, larynx, and muscles of the neck.



VEINS OF UPPER LIMBS

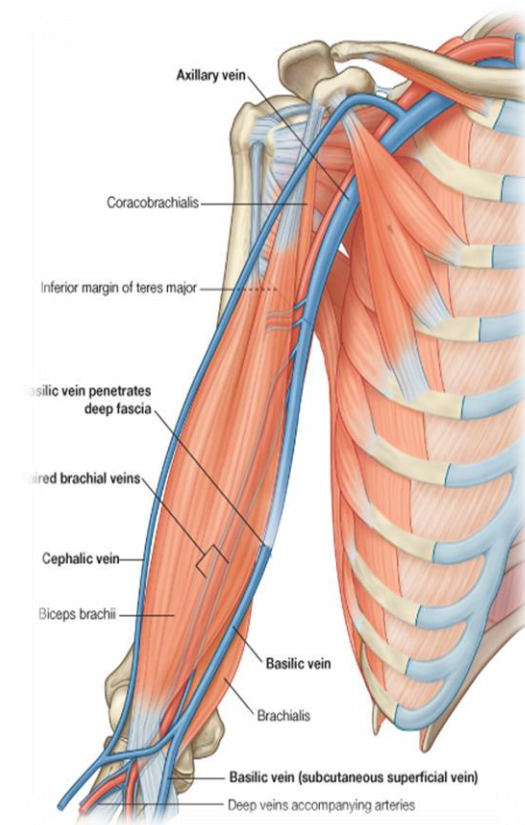
Hand Veins

- The hand is drained by network of superficial and deep veins.
- In the palm, these veins form arches and they are associated with the superficial and deep palmar arterial arches.
- This network unites to give rise to two extensive superficial veins, the cephalic and basilic veins.
- On the lateral side of the carpus, the dorsal venous network is prolonged proximally as the cephalic vein, while the basilica vein arises from the medial side.



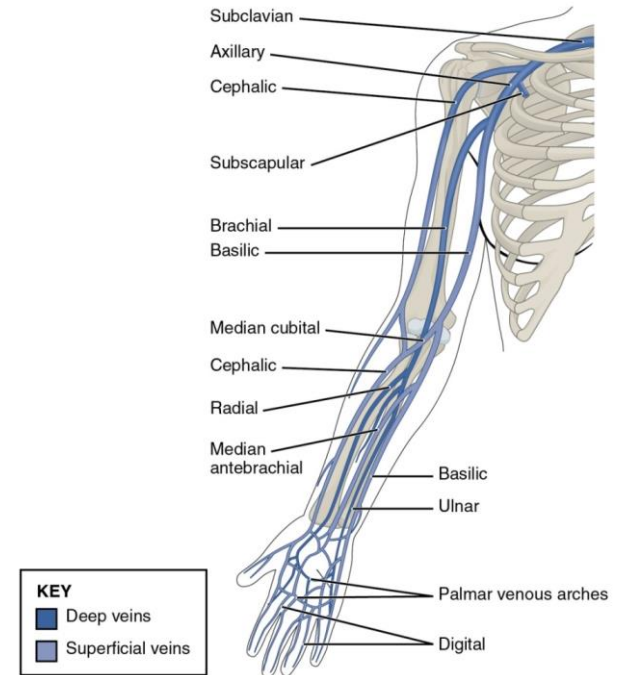
Superficial Veins

- The major superficial veins of the upper limb are the **cephalic** and **basilic** veins.
- At the elbow, the cephalic and basilic veins are connected by the **median cubital vein**.



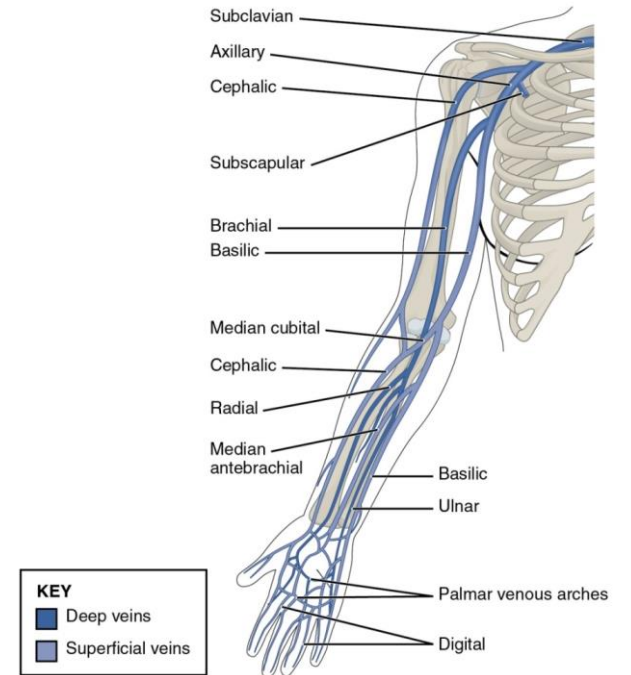
Basilic Vein

- It originates from the dorsal venous network of the hand.
- It ascends the medial aspect of the upper limb.
- At the border of the teres major, the vein moves deep into the arm.
- It then combines with the brachial veins to form the axillary vein.



Cephalic Vein

- Arises from the dorsal venous network of the hand.
- It ascends the antero-lateral aspect of the upper limb, passing anteriorly at the elbow.
- At the shoulder, the cephalic vein travels between the deltoid and pectoralis major muscles to enter the axilla region via the clavipectoral triangle.
- Within the axilla, the cephalic vein terminates by joining the axillary vein.



