Ministry of Higher Education
& Scientific Research
Al-Muthanna University
Faculty of Pharmacy

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Theory Human Anatomy

(CIHa 108)

Lec (1)

Lecturer Ahmed Adeeb Mohamed Al-Tamimi

Basic Anatomy

Anatomy is the science of the structure and function of the body.

Clinical anatomy is the study of the macroscopic structure and function of the body as it relates to the practice of medicine and other health sciences.

Basic anatomy is the study of the minimal amount of anatomy consistent with the understanding of the overall structure and function of the body.

Anatomic Terms

It is important for medical personnel to have a sound knowledge and understanding of the basic anatomic terms.
With the aid of a medical dictionary, you will find that understanding anatomic terminology greatly assists you in the learning process.
The accurate use of anatomic terms by medical personnel enables them to communicate with their colleagues. Without anatomic terms, one cannot accurately discuss or record the abnormal functions of joints, the actions of muscles, the alteration of position of organs, or the exact location of swellings or tumors.

Terms Related to Position

All descriptions of the human body are based on the assumption that the person is standing erect, with the upper limbs by the sides and the face and palms of the hands directed forward (Fig. 1.1). This is the so-called **anatomic position.**

Lateral : more distant to the body midline. In the anatomical position the radius is lateral to the ulna a simple example is the thumb is lateral to the pinky
Medial A structure situated nearer to the median plane of the body. The sternum (breast plate) is medial to the clavicle (shoulder bone).

Superior: a structure that lies farther away from the median plane than another. The cranial cavity (head cavity) is superior to the scapula (shoulder blade).

Inferior: below towards the plantar (foot) end. The patella is inferior to the femur thigh bone

Anterior: towards the front of the body. The sternum is anterior to the spine. Also known as ventral but this term is not as common in human anatomy.

Posterior: towards the rear / backside of the body. The fibula is posterior to the tibia. Also known as dorsal but this term is not as common in human anatomy. To describe the relationship of two structures, one is said to be anterior or posterior to the other insofar as it is closer to the anterior or posterior body surface. In describing the hand, the terms **palmar** and **dorsal surfaces** are used in place of anterior and posterior, and in describing the foot, the terms **plantar** and **dorsal surfaces** are used instead of lower and upper surfaces (see Fig. 1.1).

Superficial: closer to the skin nearer the body surface. Skin is superficial to the organs.
Deep: further from the body surface .

Internal and external are used to describe the relative distance of a structure from the center of an organ or cavity

Distal: further from the limbs attachment to the trunk (where trunk refers to the torso of the body): the body minus the head neck and limbs

Proximal: nearer to the limbs attachment to the trunk. The humerus is proximal to the radius.

Ipsilateral refers to the same side of the body.

Contralateral refers to opposite sides of the body.

Supine position of the body is lying on the back.

Prone position is lying face downward.

The various parts of the body are then described in relation to certain imaginary planes.

Median Sagittal Plane

This is a vertical plane passing through the center of the body, dividing it into equal right and left halves (see Fig. 1.1). Planes situated to one or the other side of the median plane and parallel to it are termed **paramedian.**

Coronal Planes

These planes are imaginary vertical planes at right angles to the median plane (see Fig. 1.1).

Horizontal, or Transverse, Planes

These planes are at right angles to both the median and the coronal planes (see Fig. 1.1).

