



Anatomy team
med 438



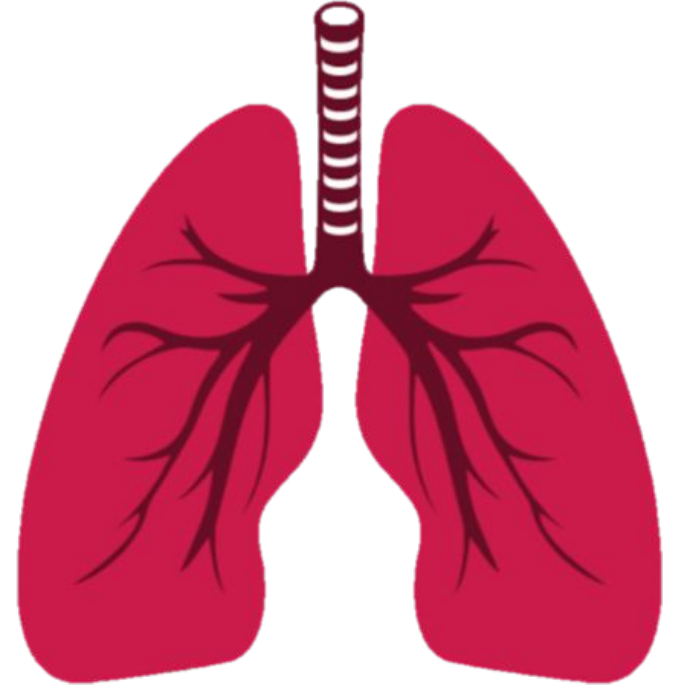
MED438
KING SAUD UNIVERSITY



Lung and Pleura

Respiratory block-Anatomy-Lecture 4

Editing file



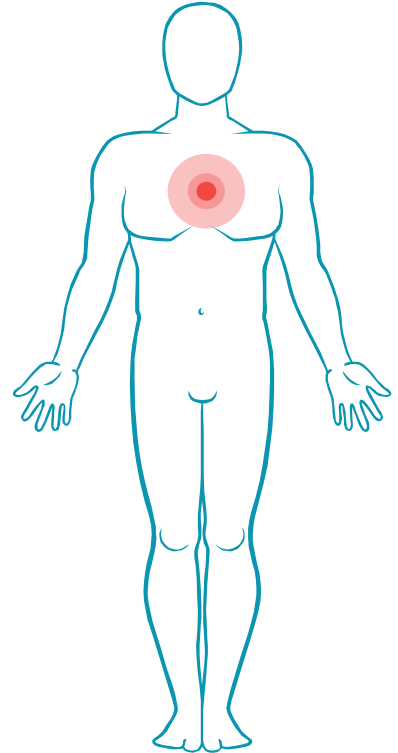
Objectives

At the end of the lecture, students should:

- ✓ Describe the anatomy of the pleura: subdivisions into parietal and visceral pleura, nerve supply of each of them.
- ✓ List the parts of parietal pleura and its recesses.
- ✓ Describe the surface anatomy of both pleura and lungs.
- ✓ Describe the anatomy of lungs : shape, relations, nerve supply & blood supply.
- ✓ Describe the difference between right & left lungs.
- ✓ Describe the formation of bronchopulmonary segments and the main characteristics of each segment in the lung.

[Click here for helpful short video ;\)](#)

Color guide :
Only in boys slides in **Green**
Only in girls slides in **Purple**
important in **Red**
Doctor note in **Blue**
Extra information in **Grey**

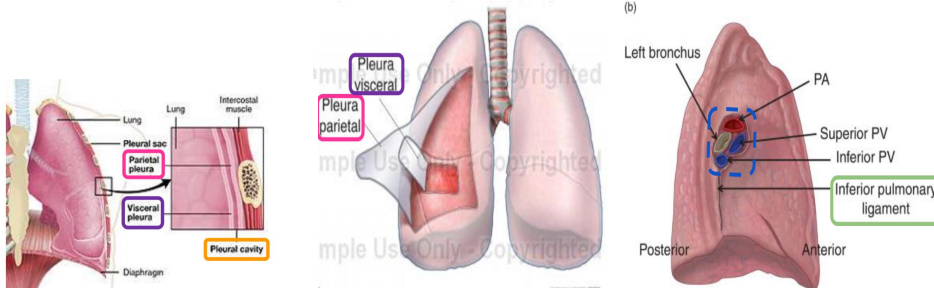


Pleura

Double-layered serous membrane enclosing the lung.
Has two layers:

Parietal layer	which lines the thoracic walls
Visceral layer	which covers the surfaces of the lung

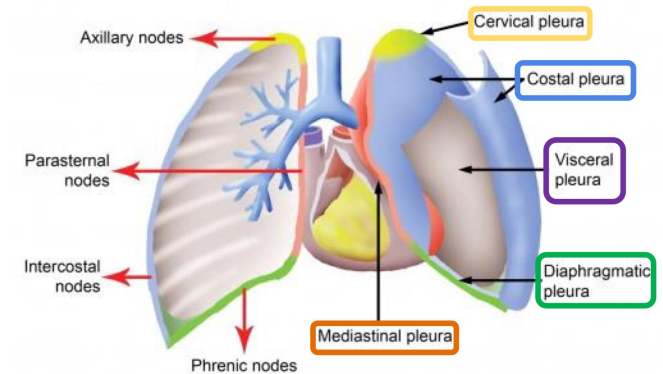
- The two layers **continue** with each other **around** the **root of the lung**, where it forms a loose cuff hanging down called the **pulmonary ligament**.
- The **space** between the two layers, the **pleural cavity**, contains a thin film of pleural serous fluid (5-10ml).