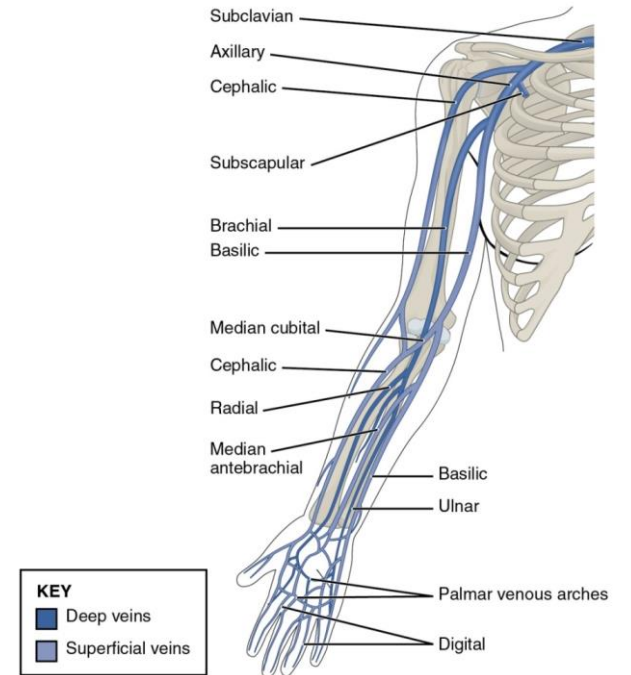
Venipuncture

- The practice of obtaining intravenous access. This can be for intravenous therapy or obtaining a blood sample.
- The main vein used in venipuncture is the **median cubital vein**.
- It is a superficial vein that is situated anteriorly at the cubital fossa region.
- It is commonly used due to its accessible and superficial position.



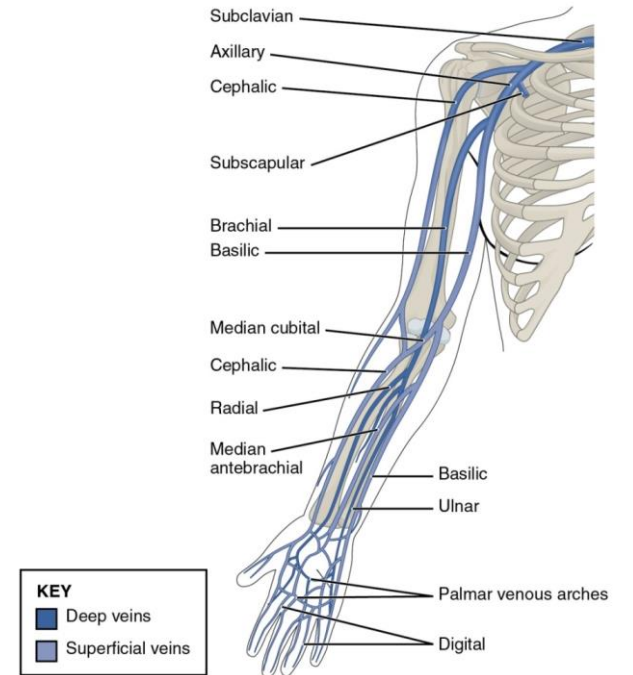
Deep Veins

- The deep veins of the upper limb are situated underneath the deep fascia.
- They are usually paired veins that accompany one artery.
 - Vena Comitantes
- The brachial veins are the largest in size and are situated either side of the brachial artery.
- Ulnar and radial veins are vena comitantes of ulnar and radial arteries.
- The pulsations of the brachial artery assists the venous return.
- Perforating veins run between the deep and superficial veins of the upper limb, connecting the two systems together.



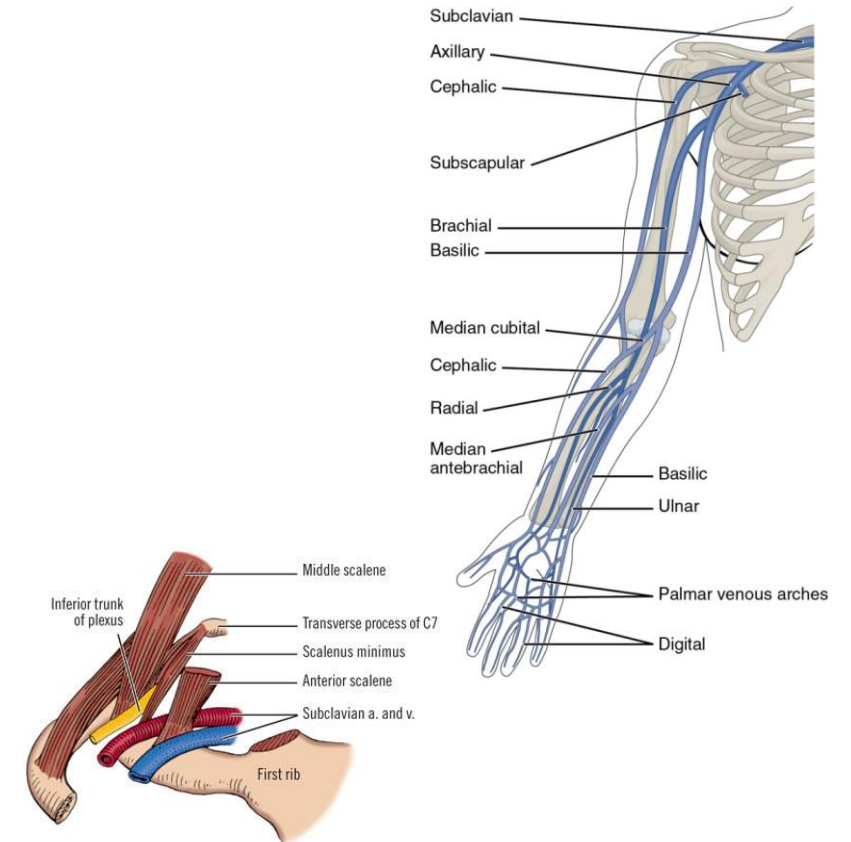
Axillary Vein

- Formed by the union of basilic vein and brachial veins (venae comitantes) of the brachial artery.