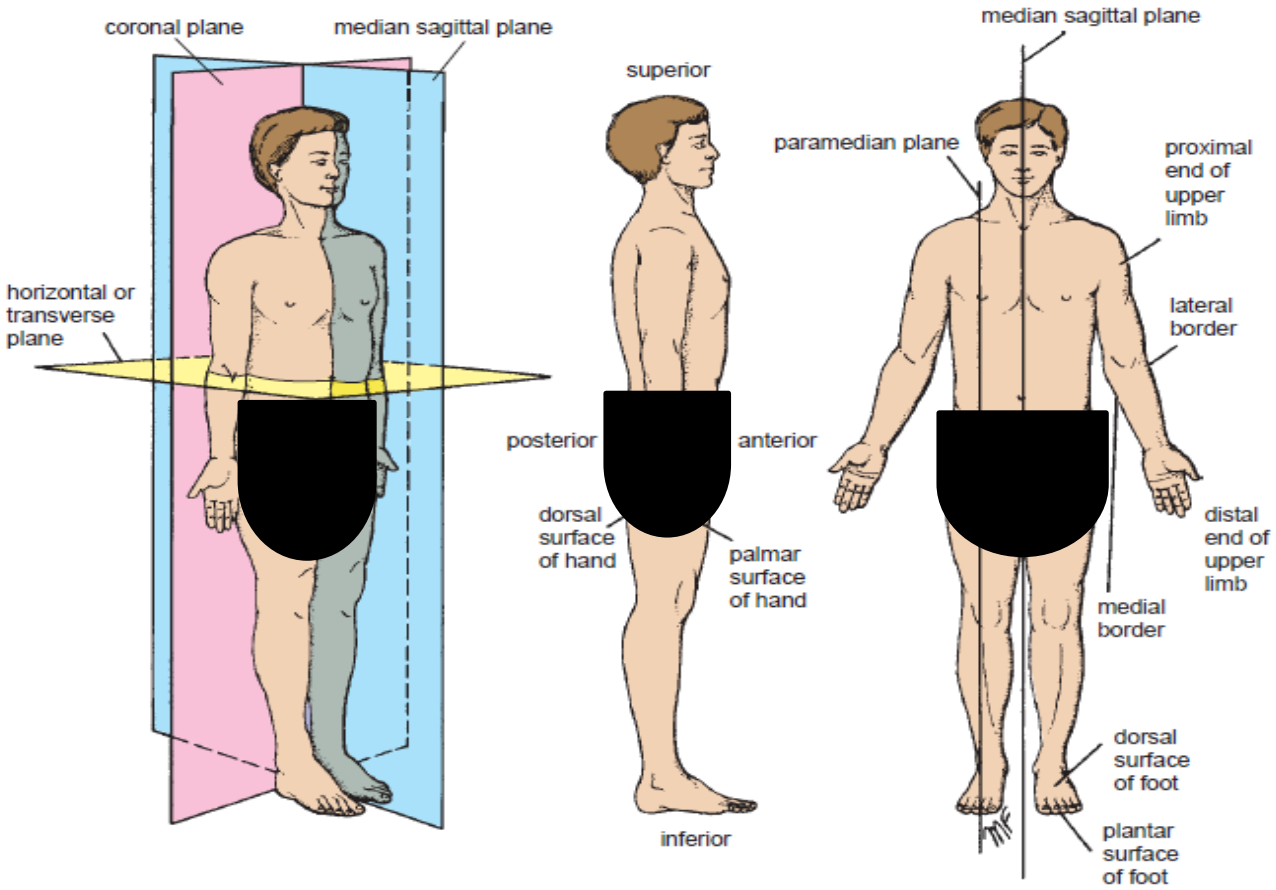

FIGURE 1.1 Anatomic terms used in relation to position. Note that the subjects are standing in the anatomic position.

Diaphragm

The diaphragm is a thin muscular and tendinous septum that separates the chest cavity above from the abdominal cavity below (Fig. 2.16). It is pierced by the structures that pass between the chest and the abdomen.

The diaphragm is the most important muscle of respiration. It is dome shaped and consists of a peripheral muscular part, which arises from the margins of the thoracic opening, and a centrally placed tendon (see Fig. 2.16). The origin of the diaphragm can be divided into three parts:

A **sternal part** arising from the posterior surface of the xiphoid process (see Fig. 2.2)

A **costal part** arising from the deep surfaces of the lower six ribs and their costal cartilages (see Fig. 2.16)

A **vertebral part** arising by vertical columns and from the arcuate ligaments.

The diaphragm is inserted into a **central tendon,** which is shaped like three leaves. (see Fig. 2.16).

Chest Cavity

The chest cavity is bounded by the chest wall and below by the diaphragm. It extends upward into the root of the neck about one fingerbreadth above the clavicle on each side (see Fig. 3.5). The diaphragm, which is a very thin muscle, is the only structure (apart from the pleura and the peritoneum) that separates the chest from the abdominal viscera. The chest cavity can be divided into a median partition, called the **mediastinum,** and the laterally placed pleurae and lungs (Figs. 3.1, 3.2, and 3.3).

