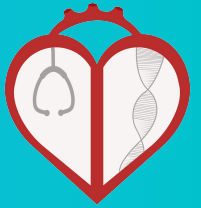
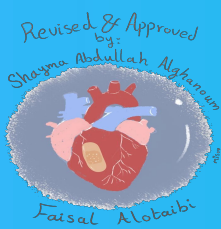




Anatomy Team
MED 439



MED439
KING SAUD UNIVERSITY

Anatomy of the large blood vessels-Veins

Cardiovascular Block - Lecture 4

Color index:

Important

In male's slides only

In female's slides only

notes

Extra information, explanation

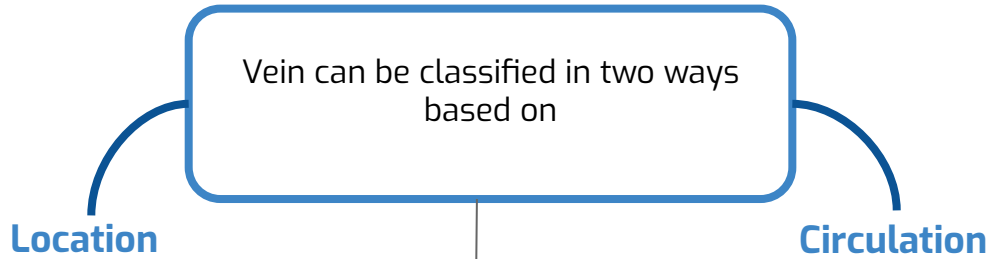
Don't forget to check the [Editing File](#)

Objectives:

- Define veins, and understand the general principles of 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

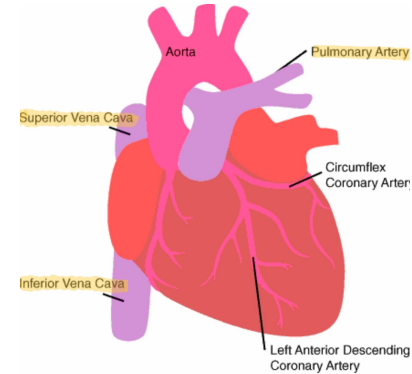
Veins

- ◇ Veins are blood vessels that bring blood back to the heart.
- ◇ All veins **carry deoxygenated blood**, with the exception of the **pulmonary veins** (to the left atrium) and **umbilical vein** (umbilical vein during fetal development).



- ◇ **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**.

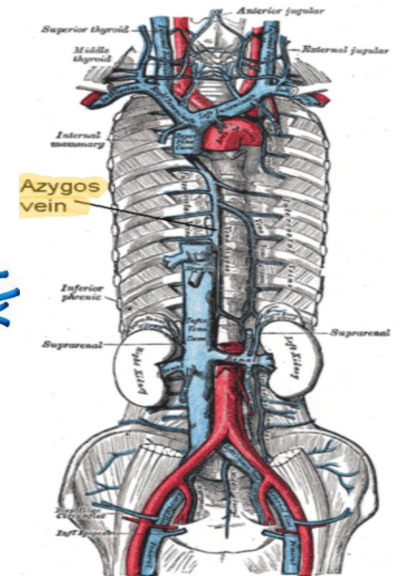
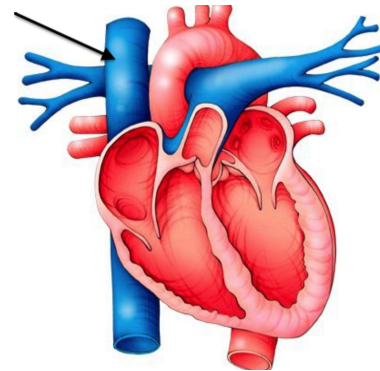
◇ **Brachiocephalic veins** are formed by the union of **internal jugular and subclavian veins**.

Drains venous blood from :

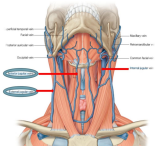

- ◇ Head & neck
- ◇ Thoracic wall
- ◇ Upper limbs

It Passes downward and enter the **right atrium**.

Receives azygos vein on its posterior aspect just before it enters the heart.

