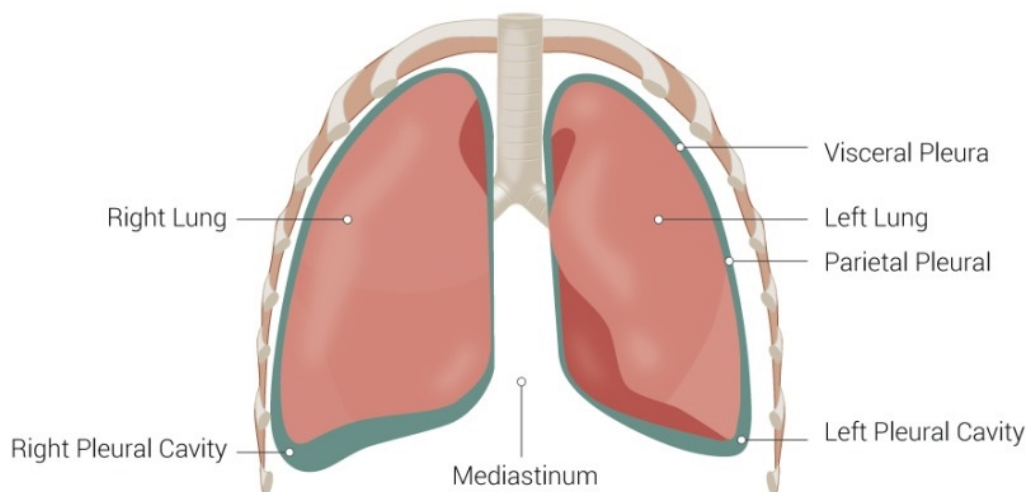


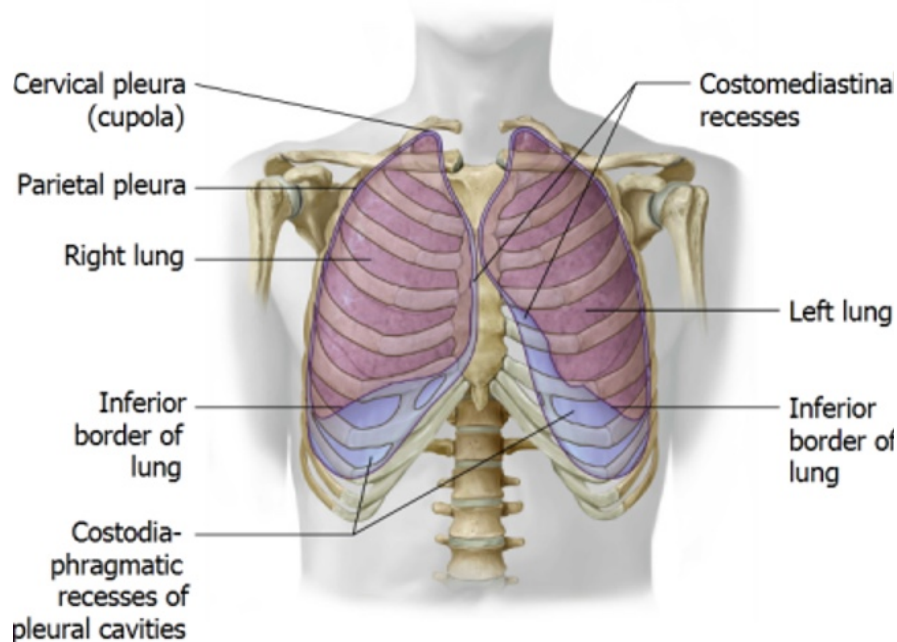
Pleural cavity

- Lined by pleura and surrounds each lung
- the pleura is composed of 2 layers:
 - **Parietal**: continuous layer that lines inner wall of thoracic cavity, superior surface of diaphragm, and mediastinum
 - parts according to location: cervical, costal, diaphragmatic and mediastinal
 - **Visceral**: covers surface of the lung and extends into the fissures
 - Continuous with one another, form the pleural sac and contains the pleural cavity
- Pulmonary ligament: is visceral and parietal pleura fold, helps anchor the lungs
- blood supply and innervation
 - visceral shares neurovasculature of lungs and bronchi
 - parietal share neurovasculature of thorax wall, pericardium, and diaphragm