Mediastinum

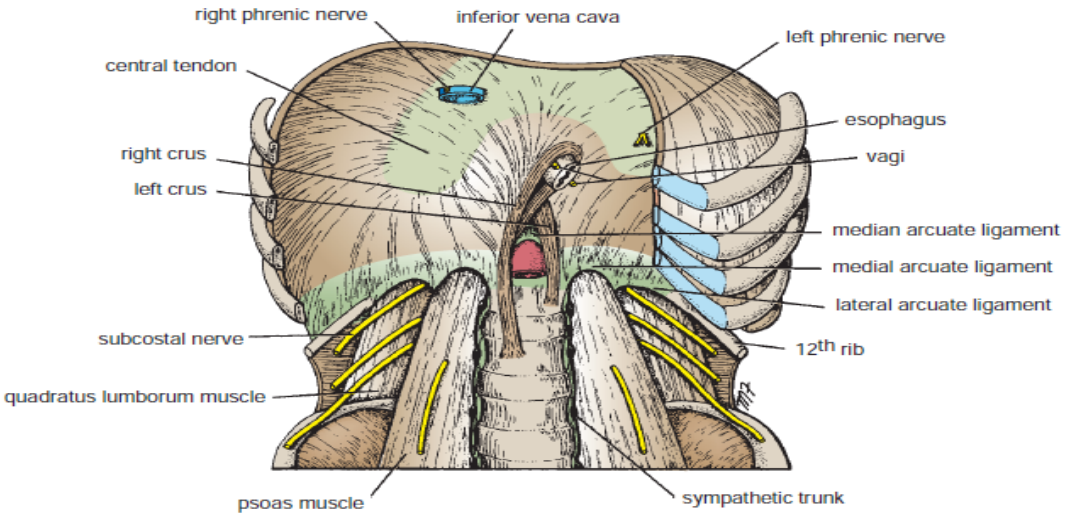

FIGURE 2.16 Diaphragm as seen from below. The anterior portion of the right side has been removed. Note the sternal, costal, and vertebral origins of the muscle and the important structures that pass through it.

The mediastinum, though thick, is a movable partition that extends superiorly to the thoracic outlet and the root of the neck and inferiorly to the diaphragm. It extends anteriorly to the sternum and posteriorly to the vertebral column. It contains the remains of the thymus, the heart and large blood vessels, the trachea and esophagus, the thoracic duct and lymph nodes, the vagus and phrenic nerves, and the sympathetic trunks.

The mediastinum is divided into **superior** and **inferior mediastina** by an imaginary plane passing from the sternal angle anteriorly to the lower border of the body of the 4th thoracic vertebra posteriorly (Fig. 3.2).

The inferior mediastinum is further subdivided into:

The **middle mediastinum,** which consists of the pericardium and heart.

The **anterior mediastinum,** which is a space between the pericardium and the sternum.

The **posterior mediastinum,** which lies between the pericardium and the vertebral column.