Subclavian Veins

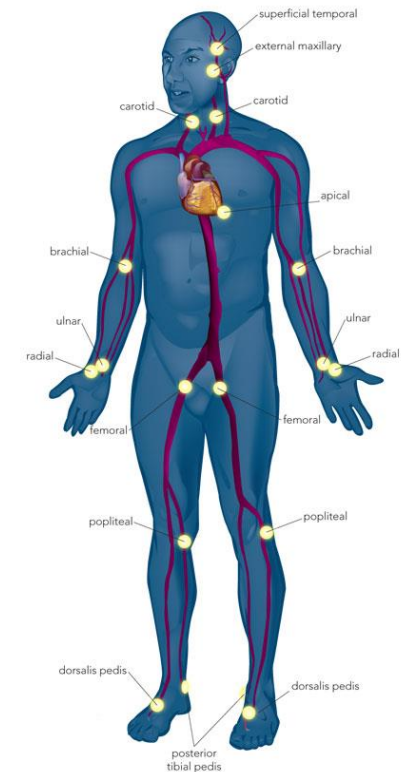
- Each subclavian vein is a continuation of the axillary vein and runs from the outer border of the first rib to the medial border of anterior scalene muscle.
- It then joins with the internal jugular vein to form the brachiocephalic vein.
- The subclavian vein follows the subclavian artery.
- The right and left brachiocephalic veins form superior vena cava that enters right atrium. anterior to the middle scalene).



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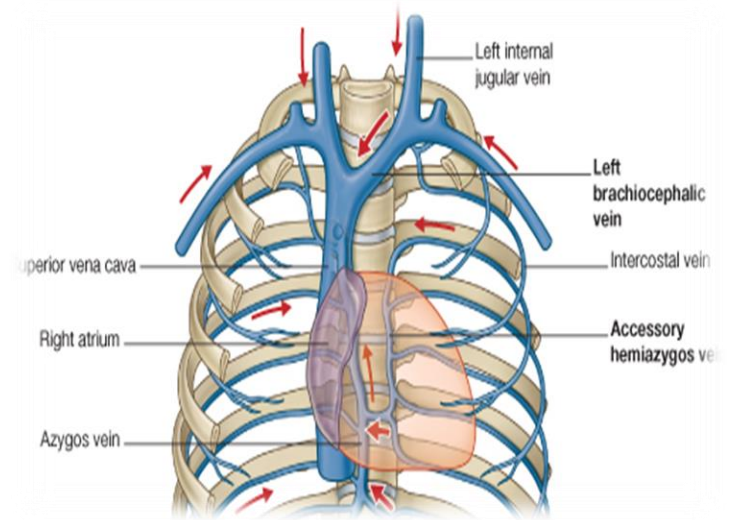
Pulse Points of Upper Limbs

- Axillary pulse
 - Located inferiorly of the lateral wall of the axilla.
- Brachial pulse
 - Located on the inside of the upper arm near the elbow, frequently used in place of carotid pulse in infants (brachial artery).
- Ulnar pulse
 - Located on the medial of the wrist (ulnar artery).
- Radial pulse
 - Located on the lateral of the wrist (radial artery).
 - It can also be found in the anatomical snuff box.



Superior Vena Cava

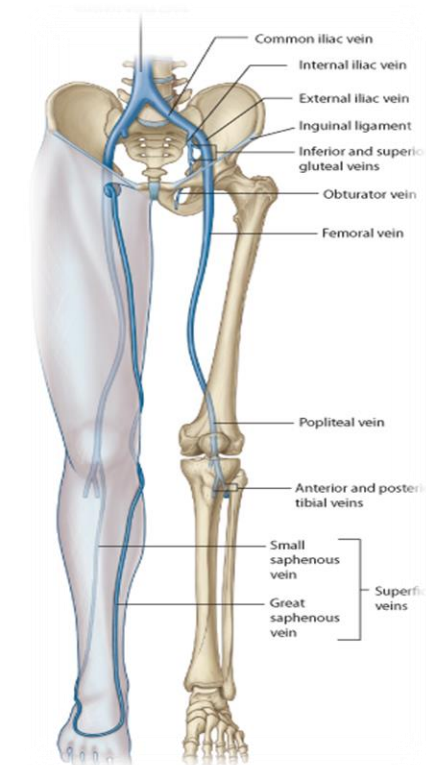
- Formed by the union of the **right and left brachiocephalic veins**.
- Brachiocephalic veins are formed by the union of **internal jugular and subclavian veins**.
- Drains venous blood from:
 - Head, neck, thoracic wall & upper limbs
- It Passes downward and enter the right atrium.
- Receives azygos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