Parietal pleura

It is divided according to the region in which it lies and the surfaces it covers, into:

- Cervical pleura.**
- Costal pleura.**
- Mediastinal pleura.**
- Diaphragmatic pleura.**



Parietal pleura

1. Cervical Pleura:

Projects upward into the neck:
About one inch above the medial 1/3rd of clavicle. It **lines** the under surface of the **Suprapleural membrane**.

2. Mediastinal pleura:

Covers the Mediastinum:
At the Hilum, It is reflected on to the **vessels** and **bronchi**, that enter the hilum of the lung. It is continuous with the **visceral pleura**.

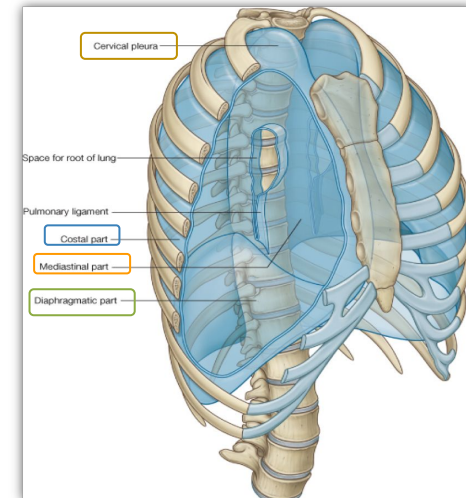
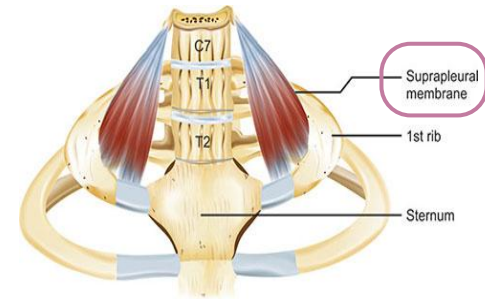
3. Costal pleura:

lines, the back of the:

- Sternum.
- Ribs.
- Costal cartilages.
- Intercostal spaces.
- Sides of vertebral bodies.

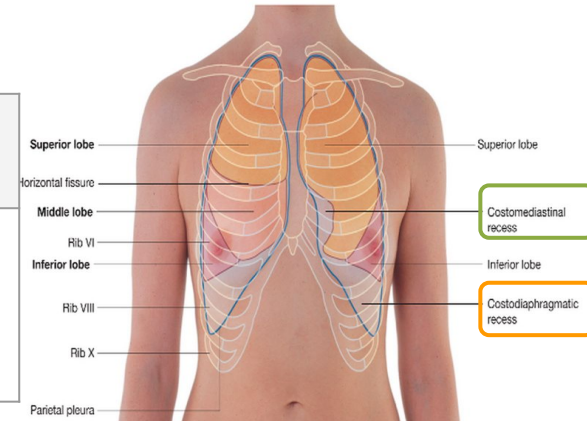
4. Diaphragmatic pleura:

Covers the: thoracic (Upper) surface of the Diaphragm.



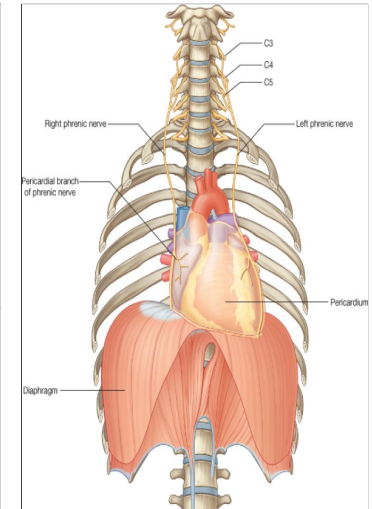
Pleural recess

<p>Costodiaphragmatic Recess</p>	<p>Costomediastinal Recess</p>
<p>Slit like space between Costal and Diaphragmatic Pleura , along the inferior border of the <u>lung enters through it in deep inspiration.</u></p>	<p>Slit like space between Costal and Mediastinal Pleura , along the anterior border of the lung enters through it in deep inspiration.</p>