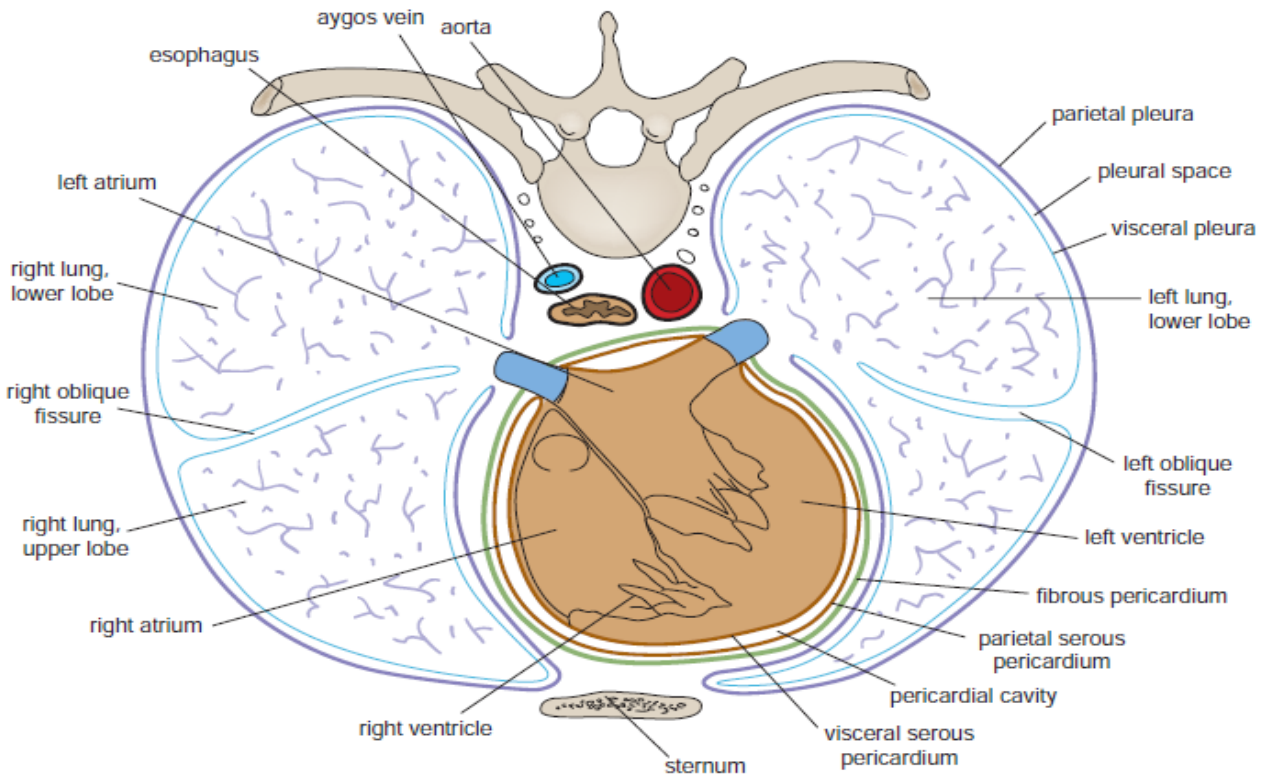

FIGURE 3.1 Cross section of the thorax at the level of the eighth thoracic vertebra. Note the arrangement of the pleura and pleural cavity (*space*) and the fibrous and the serous pericardia.

For purposes of orientation, it is convenient to remember that the major mediastinal structures are arranged in the following order from anterior to posterior.

Superior Mediastinum

(a) Thymus, (b) large veins, (c) large arteries, (d) trachea, (e) esophagus and thoracic duct, and (f) sympathetic trunks.

The superior mediastinum is bounded in front by the manubrium sterni and behind by the first four thoracic vertebrae (see Fig. 3.2).

Inferior Mediastinum

(a)Thymus, (b) heart within the pericardium with the phrenic nerves on each side, (c) esophagus and thoracic duct, (d) descending aorta, and (e) sympathetic trunks. The inferior mediastinum is bounded in front by the body of the sternum and behind by the lower eight thoracic vertebrae (see Fig. 3.2).