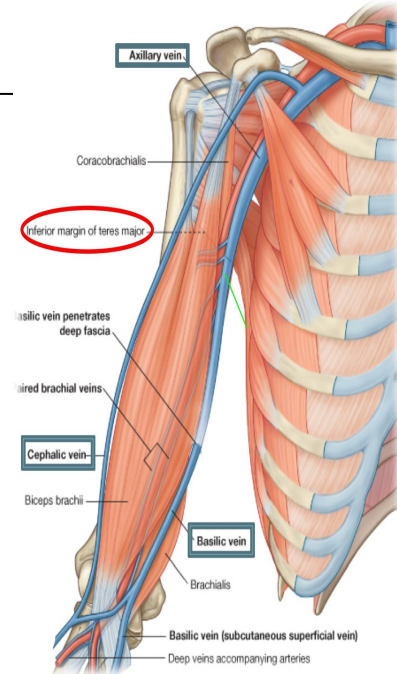


Veins of Head & Neck

Superficial veins		Deep vein
External jugular vein	Anterior Jugular Vein	Internal Jugular Vein
<p>Begins just behind the angle of mandible by union of posterior auricular vein with the posterior division of retromandibular vein.</p>	<p>It begins in the upper part of the neck by the union of the submental veins.</p>	<p>- 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. carotid sheath: fibrous connective tissue that surrounds the vascular compartment of the neck</p>
<p>- Lies superficial to the sternomastoid muscle - It passes down the neck and it is the only tributary of the subclavian vein.</p>	<p>-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.</p>	<p>Tributaries:(Branches) 1-Superior & middle thyroid. 2-Lingual 3-Facial 4-Pharyngeal. 5-Occipital veins 6-Dural venous sinuses (inferior petrosal sinus)</p>
<p>It drains blood from: 1-Outside of the skull 2-Deep parts of the face.</p>		<p>Drains blood from: 1-Brain 2-Face 3-Head & Neck.</p> 

Veins of Upper Limbs

Superficial Veins		Deep Veins	
Cephalic vein	Basilic vein	Venae comitantes	Axillary vein
<ul style="list-style-type: none"> Ascends in the superficial fascia on the lateral side of the biceps. Drains into the Axillary vein. 	<ul style="list-style-type: none"> 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 vena comitantes of the brachial artery to form the Axillary vein. 	<ul style="list-style-type: none"> Which accompany all the large arteries, usually in pairs. 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. 	<ul style="list-style-type: none"> 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.

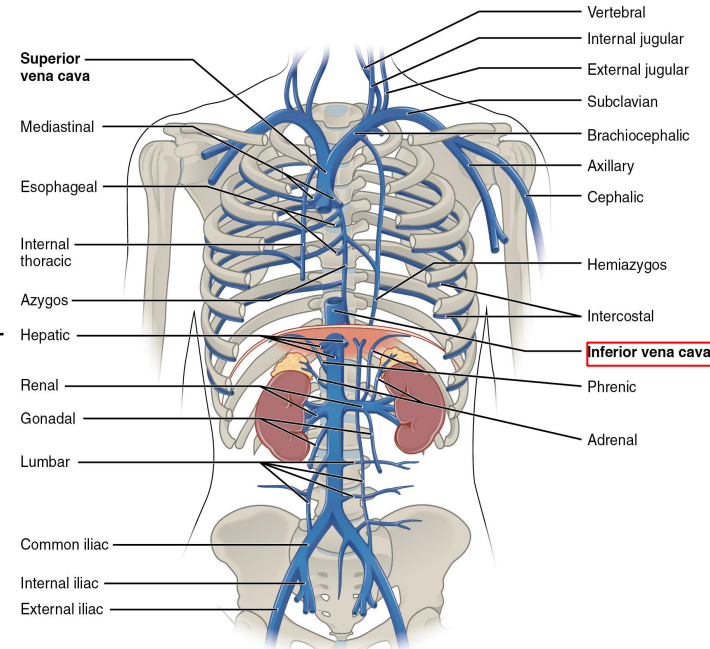
-**Formed** by the union of **2 common iliac veins** behind the right common iliac artery **at the level of the 5th lumbar vertebra(L5).**

-**Ascends** on the right side of the **aorta.**

-**Pierces** the central tendon of the diaphragm **at the level of the 8th thoracic vertebra (T8).**(Caval aperture)

Tributaries of the 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 drains into the left renal vein -
- ◇ Hepatic veins
- ◇ Paired inferior phrenic veins