VEINS OF LOWER LIMBS

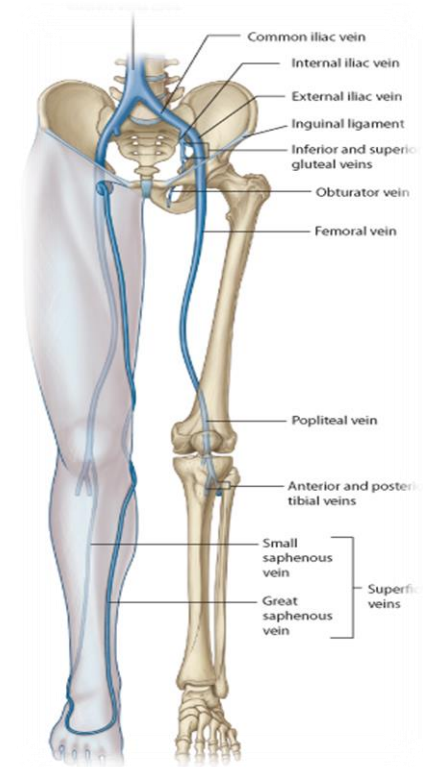
Superficial Veins

- Form a network in the subcutaneous tissue
- Pattern is variable
- They are the tributaries of the:
 - Great (long) saphenous vein
 - Small (short) saphenous vein



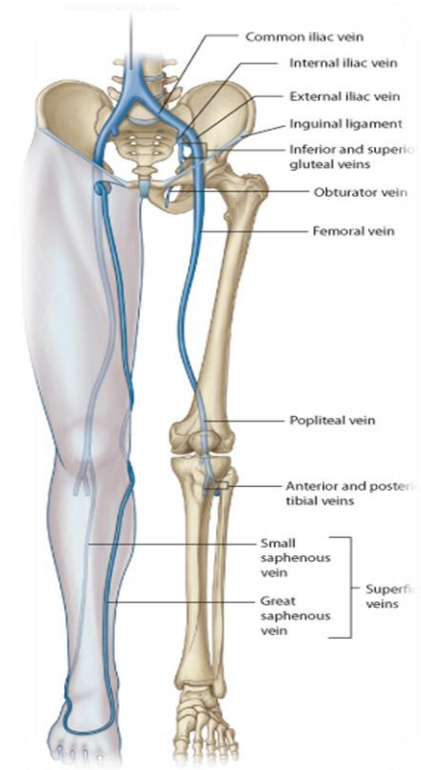
Great Saphenous Vein

- 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 4 cm below and lateral to the pubic tubercle.



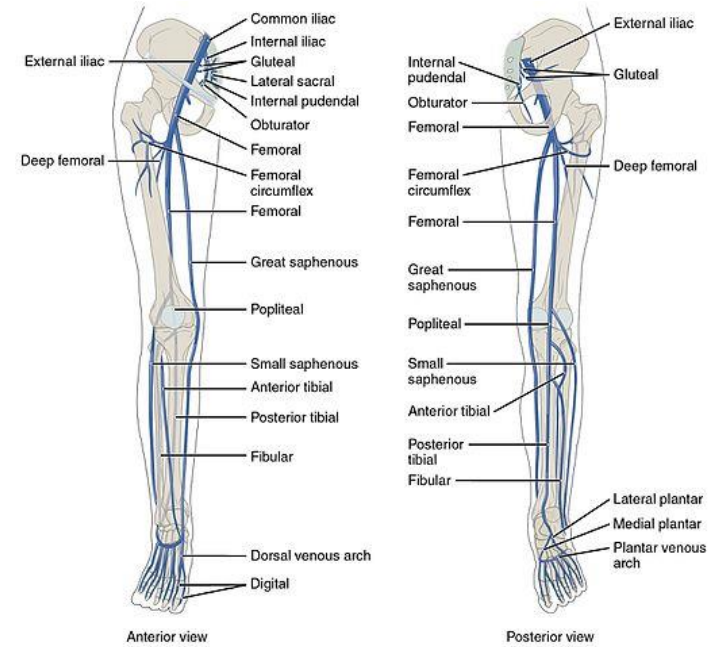
Small Saphenous Vein

- 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 with great saphenous vein.



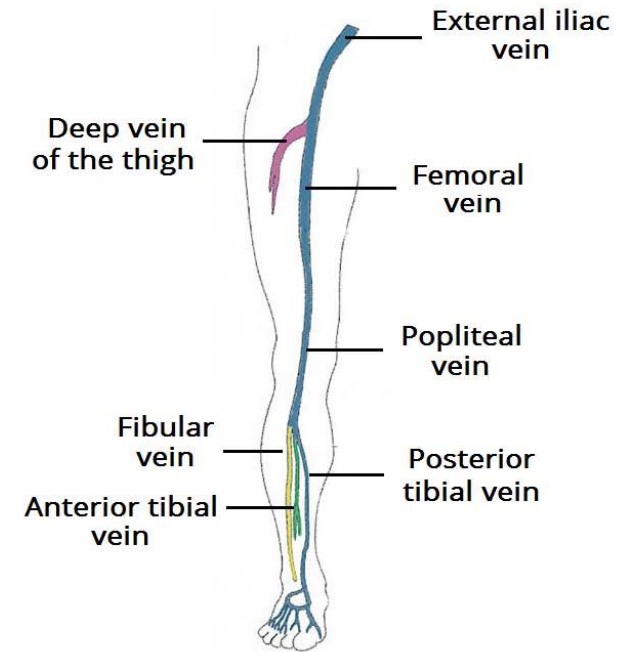
Deep Veins

- They include:
 - Anterior and posterior tibial veins
 - Popliteal vein
 - Femoral vein