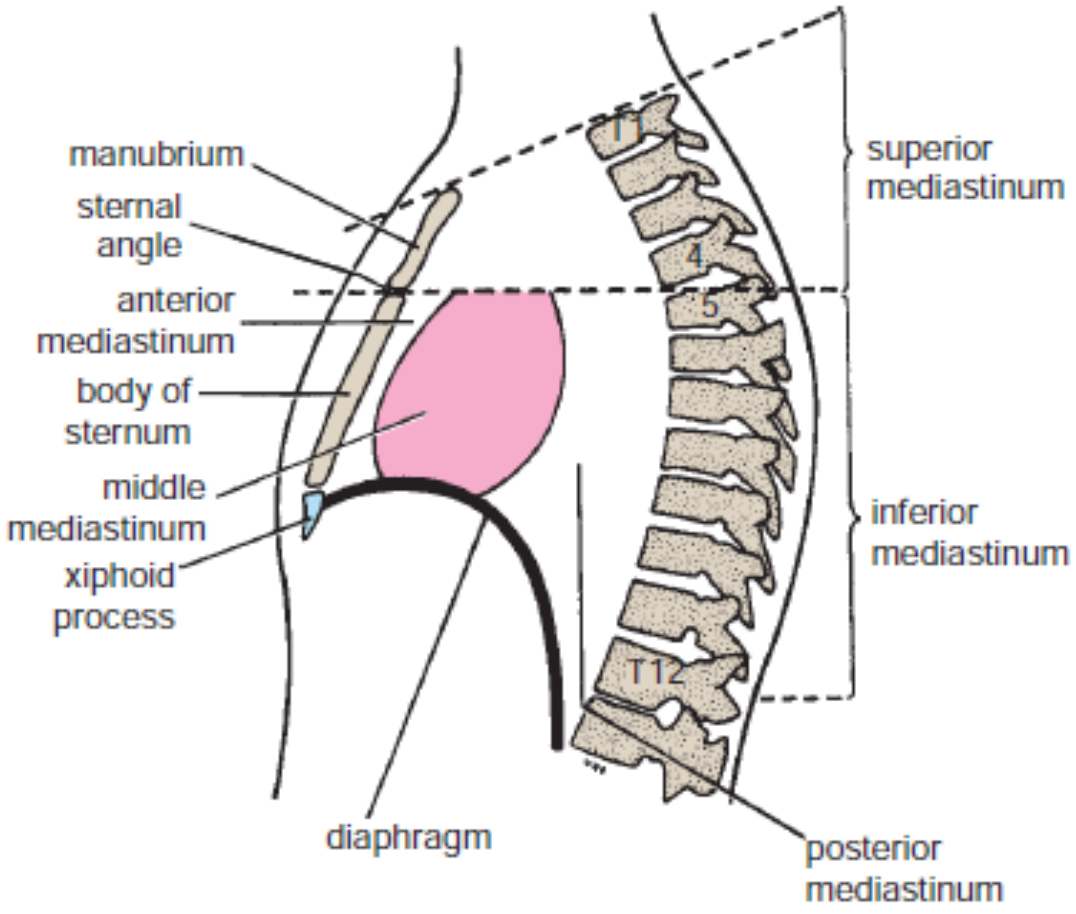

FIGURE 3.2 Subdivisions of the mediastinum.

Pleurae

The pleurae and lungs lie on either side of the mediastinum within the chest cavity (Fig. 3.3). Before discussing the pleurae, it might be helpful to look at the illustrations of the development of the lungs in Figure 3.4.

Each pleura has two parts:

a **parietal layer,** which lines the thoracic wall, covers the thoracic surface of the diaphragm and the lateral aspect of the mediastinum and extends into the root of the neck to line the undersurface of the supra pleural membrane at the thoracic outlet.

a **visceral layer,** which completely covers the outer surfaces of the lungs and extends into the depths of the interlobar fissures (Figs. 3.1, 3.3, 3.4, 3.5, and 3.6).

The parietal and visceral layers of pleura are separated from one another by a slit like space, the **pleural cavity** (Figs. 3.3 and 3.4).

The pleural cavity normally contains a small amount of tissue fluid, the **pleural fluid,** which covers the surfaces of the pleura as a thin film and permits the two layers to move on each other with the minimum of friction.

The parietal pleura divide according to the region in which it lies or the surface that it covers.

The **cervical pleura** extends up into the neck, lining the under surface of the supra pleural membrane (see Fig. 2.13).

The **costal pleura** lines the inner surfaces of the ribs, the costal cartilages, the intercostal spaces, the sides of the vertebral bodies, and the back of the sternum (Fig. 3.3).

The **diaphragmatic pleura** covers the thoracic surface of the diaphragm (Figs. 3.3 and 3.5).

The **mediastinal pleura** covers and forms the lateral boundary of the mediastinum (see Figs. 3.3 and 3.5). At the hilum of the lung, it is reflected as a cuff around the vessels and bronchi and here becomes continuous with the visceral pleura. It is thus seen that each lung lies free except at its hilum, where it is attached to the blood vessels and bronchi that constitute the **lung root.**