Veins of Lower Limbs : Superficial veins

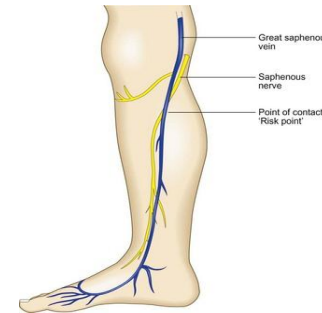
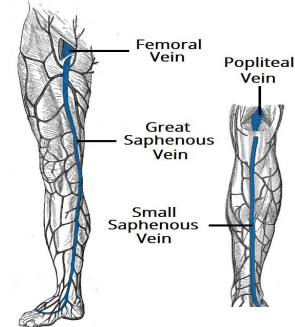
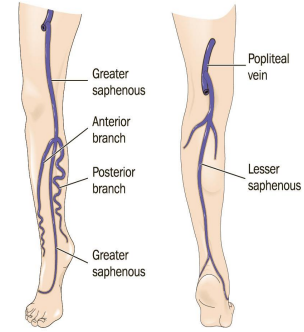
Form a network in the **subcutaneous tissue**.
They are the tributaries of the:

Great (long) 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 join the femoral vein about 1.5 in. (4cm) **below and lateral to the pubic tubercle**.
- ◇ It is **connected to** the small saphenous vein by one or both of the 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 fluid due to other venous collapse**.
- ◇ The great saphenous vein is used in venous grafting and saphenous vein cutdown may be necessary for inserting the needle or cannula.(take care of saphenous nerve)

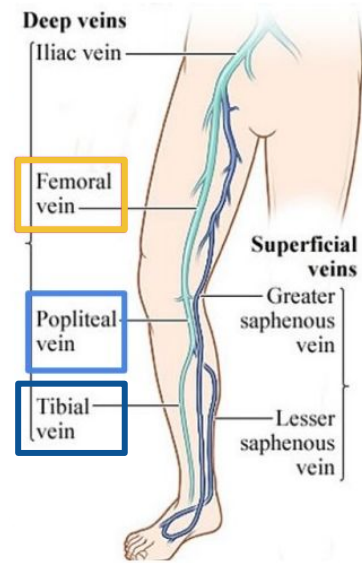
Small (short) saphenous vein

- ◇ **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 tendo-calcaneus 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.



Veins of Lower Limbs : Deep veins(venae comitantes)

- ◇ Accompany all the large **arteries** in the deep fascia, usually in pairs.
- ◇ **Course:**
 - Venae comitantes unite to form the **popliteal vein**
 - Which continues as the **femoral vein**
- ◇ Deep veins receive blood from superficial veins through perforating veins.
- ◇ **Deep veins Include:** **Males Slides Only**
 - Anterior and posterior tibial veins
 - Popliteal vein
 - Femoral Vein
- ◇ The venous system of the lower limb drains deoxygenated blood from the foot, legs and thigh.



Not a Helpful video

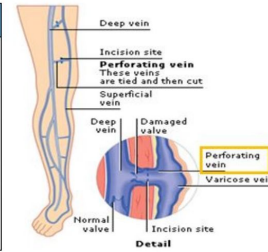
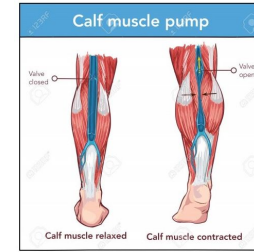
Veins of Lower Limbs : Deep veins(venae comitantes)

Found in male slides only

Anterior & Posterior Tibial Veins	Popliteal	Femoral
<ul style="list-style-type: none">◇ Some veins from the arch penetrate deep into the leg, forming the anterior tibial vein.◇ Veins of plantar aspect combine to form the posterior tibial and fibular veins.◇ The posterior tibial vein accompanies the posterior tibial artery, entering the leg <u>posteriorly</u> to the <u>medial</u> malleolus.◇ On the <u>posterior surface</u> of the knee, the anterior tibial, posterior tibial and fibular veins unite to form the popliteal vein.	<ul style="list-style-type: none">◇ 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.	<ul style="list-style-type: none">◇ The femoral vein is a blood vessel that accompanies the femoral artery in the femoral sheath.◇ It is a continuation of the popliteal vein.◇ The femoral vein leaves the thigh by running underneath the inguinal ligament, at this point it is known as the external iliac vein.◇ Both right and left common iliac veins form inferior vena cava that drains the entire low part of the body.