Pleural cavity

- potential space between visceral and parietal parts of pleura
- Contains serous fluid: lubricates and allows less friction
- Has 2 Recesses which accommodate expansion of lungs during inspiration
 - **Costodiaphragmatic recess**
 - diaphragmatic pleura reflects from the perimeter of diaphragm to meet costal pleura
 - **Costomediastinal recess**
 - between pericardial sac and sternum where the mediastinal pleura meets the costal pleura



Lungs:

- Costal surface: touches the ribs
- Mediastinal surface: touches pericardium
- Diaphragmatic surface: touches diaphragm
- Apex: top
- Base: bottom, rests on diaphragm
- Root: connect lung to mediastinum, contains the pulmonary vessels, nerves and bronchi
 - enters lung at hilum from heart, indentation
- fissures divide lung into lobes. Right lung: 3 lobes & Left lung: 2 lobes

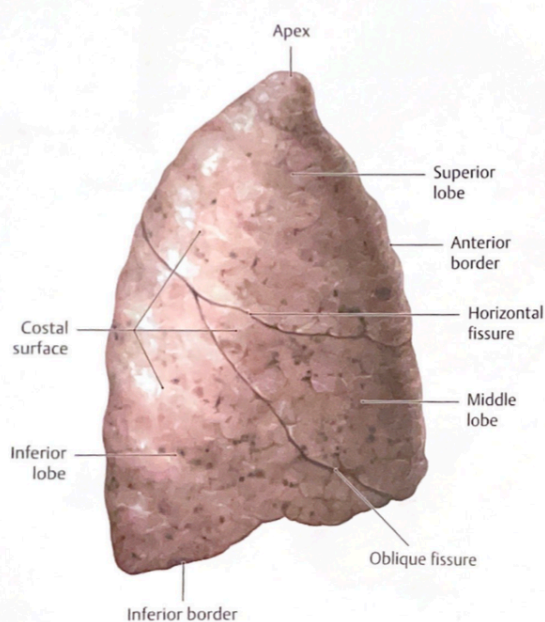
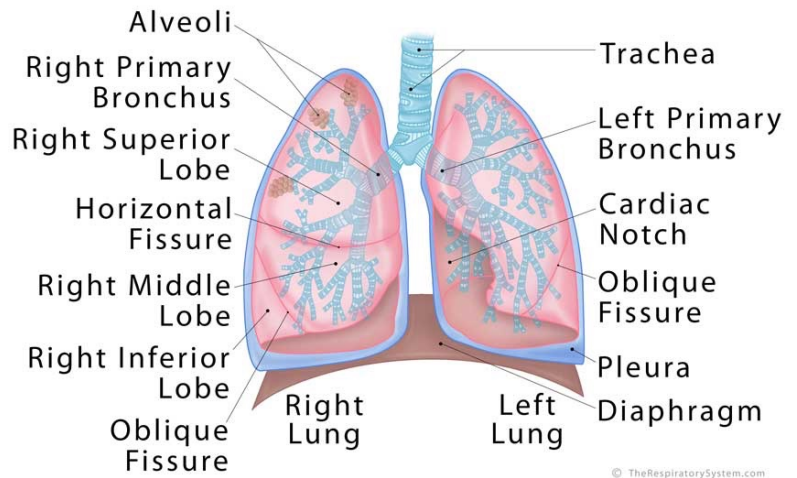
Right lung:

- diaphragm higher on right side so right lung is heavier, shorter and wider
- horizontal and oblique fissure divide right lung into 3 lobes:
 - superior
 - middle
 - inferior lobes
- Bronchopulmonary segments separated by intersegmental septa, a continuation of visceral pleura
 - each an independent respiratory unit
 - 10 in right lung

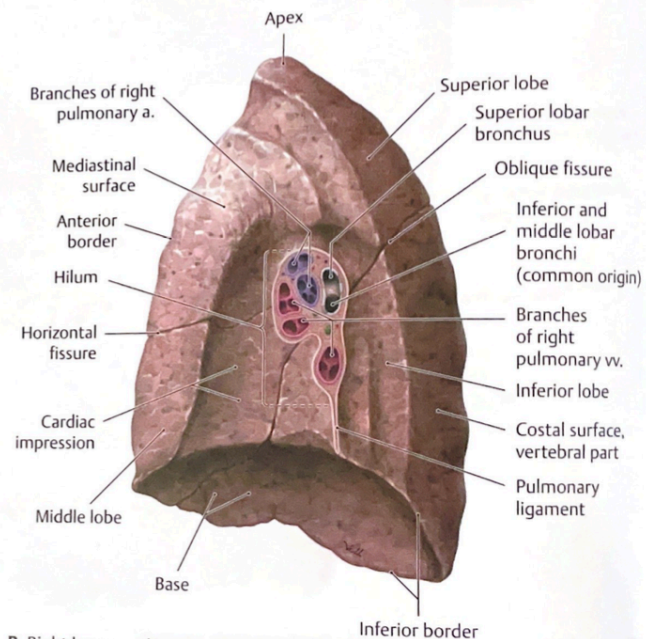
Left lung:

- 2 lobes separated by oblique fissure:
 - Superior
 - Inferior
- Lingula on superior lobe forms inferior border of cardiac notch
- along anterior border of superior lobe is cardiac notch, accommodates the leftward projection of the apex of the heart
- 8-10 bronchopulmonary segments

Lungs



A Right lung, lateral view.



B Right lung, medial view.