Pleura nerve supply

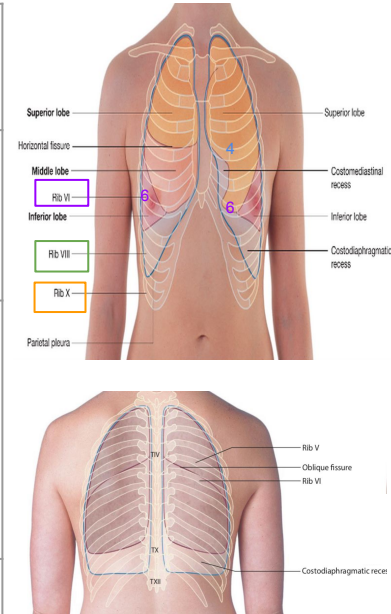
<p>Parietal</p>	<ul style="list-style-type: none"> • It is sensitive to (PPTT) pain, pressure, temperature, and touch. • It is supplied as follows: Cervical and Costal pleura is segmentally supplied by the intercostal nerves. Mediastinal pleura is supplied by phrenic nerves. Diaphragmatic pleura is supplied <u>over the domes</u> by phrenic nerves, around the <u>periphery</u> by lower 6 intercostal nerves
<p>Visceral</p>	<p>sensitive to stretch only and is supplied by the autonomic fibers from the pulmonary plexus.</p>



Surface anatomy of pleura

Note: This slide is important, especially the numbers

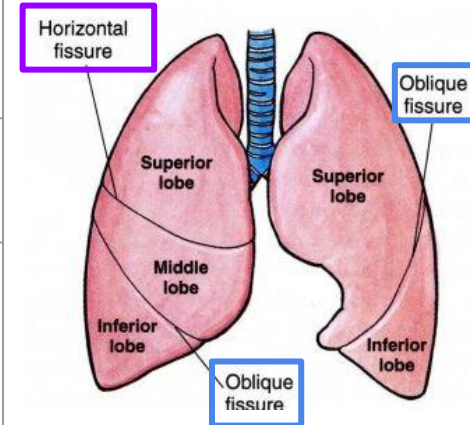
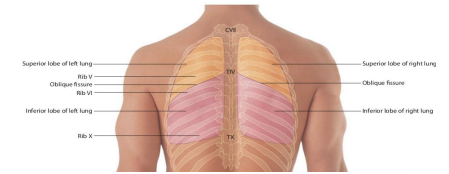
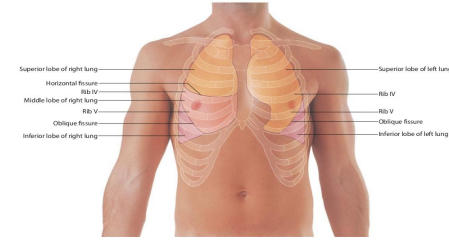
<p>Apex:</p>	<p>Lies <u>one inch</u> above the medial 1/3 of the Clavicle.</p>
<p>Anterior margin:</p>	<p>Right pleura: extends vertically from Sternoclavicular joint to xiphisternal joint (6th costal cartilage).</p>
	<p>Left pleura: extends from Sternoclavicular joint to the 4th costal cartilage, then <u>deviates laterally</u> and extends to <u>lateral margin</u> of the sternum to form cardiac notch then turns sharply <u>downward</u> to xiphisternal joint (6th costal cartilage).</p>
<p>Inferior margin:</p>	<p>Passes around the chest wall, on the 8th rib in <u>midclavicular</u> line, 10th rib in <u>mid-axillary</u> line and finally reaching to 12th rib adjacent to vertebral column posteriorly (T12).</p>
<p>Posterior margin :</p>	<p>Along the vertebral column from the apex (C7) to the inferior margin (T12).</p>



Surface anatomy of lung

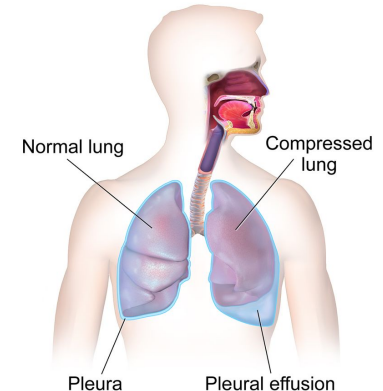
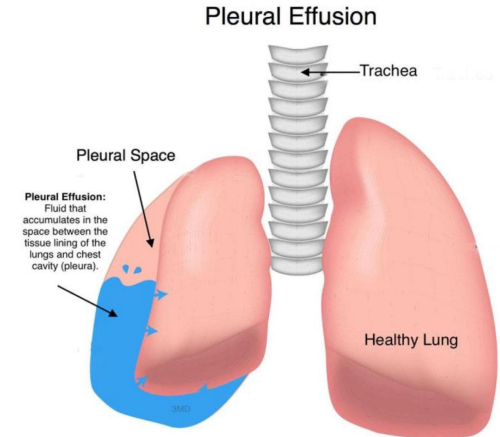
Note: This slide is important, especially the numbers

Apex, anterior border:	Correspond nearly to the lines of Pleura but are <u>slightly away</u> from the median plane .
Inferior margin:	passes around the chest wall , on the 6th rib in midclavicular line , 8th rib in mid-axillary line and finally reaching to 10th rib adjacent to vertebral column posteriorly. -as pleura but more horizontally and finally reaching to the (T10) not (T12) .
Posterior margin :	Along the vertebral column from the apex (C7) to the inferior margin (T10)
Oblique fissure:	Represented by a line extending from 3rd or 4th thoracic spine , obliquely ending at 6th costal cartilage .
Transverse fissure: (Only in the right lung)	Represented by a line extending from 4th right costal cartilage to meet the oblique fissure .