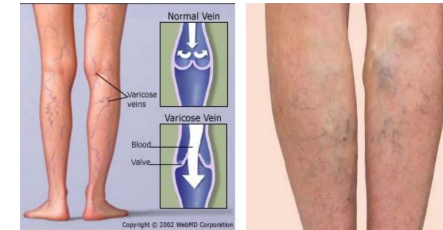
Mechanism Of Venous Return From Lower Limb (for your information)

- ◇ 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 **varicose**.
- ◇ Most common in **posterior & medial** parts of the lower limb, particularly in old people.



FACTORS AIMING BLOOD RETURN (Males slide only)

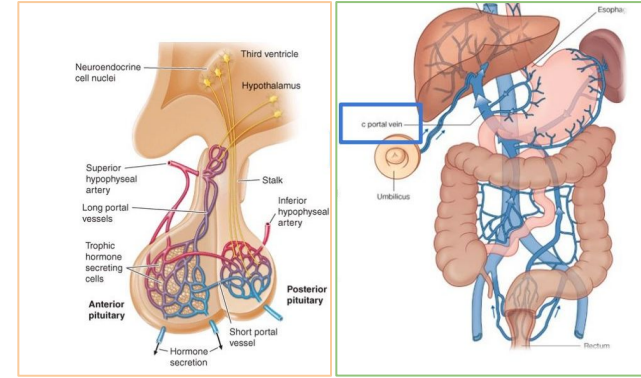
Muscle Contraction	Respiratory Pump	Decreased Venous Compliance	Gravity
<p>Rhythmical contraction of limb muscles as occurs during normal locomotory* activity (walking, running, swimming) promotes venous return by the muscle pump mechanism.</p> <p><small>Locomotory : mean moving forward, backward, or even upwards using certain skills. Examples of locomotor skills include: Walking or running. Jumping or hopping</small></p>	<p>During respiratory inspiration, the venous return increases because of a decrease in right atrial pressure.</p>	<p>Sympathetic activation of veins decreases venous compliance, increases central venous pressure and promotes venous return.</p>	<p>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.</p> <p><small>paradoxical : معاكس*</small></p>

Portal Circulation

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

Examples of such systems include

1. **Hepatic portal vein**
2. **Hypophyseal portal system.**



Hepatic Portal Vein

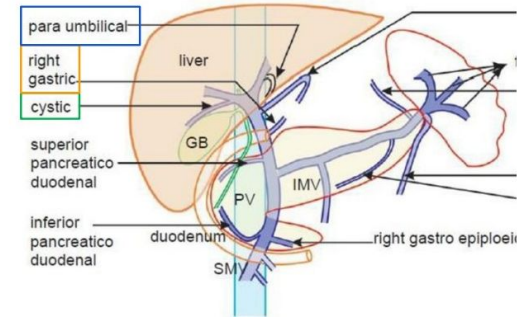
◇ Drains blood from the **GIT** and **spleen** to the liver.

◇ 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: (4)

1. **Right Gastric vein.**
2. **Left Gastric vein.**
2. **Cystic vein** from the gallbladder joins its right branch.
3. **Para-umbilical** veins that drain veins from anterior abdominal wall to the hepatic portal vein.

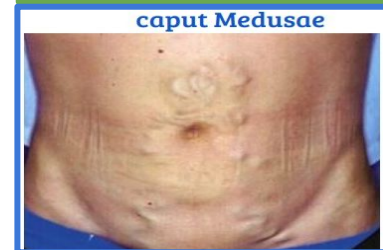
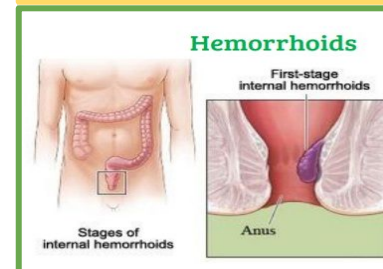
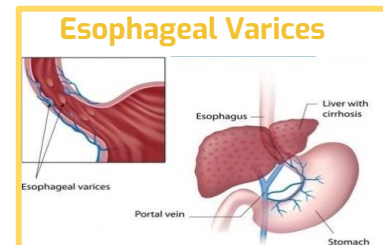


Portocaval Anastomosis

◇ 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 (IVC)**.