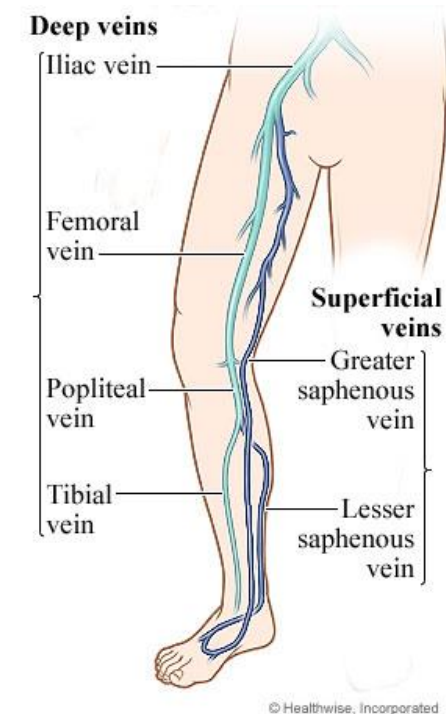
Veins of Foot & Leg

- The main venous structure of the foot is the dorsal venous arch, which mostly drains into the superficial veins.
- Some veins from the arch penetrate deep into the leg, forming the anterior tibial vein.
- The plantar aspect of the foot, medial and lateral plantar veins arise.
- These veins combine to form the posterior tibial and fibular veins.
- The posterior tibial vein accompanies the posterior tibial artery, entering the leg posteriorly to the medial malleolus.
- On the posterior surface of the knee, the anterior tibial, posterior tibial and fibular veins unite to form the popliteal vein.



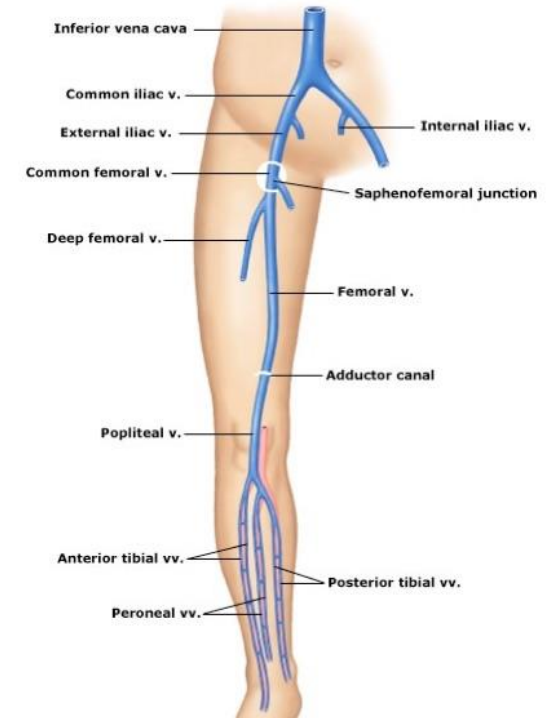
Popliteal Vein

- Comprise the venae comitantes, which accompany popliteal artery.
- Formed by the unite of anterior, posterior tibial and fibular veins.
- Popliteal vein then continues as the femoral vein.
- Receive blood from superficial veins through perforating veins.



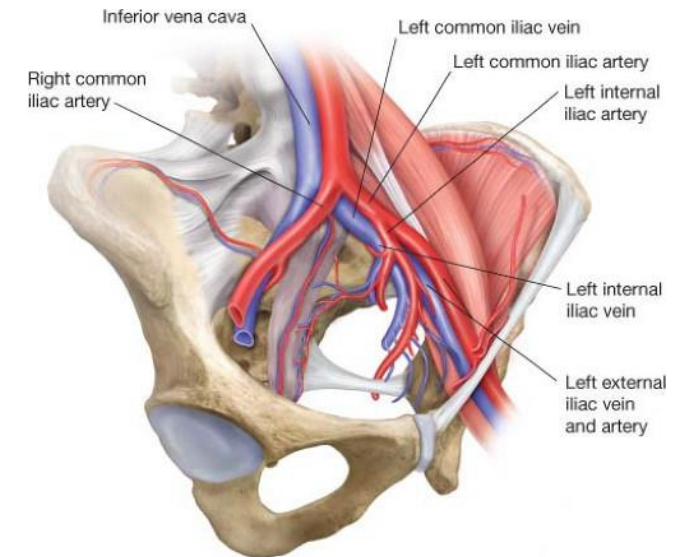
Femoral Vein

- The **femoral vein** is a blood vessel that accompanies the femoral artery in the femoral sheath.
- It is a continuation of the **popliteal vein**.
- Ends at the inferior margin of the inguinal ligament, where it becomes the **external iliac vein**.



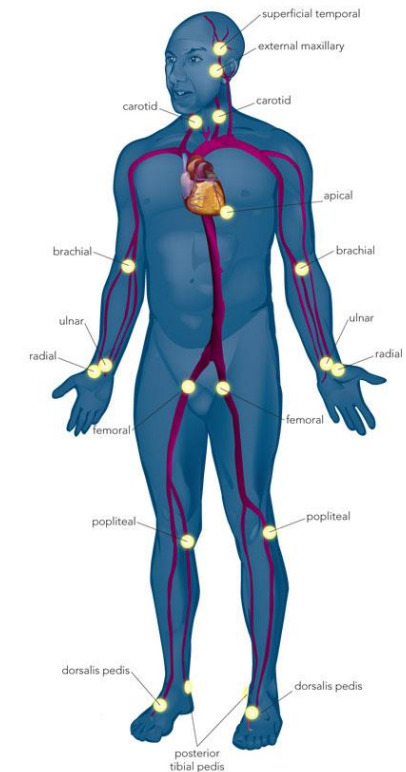
External Iliac

- External iliac join internal iliac to form common iliac veins.
- Both right and left common iliac veins form inferior vena cava that drains the entire low part of the body.
- Inferior vena cava drains into right atrium.