Pleural effusion

- It is an **abnormal** accumulation of pleural fluid about **300 ml** in the Costodiaphragmatic pleural recess (**normally 5-10 ml fluid**)
- **Causes:**
 - Inflammation.
 - TB. (**most common**)
 - Congestive heart disease.
 - Malignancy.
- The lung is **compressed** and the bronchi are **narrowed**.
- **Auscultation** would reveal only **faint & decreased breathing sounds** over compressed or collapsed lung lobe.
- **Dullness** on percussion over the effusion.



The Lung

- **Located in:**
thoracic cavity, one on each side of the mediastinum

- **Each lungs:**

Conical in shape.

Covered by the visceral pleura.

Suspended free in its **own** pleural cavity.

Attached to the mediastinum only by its root.

- **Each lung has:**

1. Apex & Base:

Identify the top and bottom of the lung, respectively.

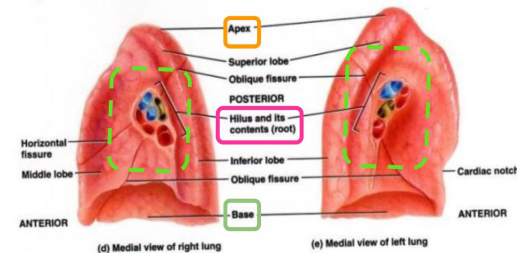
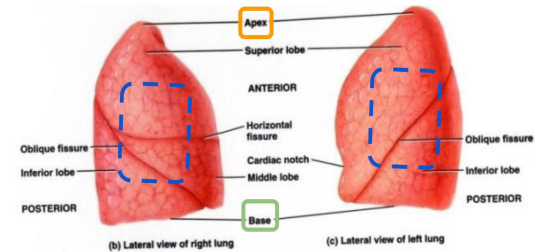
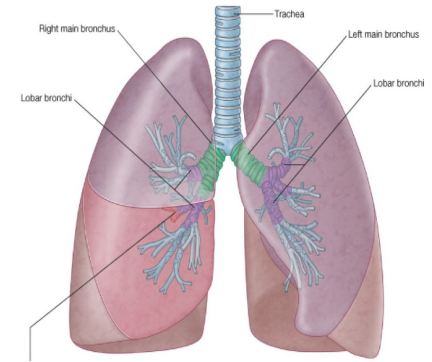
2. Costal surface:

Surrounded by the ribs and intercostal spaces from front, side and back.

3. Medial surface:

Where the bronchi, blood vessels, and lymphatic vessels enter or leave the lung at the **Hilum**.

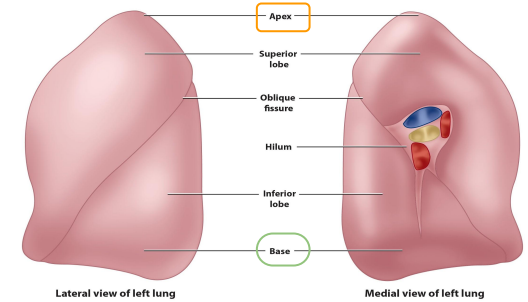
It is also related to the structures forming the Mediastinum.



The Lung

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Apex	<p>Projects into the <u>root of the neck</u> (0.5-1 inch above medial 1/3 of clavicle). It is covered by cervical pleura. It is grooved <u>anteriorly</u> by subclavian artery.</p>
Base	<p>inferior or diaphragmatic surface , is concave and rests on the diaphragm.</p>

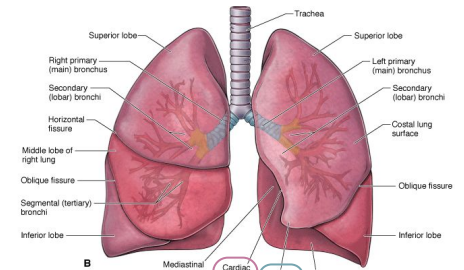


Lateral view of left lung

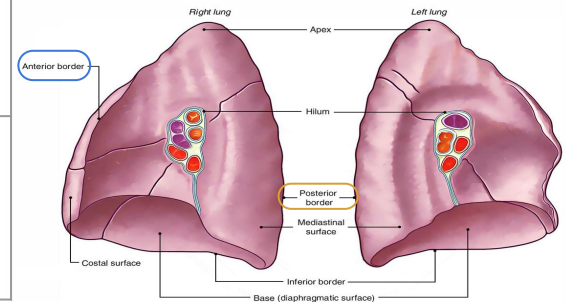
Medial view of left lung

Borders

Anterior border	<p>Is sharp, thin and overlaps the heart. <u>Anterior border of left lung</u> presents a cardiac notch at its lower end, has a thin projection called the lingula below the cardiac notch.</p>
Posterior border	<p>is rounded, thick and lies beside the vertebral column.</p>