◇ The anastomotic channels become **dilated** (varicosed) in case of **portal hypertension**.

site	Portal vein	Systemic Vein	Associated condition
Lower end of esophagus	Left gastric vein	Esophageal branch of azygos vein	Esophageal Varices dilated دوالي المري >> ruptured >> vomiting of the blood >> if it is sever >> death
Lower part of rectum	Superior rectal vein	Middle and inferior rectal veins	Hemorrhoids البواسير
Paraumbilical region	Paraumbilical veins	Superficial epigastric vein	Caput Medusae
Retroperitoneal	Colic veins	Veins of the posterior abdominal wall (retroperitoneal veins)	
Patent ductus venosus (intrahepatic portosystemic shunt) during fetal development ductus venosus الطبيعي انه يفتل مع الولادة	Umbilical vein and portal vein shunt blood via patent ductus venosus into IVC.	Inferior Vena Cava (IVC)	Portosystemic shunts may be congenital or may be acquired with diseases that cause: portal hypertension Hepatomegaly, ascitis and signs of portal hypertension That's happened because ductus venosus doesn't close
Bare area of liver	There is some anastomosis between portal venous channels in the liver and azygous system of veins above the diaphragm.		



MCQ

Q1: Which one of the following drains into the inferior vena cava:

- A. Portal vein
- B. Left gonadal
- C. Renal vein
- D. Left supra renal

Q4: Dural venous sinuses is tributaries of:

- A. External jugular veins
- B. Internal jugular veins
- C. Anterior jugular veins
- D. Inferior jugular veins

Q2: One of the tributaries of the portal vein is:

- A. Superior mesenteric
- B. Hepatic vein
- C. The inferior vena cava
- D. Renal vein

Q5: The common iliac vein drains into:

- A. External iliac vein
- B. Inferior vena cava
- C. Superior vena cava
- D. Phrenic vein

Q3: All of the following organs drain into the superior vena cava EXCEPT;

- A. Lungs
- B. Upper limbs
- C. Gonads
- D. Neck

Q6: The superior vena cava is formed by the union of:

- A. 2 brachiocephalic veins
- B. Azygous and pericardial vein
- C. Internal jugular and subclavian vein
- D. None of the above

MCQ

Q7: Inferior vena cava is formed at the level of:

- A. T5
- B. T2
- C. L2
- D. L5

Q10: The posterior intercostal vein drains into:

- A. Azygos vein
- B. Hemiazygos vein
- C. Both A & B
- D. Inferior vena cava

Q8: Which one of following nerves accompanies the great saphenous vein in the medial side of the leg:

- A. Sural nerve
- B. Sciatic nerve
- C. Saphenous nerve
- D. Tibial nerve

Q11: Which one of the following veins can be used in coronary artery bypass:

- A. Small saphenous vein
- B. Hepatic vein
- C. Renal vein
- D. Great saphenous vein

Q9: Which one of the upper limb veins is deep:

- A. Cephalic
- B. Basilic
- C. Axillary
- D. Medial cubital

Q12: The anastomotic channels of portocaval become dilated (varicosed) in case of.....

- A. Portal hypertension
- B. Portal hypotension
- C. Both A & B
- D. None of the above

SAQ :

1 : List the veins that supply the head and neck.

2 : List the veins that supply the upper limbs.

3 : List the Tributaries of the inferior Vena Cava.

SAQ Answers :

1 :

- External jugular vein
- Anterior jugular vein
- Internal jugular vein

2 :

- Cephalic vein
- Basilic vein
- Venae comitantes
- Axillary vein

3 :

- Paired inferior phrenic veins
- Hepatic veins
- Right suprarenal vein
- Paired renal veins
- Right gonadal vein
- 4 paired lumbar veins
- 2 common iliac veins
- Median sacral vein

Team leaders

Abdullah Alsubaihi ◉
Abeer Awwad ◉

Team Members :

- Shayma Abdullah ◉
- Sumo Abdulrahman
- Fatimah Saad
- Shaden Alsaiedan ◉
- Ghada Aljedaie ◉
- Joud alnujaidi
- Shahad almezel
- Osama Alharbi ◉
- Nawaf Al-Shahrani
- Bader Alrayes
- Nawaf Alsaadi
- Mohammed Akresh
- Ibrahim Alabdulkarim

This lecture is done by : ◉