Fig. 6.5 Gross anatomy of the lungs

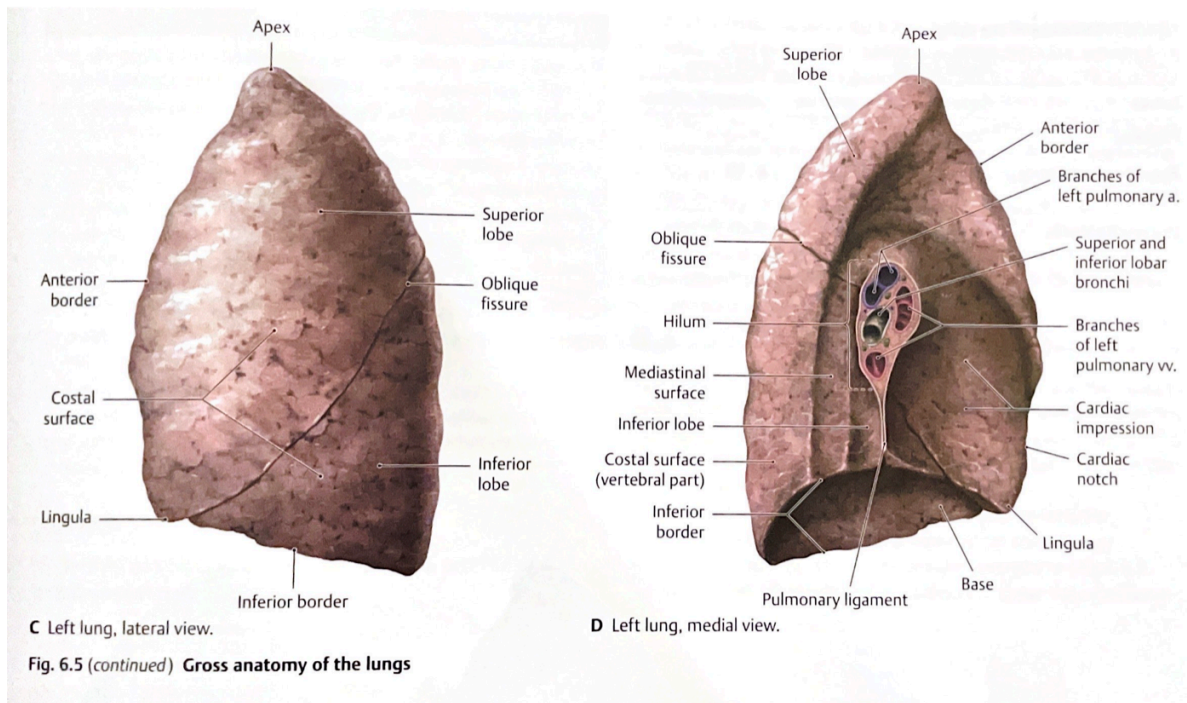
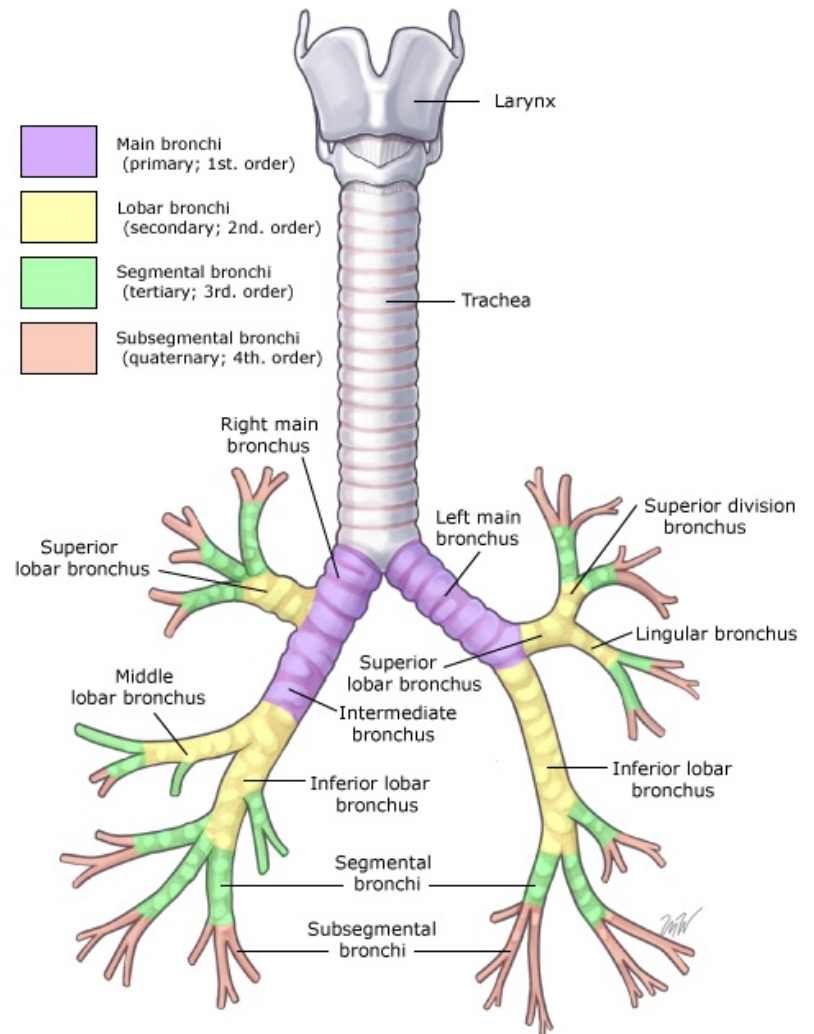