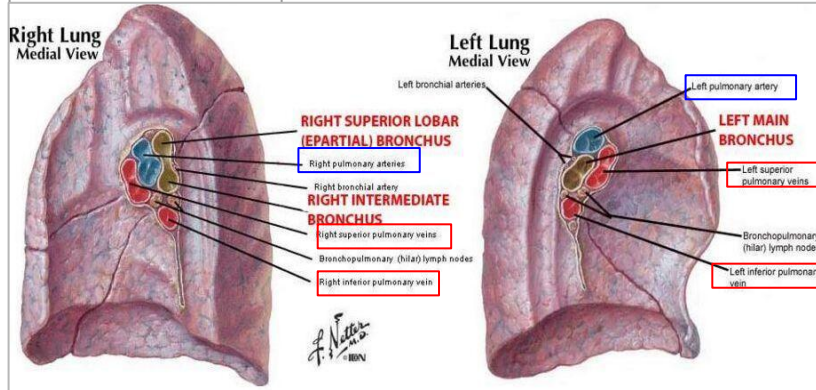


B



Lung roots

	Right lung root	Left lung root
Bronchi*	2 bronchi Lie posterior	One bronchus Lies posterior
Pulmonary artery	Superior	
2 Pulmonary veins	Are inferior and anterior	



Surfaces: Costal & Mediastinal

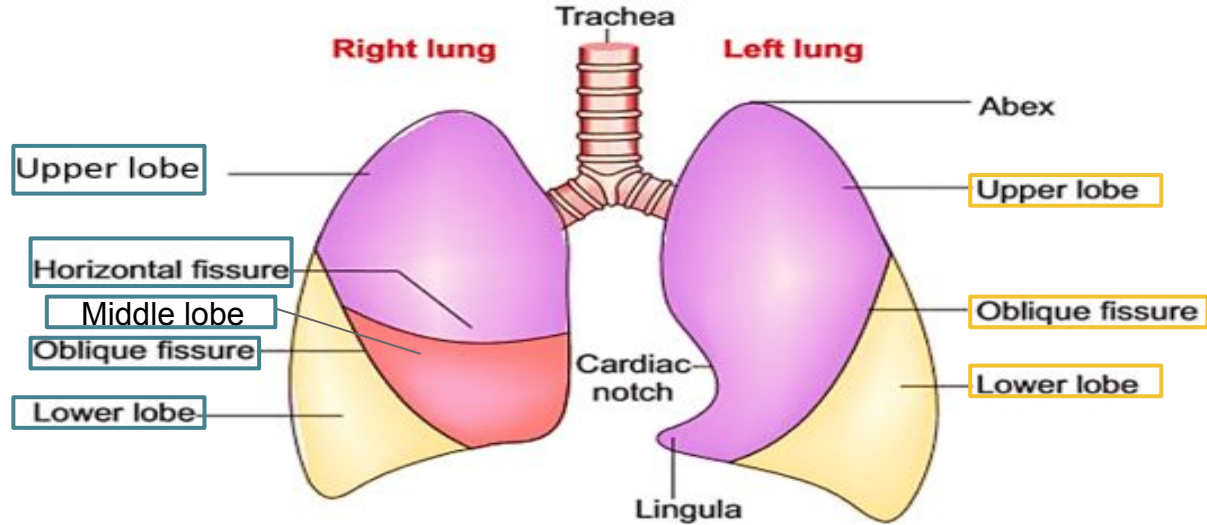
Costal surface:	Medial surface: It is divided into 2 parts:	
Convex	Anterior (mediastinal)	Posterior (vertebral)
Covered by costal pleura which separates lung from: ribs, costal cartilages & intercostal muscles.	Contains a hilum in the middle (it is a depression in which bronchi, vessels, & nerves forming the root of lung).	It is related to: - Bodies of thoracic vertebrae. - Intervertebral discs - Posterior intercostal vessels - Sympathetic trunk.

Right lung

Divided by
2 fissures
(oblique &
horizontal)

3 lobes
(upper,
middle and
lower lobes).

Larger & shorter than
left lung



Left lung

Divided by
one
oblique
fissure

2 lobes,
Upper and
lower.

There is **No**
horizontal
fissure.

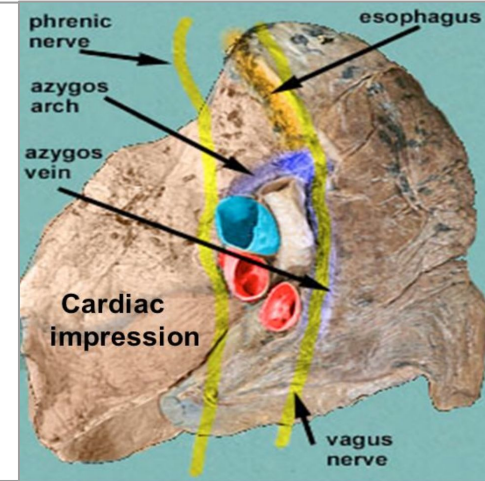
It has a **cardiac
notch** at lower
part of its
anterior border.