Pulse Points of Lower Limbs

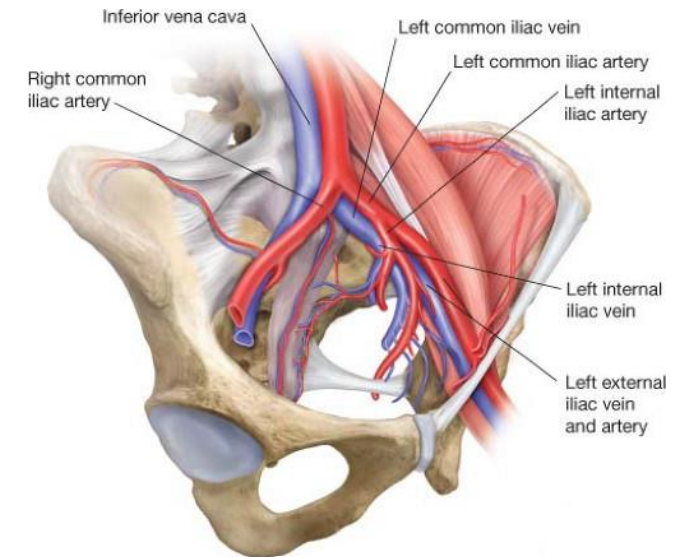
- Femoral pulse
 - Located in the inner thigh, at the mid-inguinal point, halfway between the pubic symphysis and anterior superior iliac spine (femoral artery).
- Popliteal pulse
 - Located above the knee in the popliteal fossa.
 - The patient bends the knee at approximately 124° , and the physician holds it in both hands to find the popliteal artery in the pit behind the knee (Popliteal artery).
- Dorsalis pedis pulse
 - Located on top of the foot, immediately lateral to the extensor of hallucis longus (dorsalis pedis artery).



VEINS OF PELVIC REGION

Internal Iliac

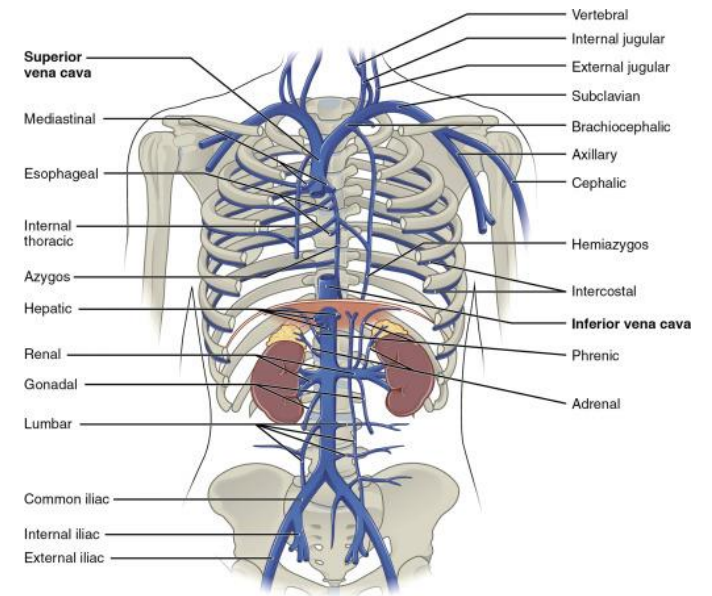
- It is responsible for the majority of pelvic venous drainage,
- It receives numerous tributaries from veins that drain the pelvic region.
- It is formed near the greater sciatic foramen, ascending anteriorly to the sacroiliac joint, before combining with the external iliac vein to form the common iliac vein.
- It receives venous blood from the followings:
 - Superior and inferior gluteal veins
 - Internal pudendal vein
 - Obturator vein
 - Lateral sacral veins
 - Middle rectal vein
 - Vesical veins
 - Uterine and vaginal veins