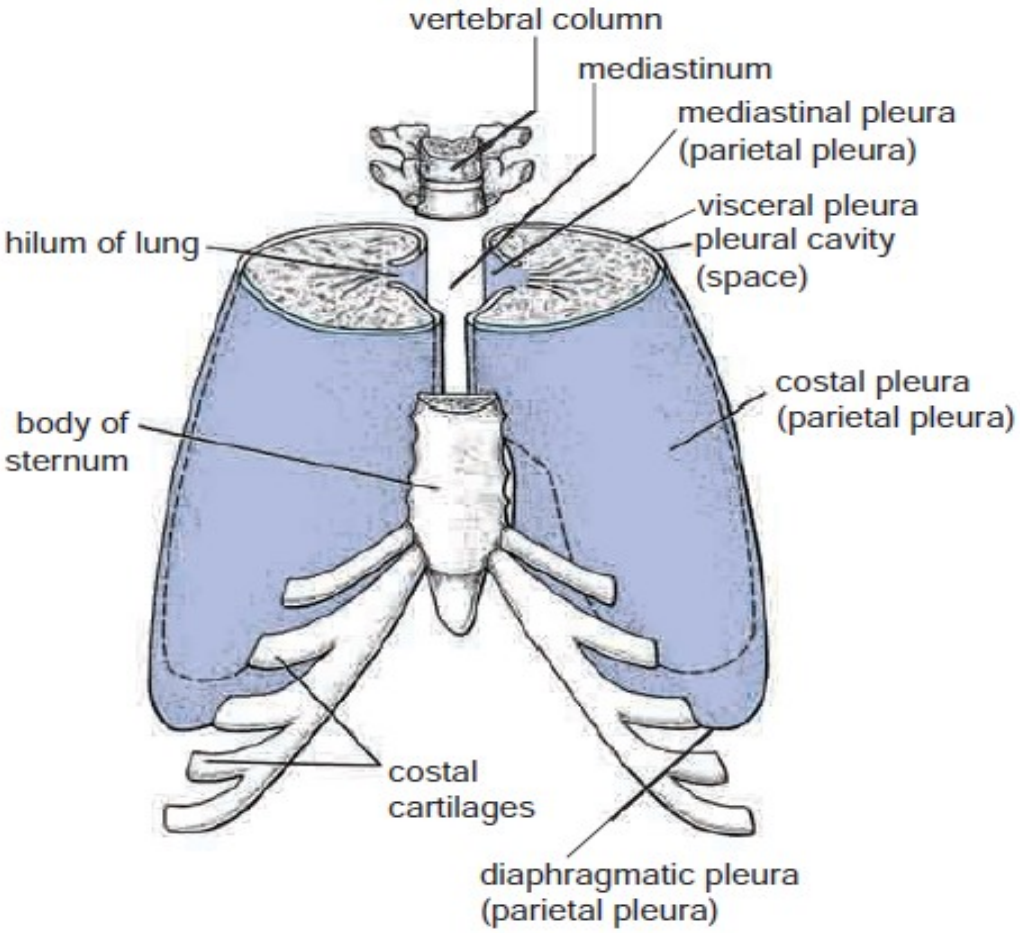

FIGURE 3.3 Pleurae from above and in front. Note the position of the mediastinum and the hilum of each lung.