Table 6.1 Structure of the Lungs

	Right Lung	Left Lung
Lobes	Superior, middle, inferior	Superior, inferior
Fissures	Oblique, horizontal	Oblique
Bronchopulmonary Segments	10	8–10
Unique Features	Larger and heavier than the left, but shorter and wider due to higher right hemidiaphragm	Superior lobe characterized by the lingula and a deep cardiac notch

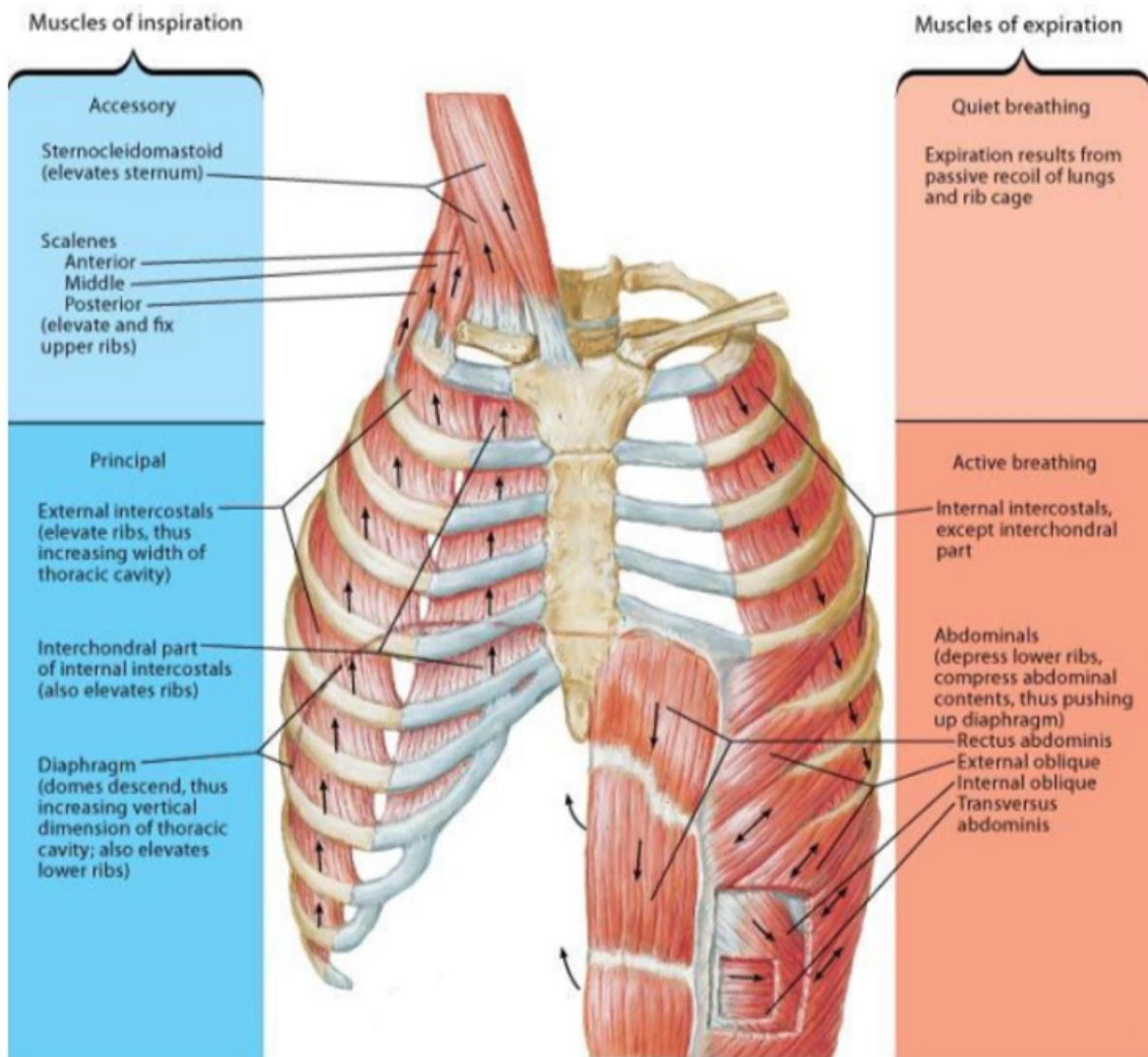
Tracheobronchial tree:

- has conducting and respiratory components
- **Trachea**
 - plus its larger branches form conducting component, passageway for air exchange between lung and external environment
 - **branches include:**
 - primary bronchi (right and left main) formed by bifurcation and each enter hilum of lung
 - Lobar (secondary) bronchi comes from main and enters each lobe of respective lung
 - Right superior lobar bronchi enters the right superior lobe, etc.
 - Lobar branches to segmental bronchi, which enters each bronchopulmonary segment
 - Conducting bronchioles, subdivisions of segmental bronchi and decrease in size
 - Terminal bronchioles, last branch and final part of conducting airway
 - Contains respiratory bronchioles, alveolar sacs, alveoli
 - Alveoli designed for gas exchange



Mechanics of respiration

- exchange of oxygen and carbon dioxide requires continuous flow of air between lungs and external environment through:
 - Thoracic volume
 - corresponding expansion (inspiration) and contraction (expiration) of lungs
 - **Inspiration/inhalation** requires expansion of pulmonary cavities and decreased intrapleural pressure
 - pressure is below atmospheric pressure, dragging air into lungs
 - Quiet breathing, diaphragm flattens to make room from air filled lungs
 - Forced respiration: elevates the ribs, sternum and expands cavities horizontally.
 - **Expiration/exhalation:** requires contraction of pulmonary cavities and increased intrapleural pressure
 - Quiet: relaxed diaphragm decreases thoracic volume and air is expelled
 - Forced: requires abdominal and intercostal muscles to decrease thoracic volume



Neurovasculature of Lungs and Bronchi Tree:

- Pulmonary arteries: take deoxygenated blood to capillary network that surrounds alveoli
- Bronchial arteries: branch of thoracic aorta, supply bronchial tree, connective tissue of lungs, and visceral pleura. Typically 1 branch to right lung and 2 to left

Veins:

- pulmonary veins: arise from capillary beds around alveoli, carry oxygenated blood, and join to form two pulmonary veins within each lung, enter the left atrium
- bronchial v.: one from each lung, drain proximate portion of root and terminate in azygos and accessory hemiazygos (superior intercostals) v.

Lymphatics: *--> = drain to

- drain to inferior and superior tracheobronchial nodes, deep plexus first drains to bronchopulmonary node
- lymph from tracheobronchial nodes --> paratracheal nodes --> bronchomediastinal trunk on either side --> terminating in junction of subclavian and jugular v.
- superficial lymphatic plexus: drains pleura
- deep lymphatic plexus: drains structures associated with root
- right lung lobes and superior lobe of left --> ipsilateral channels

Nerves:

- pulmonary plexus, innervates lung, bronchial tree, and visceral pleura
- Visceral sensory fibers carry pain from bronchi
- Visceral sensory fibers for cough and blood pressure travel with vagus nerve
- Parietal pleura: innervated by somatic nerves, EXTREMELY sensitive to pain.
- Intercostal n. innervate costal surface
- phrenic n. (C3-C5) innervate mediastinal and diaphragmatic surfaces
- Irritation of parietal pleura supplied by phrenic nerve refers to the dermatomes of C3-C5 on the neck and shoulder

High Yielders:

Table 6.2 Autonomic Innervation of the Lungs and Bronchial Tree

Target Structures	Sympathetic	Parasympathetic
Bronchial muscles	Inhibitory (bronchodilation)	Motor (bronchoconstriction)
Pulmonary vessels	Motor (vasoconstriction)	Inhibitory (bronchodilation)
Secretory cells of alveoli	Secretomotor	Inhibitory

pulmonary circulation:

