Anatomy of the Respiratory System

The major role of the respiratory system is to supply the body with oxygen and dispose of carbon dioxide.

Respiration consists of four distinct processes:

Pulmonary ventilation – The tidelike movement of air into and out of the lungs so that the gases in the alveoli are continuously changed and refreshed. Also called breathing.

External respiration – The gas exchange between the blood and the air-filled chambers of the lungs.

Transport of respiratory gases – The transport of respiratory gases between the lungs and tissue cells of the body accomplished by the cardiovascular system, using blood as the transport vehicle.

Internal respiration – Exchange of gases between systemic blood and tissue cells.

The respiratory and circulatory systems are linked, if either one of the systems fail, cells die. This can lead to death of the organism if left uncorrected.

Upper Respiratory System Structures

The upper respiratory system structures include the nose, pharynx, and larynx.

Air passes into the respiratory tract through the external nares (nostrils) and enters the nasal cavity. It then flows over three pairs of lobelike structures, the inferior, superior, and middle nasal chonchae. The passing air is warmed, moistened, and filtered by the nasal mucosa. The nasal cavity is surrounded by the paranasal sinuses. The nasal passages are separated from the oral cavity below by a partition composed anteriorly of the hard palate and posteriorly by the soft palate.

- A cleft palate is a genetic defect that causes difficulty in breathing and oral cavity functions such as sucking, mastication, and speech.

Air may also enter the body through the mouth. It passes through the oral cavity to move into the pharynx where the oral and nasal cavities are joined.

The funnel-shaped pharynx (commonly called the throat) connects the nasal and oral cavities to the larynx and esophagus inferiorly. It consists of three parts:

1. The **nasopharynx** lies above the soft palate. It serves as an air passage.

- Nasal infections may invade the middle ear cavity and cause otitis media, which can be difficult to treat.

2. The **oropharynx** extends from the soft palate and serves as a common conduit for food and air. The palatine tonsils are in its lateral walls. The lingual tonsil covers the base of the tongue.

3. The **laryngopharynx** also accommodates ingested food and air. From here, air enters the lower respiratory passageways by passing through the larynx and into the trachea.

The larynx consists of nine cartilages including the large shield-shaped thyroid cartilage and the ring-shaped cricoid cartilage. All of the laryngeal cartilages are composed of hyaline cartilage except the flap-like epiglottis. This structure closes off the respiratory passageways to incoming food or drink. If anything other than air enters the larynx, a cough reflex attempts to expel the foreign substance. However, this response only occurs when a person is conscious.

The mucous membrane of the larynx is in two pairs of folds, the upper vestibular folds and the vocal folds, or the true vocal cords.

Lower Respiratory System Structures

The trachea, or windpipe, divides into the right and left main (primary) bronchi which enter their respective lungs at indented areas called the hilus.

The primary bronchi divide further into smaller and smaller branches (the secondary, tertiary, etc.), finally becoming the bronchioles. Their terminal branches are called respiratory bronchioles.

The paired lungs are soft organs that occupy the thoracic cavity.

The medial surface of the left lung exhibits a concavity called the cardiac notch which accommodates the heart. Fissures divide the lungs into lobes – two in the left lung and three in the right lung.

Each lung is enclosed in a sac called the pleura. The parietal pleura is the outer layer and is attached to the thoracic walls and the diaphragm. The visceral pleura, or the inner layer, covers the lung tissue. These two layers are separated by the pleural cavity, which is more potential than actual space.

- Know the slides of lung tissue.

- Know Figures 36.1, 36.2, 36.3, 36.5, and 36.7.