VEINS OF ABDOMEN & THORACIC

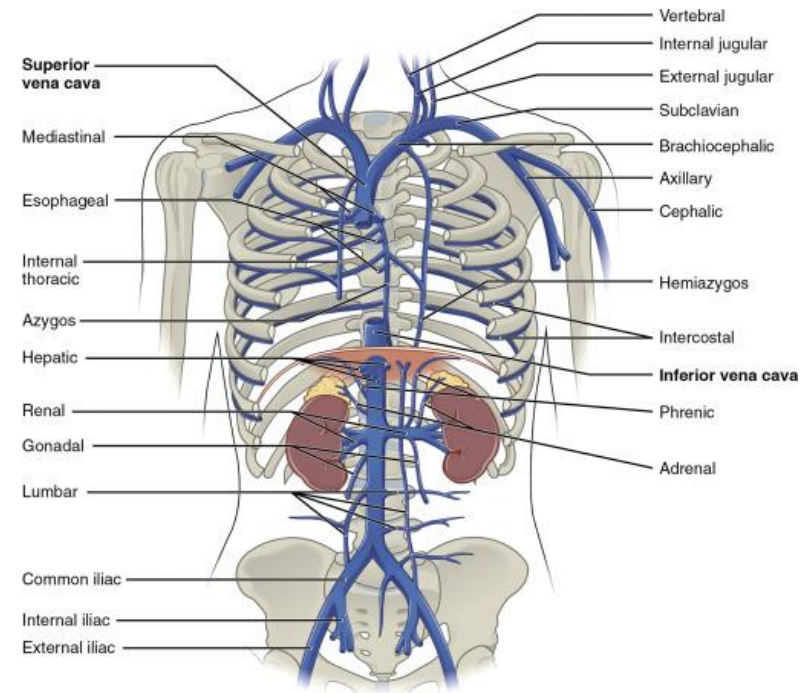
Inferior Vena Cava

- 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

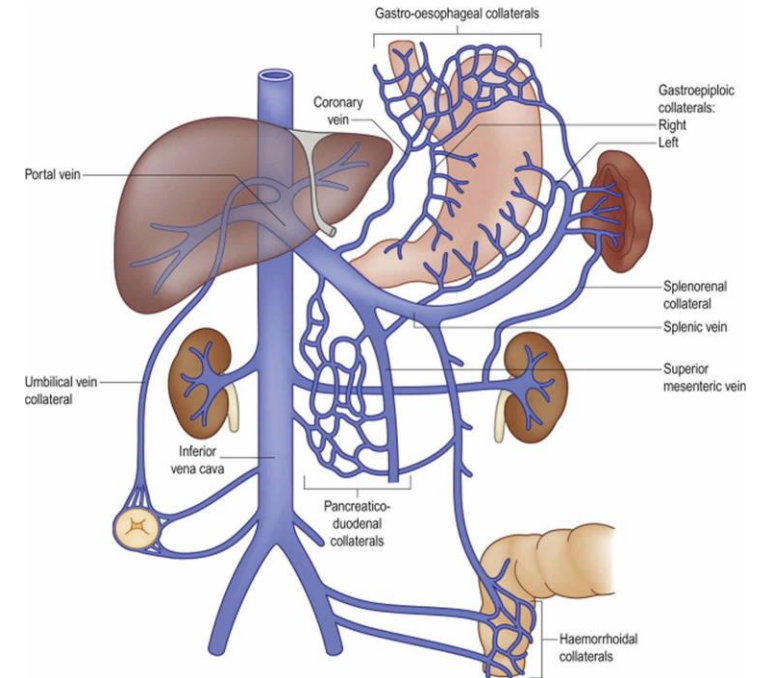




PORTAL SYSTEM

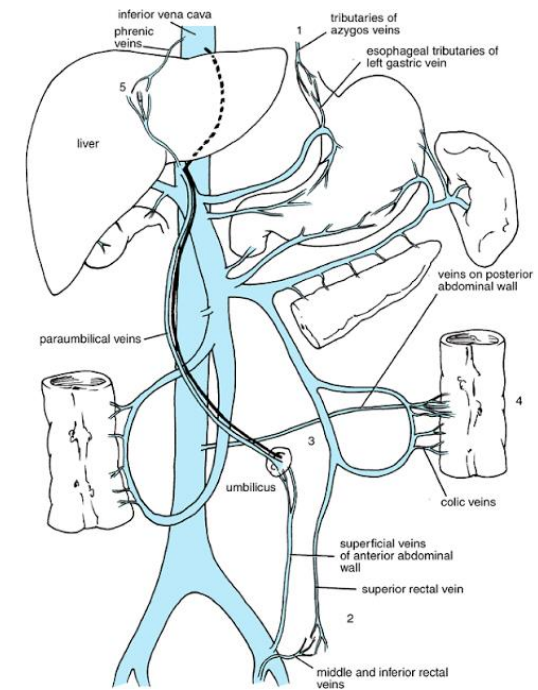
Portal Venous System

- It 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 vein
 - Cystic vein



Sites of Portocaval Anastomosis

- Lower end of esophagus
 - left gastric vein & azygos vein
- Lower part of rectum
 - superior and middle rectal veins & inferior rectal vein
- Para umbilical region
 - Para umbilical veins & superficial epigastric vein
- Retroperitoneal
 - veins draining colon & veins of the posterior abdominal wall
- Bare area of liver
 - There is some anastomosis between portal venous channels in the liver and azygous system of veins above the diaphragm.