Mediastinal surface

Mediastinal surface of right lung

On the mediastinal surface of the right lung, you find these structures:

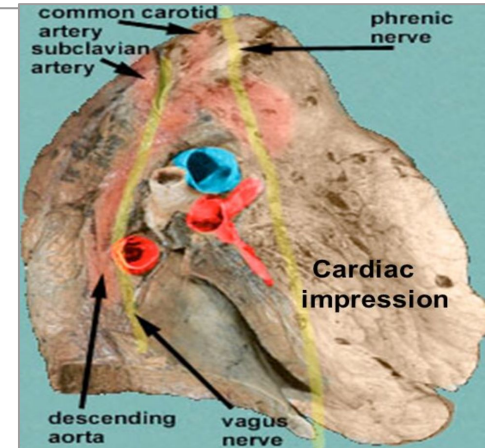
- **Vagus nerve** posterior to the root of the lung.
- **Phrenic nerve** anterior to the root of the lung.
- **Cardiac impression**: related to **right atrium**.
- **Azygos vein and its arch** (posterior and over the root of the lung).
- **Esophagus** posterior to the root.
- Below hilum and in front of pulmonary ligament : **groove for I.V.C."** Inferior vena cava"

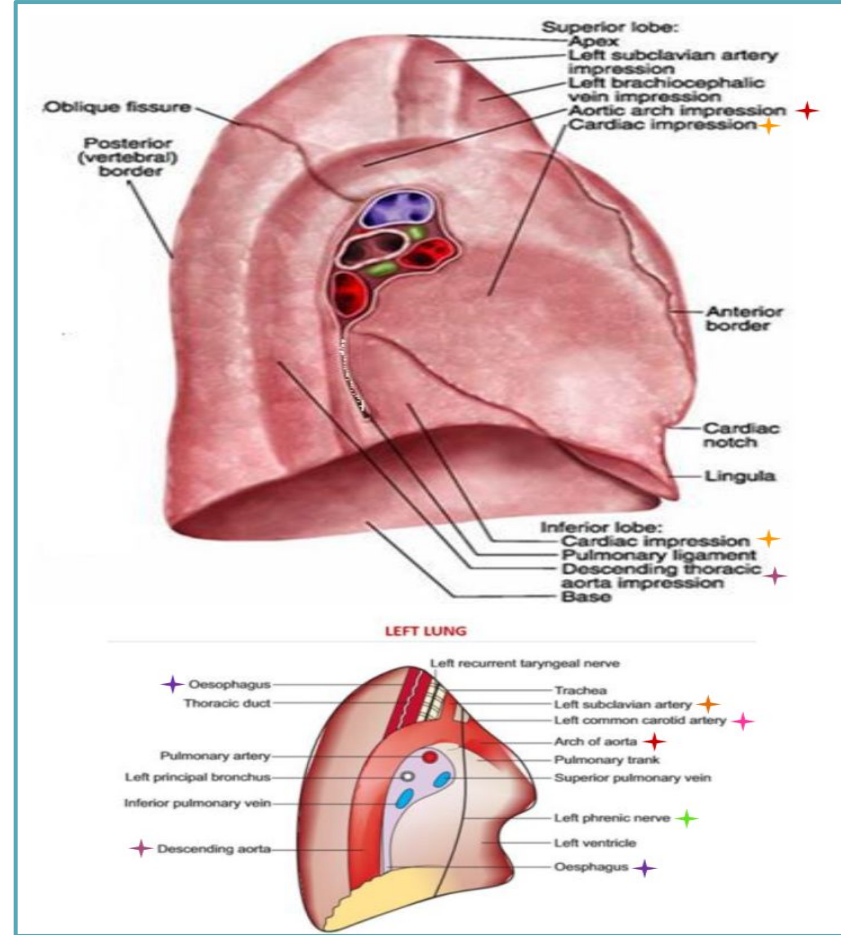
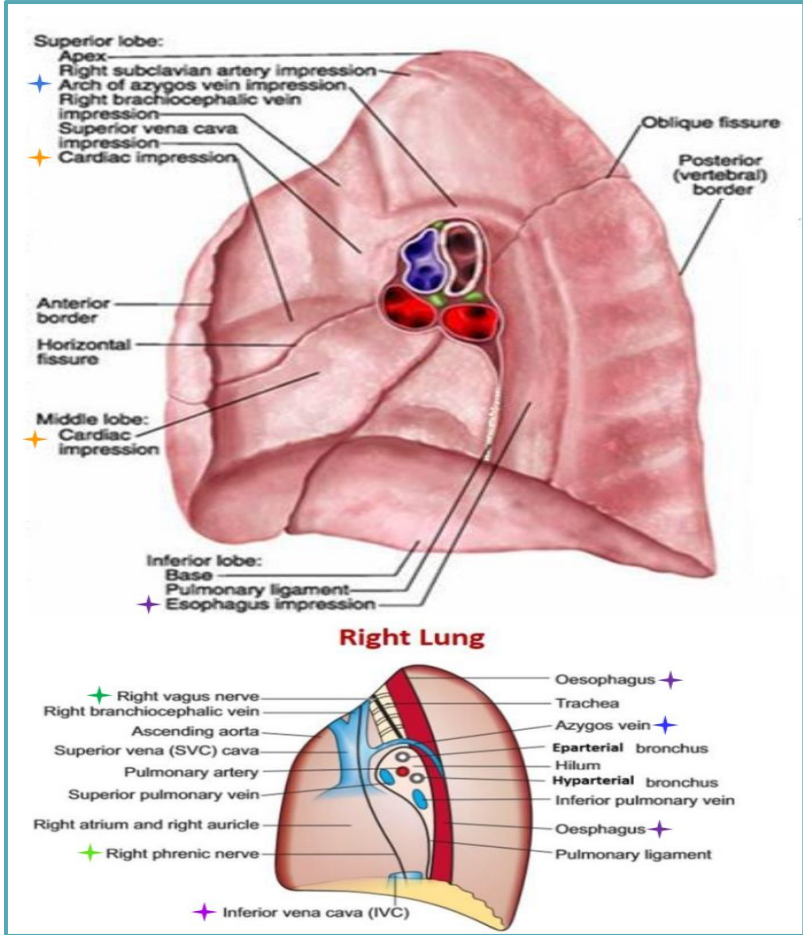


Mediastinal surface of left lung

On the mediastinal surface of the left lung, you will find these structures:

- **Vagus nerve** posterior to the root of the lung & over the root.
- **Phrenic nerve** anterior to the root of the lung.
- **Cardiac impression**: related to **left ventricle**.
- **Descending aorta** posterior to the root.
- **Arch of the aorta** over the root of the lung.
- Groove for **left common carotid** and **left subclavian arteries**.





Blood supply of lung

Arteries	Veins
<p>Bronchial arteries (From descending aorta) It supplies oxygenated blood to bronchi , lung tissue & visceral pleura.</p>	<p>Bronchial veins drain into azygos & hemiazygos veins.</p>
<p>Pulmonary artery which carries non-oxygenated blood from right ventricle to the lung alveoli.</p>	<p>pulmonary veins carry oxygenated blood from lung alveoli to the left atrium of the heart.</p>

Nerve supply of lung

<h3>Pulmonary plexus</h3> <p>at the root of lung is formed of autonomic N.S. from sympathetic & parasympathetic fibers.</p>	
Sympathetic Fibers	Parasympathetic Fibers
<p>From : sympathetic trunk</p> <p>Action: broncho-dilatation & vasoconstriction</p>	<p>From: Vagus nerve</p> <p>Action: Broncho-constriction & vasodilatation & secretomotor to bronchial glands.</p>

The Bronchi

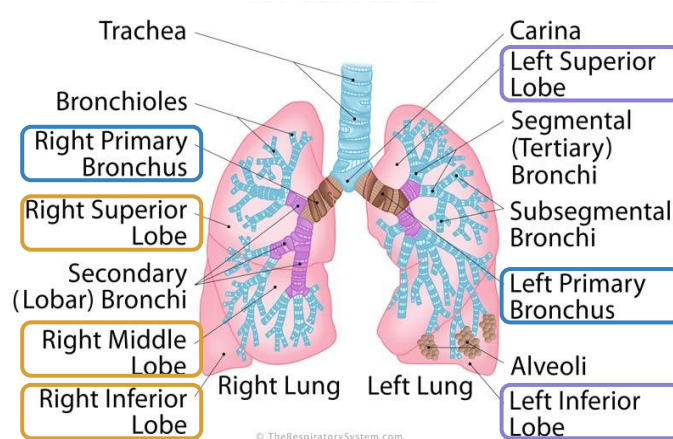
The trachea divides into **2 main bronchi**:

Right main bronchus

- which divides **before** entering the hilum, it gives: **superior** lobar (**secondary**) bronchus.
- **On** entering hilum, it divides into **middle & inferior** lobar bronchi.

Left main bronchus

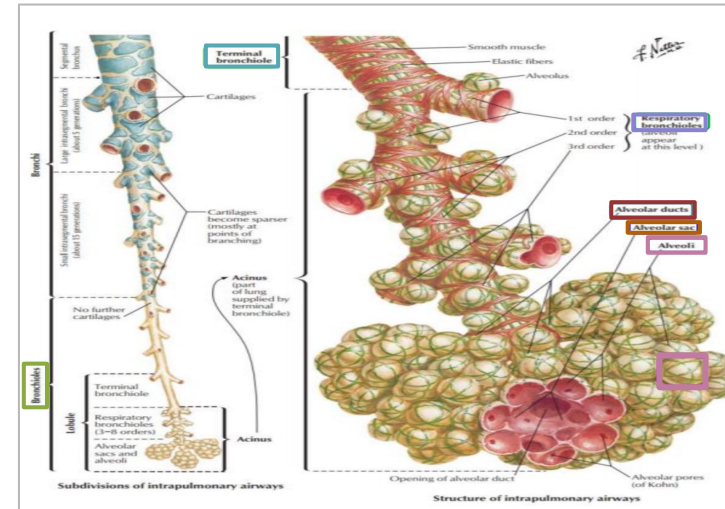
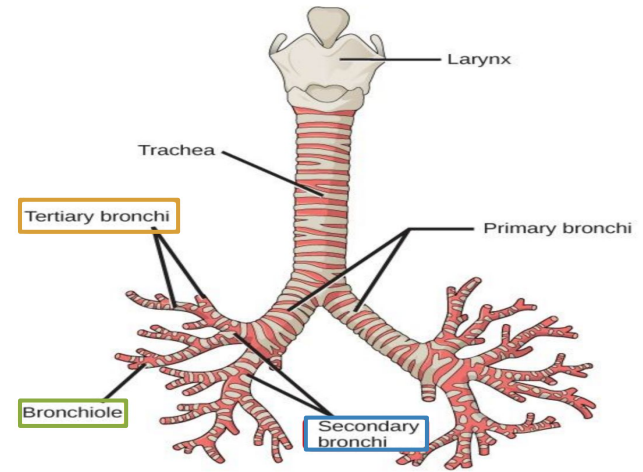
- **On** entering hilum, it divides into **superior & inferior** lobar bronchi.