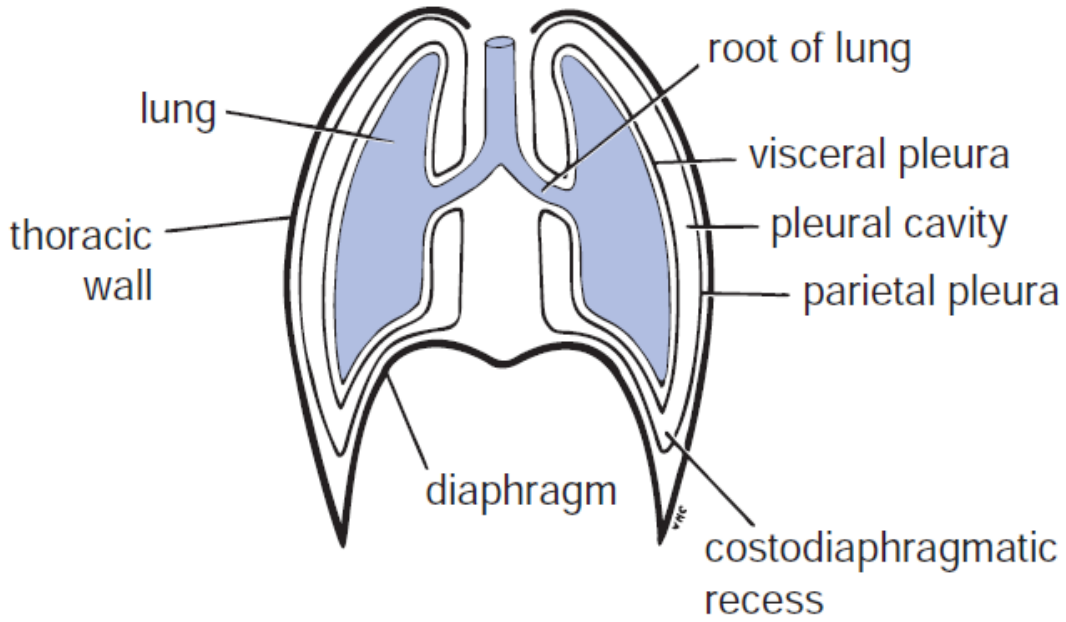

FIGURE 3.4 Formation of the lungs. Note that each lung l

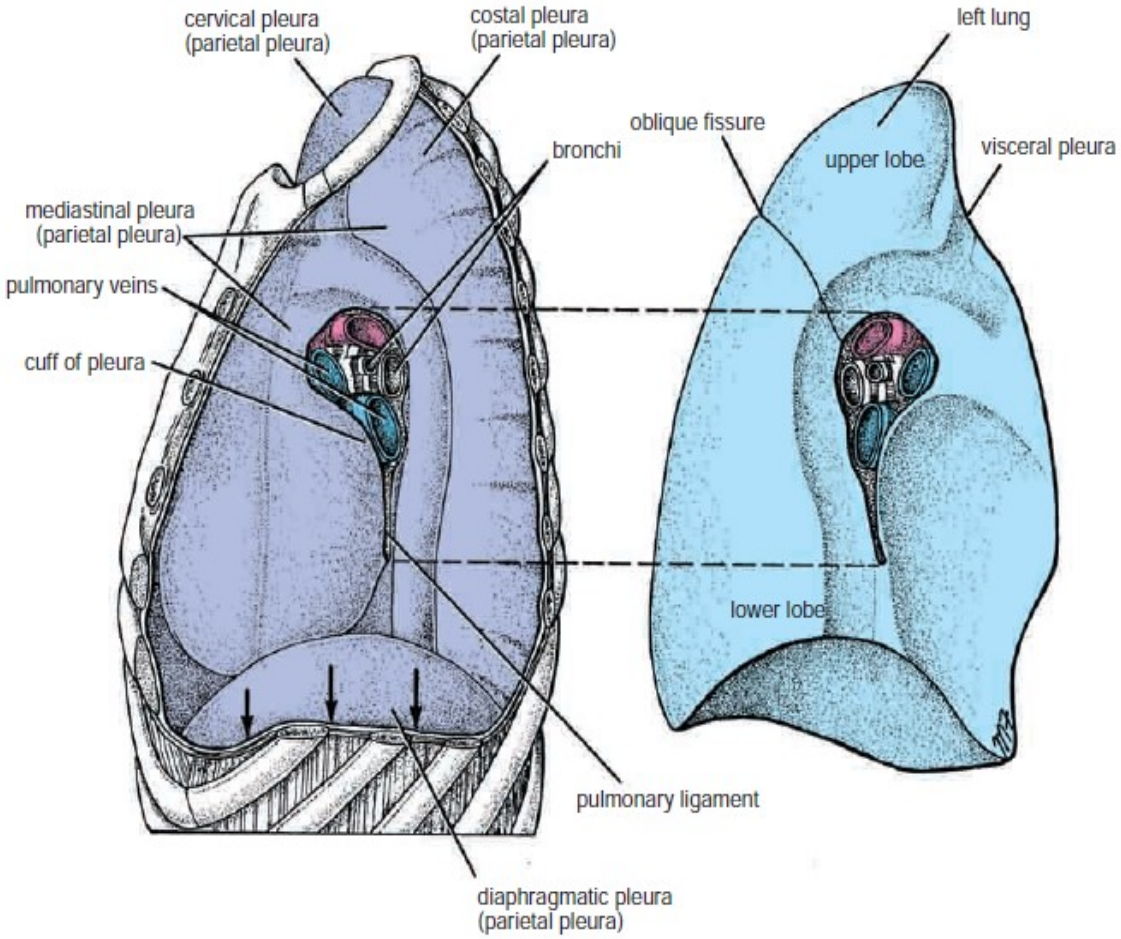

FIGURE 3.5 Different areas of the parietal pleura. Note the cuff of pleura (*dotted lines*) that surrounds structures entering and leaving the hilum of the left lung. It is here that the parietal and the visceral layers of pleura become continuous. *Arrows* indicate the position of the costodiaphragmatic recess.