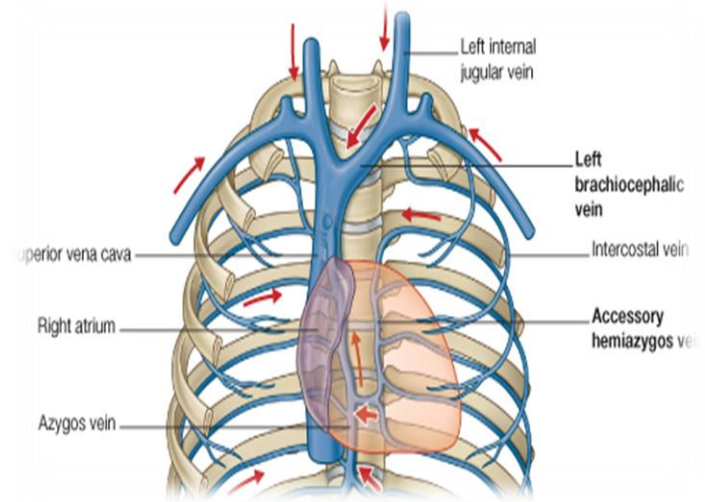




VENA CAVA

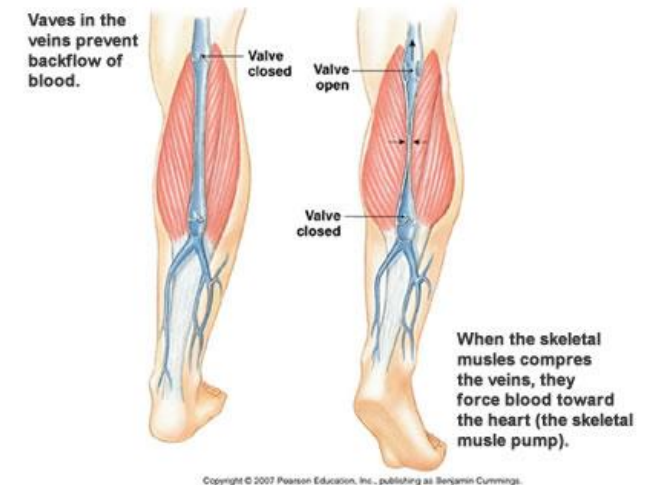
Vena Cava

- They are two large veins that return deoxygenated blood from the body into the heart.
- There are the **superior vena cava** and the **inferior vena cava**.
- Both empty into the **right atrium**.
- They are located slightly off-center toward the right side of the body.
- The **superior vena cava** is above the heart and formed by the union of the left and right brachiocephalic veins, which drain blood from the head and the upper limbs.
- The **inferior vena cava** travels up alongside the abdominal aorta with blood from the lower part of the body.
- It is the largest vein in the human body.



Mechanism of Venous Return

- 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.



Factors Aiming Blood Return

▪ Muscle Contraction

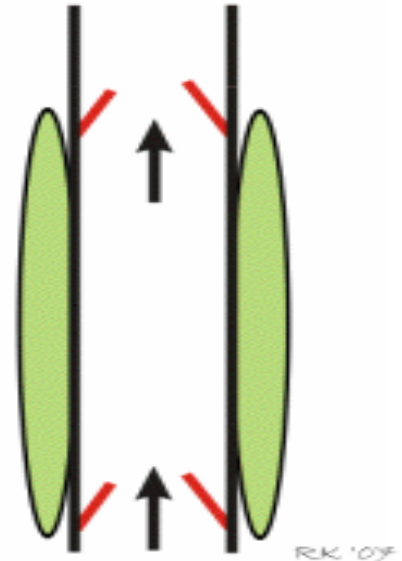
- Rhythmical contraction of limb muscles as occurs during normal locomotory activity (walking, running, swimming) promotes venous return by the muscle pump mechanism.

▪ Respiratory Pump

- During respiratory inspiration, the venous return increases because of a decrease in right atrial pressure.
- Decreased Venous Compliance
- Sympathetic activation of veins decreases venous compliance, increases central venous pressure and promotes venous return.

▪ Gravity

- The effects of gravity on venous return seem paradoxical because when a person stands up hydrostatic forces cause the right atrial pressure to decrease and the venous pressure in the dependent limbs to increase.



Summary

Head & Neck

Internal Jugular Vein
External Jugular Vein
Anterior Jugular Vein

Upper Limbs

Superficial & Deep Veins
Axillary Vein
Subclavian Vein

Portal System

Inferior Mesenteric Vein
Superior Mesenteric Vein
Splenic Vein
Portal Vein

Pelvis & Lower Limbs

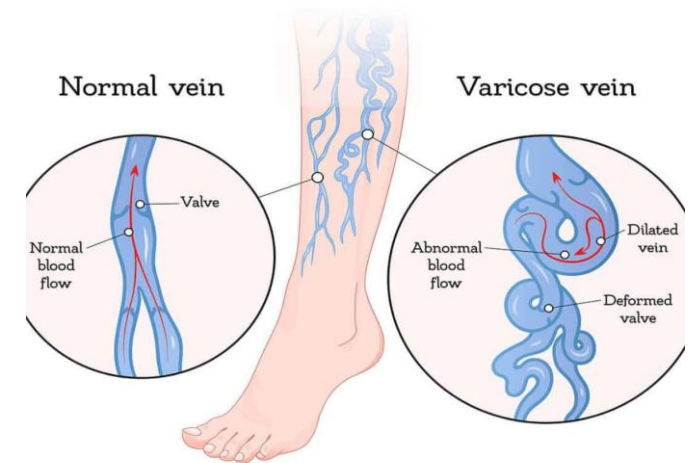
Superficial & Deep Veins
Femoral Vein
External & Internal Veins
Common Iliac Veins

CLINICAL NOTES



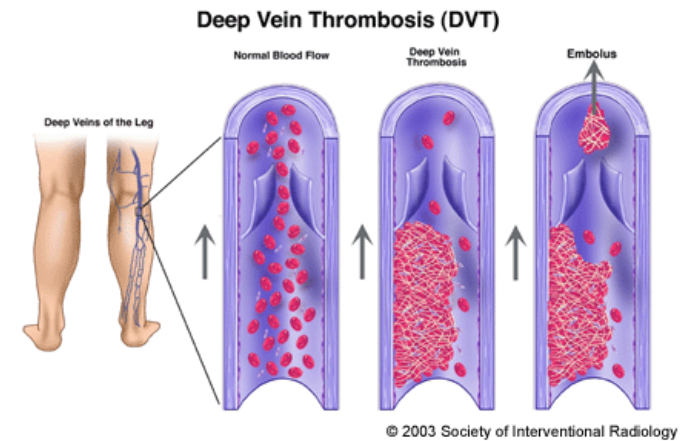
Varicose Veins

- 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.



Deep Vein Thrombosis (DVT)

- Occurs when a blood clot (thrombus) forms in one or more of the deep veins in your body, usually in your legs.
- Deep vein thrombosis can cause leg pain or swelling but may occur without any symptoms.
- Deep vein thrombosis is a serious condition because blood clots in your veins can break loose, travel through your bloodstream and lodge in your lungs, blocking blood flow (pulmonary embolism).





QUESTIONS?

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