Bronchopulmonary segments

- They are the **anatomic, functional, and surgical** units of the lungs.

- Each **lobar (secondary)** bronchus gives **segmental (tertiary)** bronchi.
- Each segmental bronchus divides repeatedly into **bronchioles**.
- Bronchioles divide into **terminal bronchioles**, which show delicate outpouchings “the **respiratory bronchioles**”
- The respiratory bronchioles end by branching into **alveolar ducts**, which lead into **alveolar sacs**.
- The alveolar sacs consist of several **alveoli**, each alveolus is surrounded by a network of blood capillaries for gas exchange.

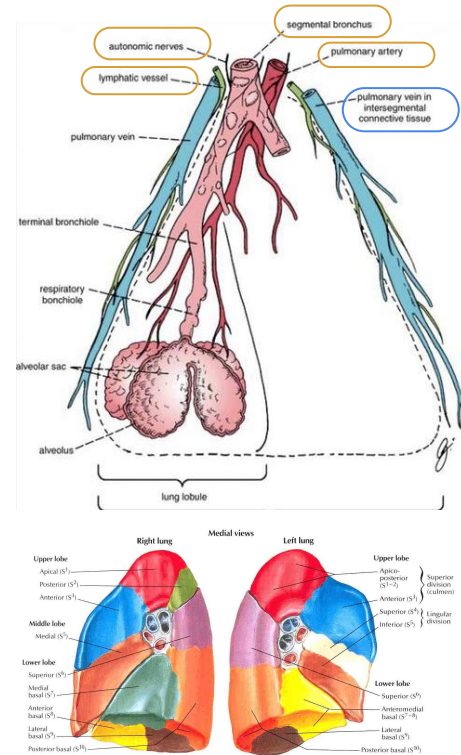


Bronchopulmonary segments

The main **characteristics** of a bronchopulmonary **segment**:

- It is a **subdivision** of a lung lobe.
- It is **pyramidal** shaped, its **apex** toward the lung root.
- It is **surrounded** by connective tissue septa.
- It has a **segmental bronchus**, a **segmental artery**, **lymph vessels**, and **autonomic nerves**.
- The **segmental vein** lies in the **inter- segmental C.T. septa** between the segments.
- A diseased segment can be **removed** surgically, because it is a **structural unit**.

Note: Segmental vein can't be removed, since it also gives the neighbor segment



MCQs

19

Question 1: Which feature is found only in the left lung ?

- A. Oblique fissure
- B. Cardiac notch
- C. Transverse fissure
- D. Both A and C

Question 2: The lung is innervated by :

- A. Sympathetic fibers
- B. Parasympathetic fibers
- C. Both sympathetic and parasympathetic fibers
- D. Motor fibers

Question 3: The pleural cavity, contains a thin film of pleural serous fluid. what is the normal value of it ?

- A. 25-30 ml
- B. 15-20 ml
- C. 20-25 ml
- D. 5-10 ml

Question 4: which one of the following is **not** a characteristic of the left lung ?

- A. contains 2 lobes
- B. Has one fissure
- C. Has lingual projection
- D. shorter than the right lung

Question 5: Mediastinal pleura is supplied by :

- A. Phrenic nerves
- B. Intercostal nerves
- C. Autonomic fibers
- D. Both A and B

Question 6: The pulmonary artery carries blood from.....:

- A. Oxygenated / Left ventricle
- B. Oxygenated / Left atrium
- C. Deoxygenated / Right ventricle
- D. Deoxygenated / Right atrium

Question 7: Visceral pleura is supplied by :

- A. Autonomic fibers.
- B. thoracic nerve.
- C. intercostal nerves.
- D. Phrenic nerves.

Question 8: The phrenic nerve is found (.....) to the root of the lung :

- A. Superior
- B. Anterior
- C. Inferior
- D. posterior

Best wishes



**Don't forget to leave
your feedback:**



Team members

Boys team:

- Khalid AL-Dossari
- Naif Al-Dossari
- Faisal Alqifari
- Salman Alagla
- Ziyad Al-jofan
- Suhail Basuhail
- Ali Aldawood
- Khalid Nagshabandi
- Mohammed Al-huqbani
- Jihad Alorainy
- Khalid AlKhani
- Omar Alammari

Team leaders

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- ★ Ateen Almutairi

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- Taif Alotaibi
- Noura Al Turki
- Amirah Al-Zahrani
- Alhanouf Al-haluli
- Sara Al-Abdulkarem
- Rawan Al Zayed
- Renad Al Haqbani
- ★ Nouf Al Humaidhi
- Jude Al Khalifah
- Nouf Al Hussaini
- Alwateen Al Balawi
- ★ Rahaf Al Shabri
- Danah Al Halees
- Rema Al Mutawa
- ★ Amirah Al Dakhilallah
- Maha Al Nahdi
- Ghaida Al Braithen