

Respiratory system

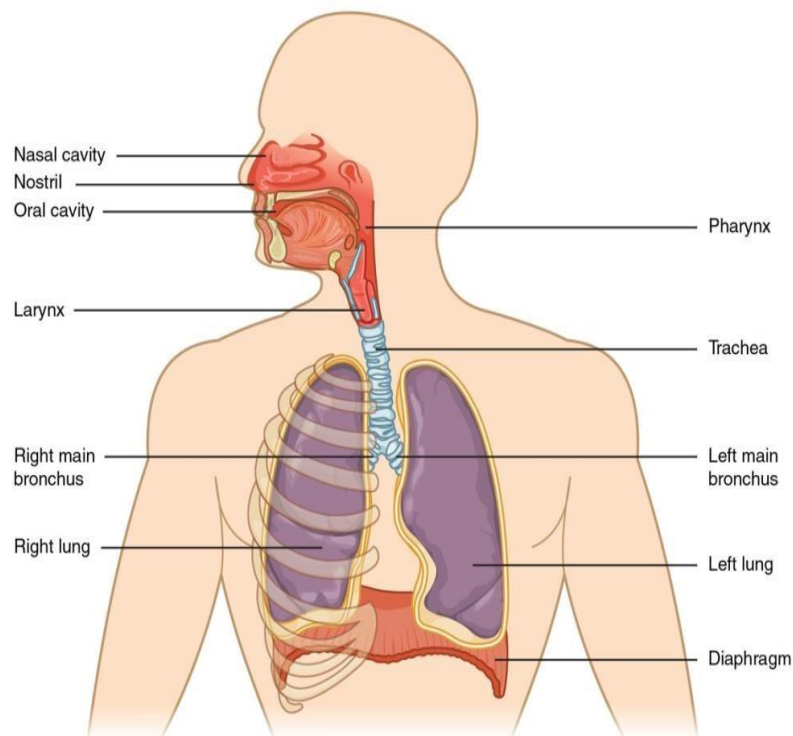
Lec 3

Respiratory System Consists of:

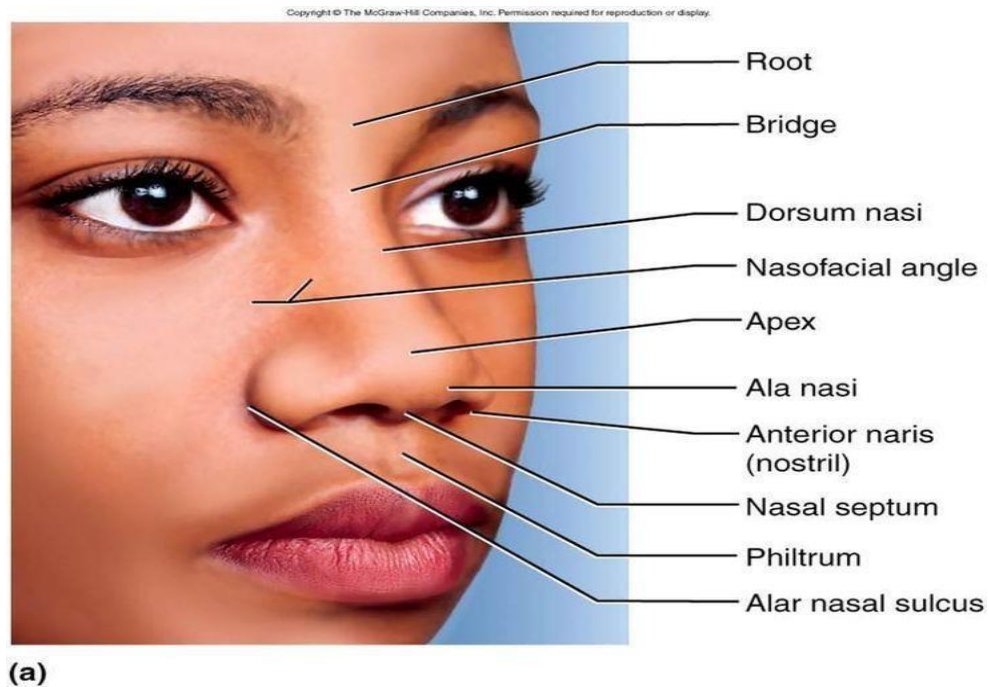
- 1- **Conducting portion transports air:** includes the nose, nasal cavity, pharynx, larynx, trachea, and progressively smaller airways, from the primary bronchi to the terminal bronchioles.
- 2- **Respiratory portion carries out gas exchange:** composed of small airways called respiratory bronchioles and alveolar ducts as well as air sacs called alveoli.

Respiratory System Functions:

1. supplies the body with oxygen and disposes of carbon dioxide
2. filters inspired air
3. produces sound
4. contains receptors for smell
5. rids the body of some excess water and heat
6. helps regulate blood pH



Structure of Nose

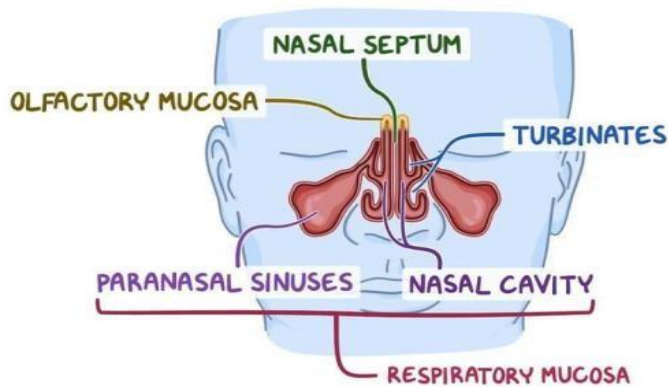


Function of the Nose:

1. Providing an airway for respiration.
2. Moistening (humidifying) and warming the entering air.
3. Filtering inspired air and cleaning it of foreign matter.
4. Serving as a resonating chamber for speech.
5. Housing the olfactory receptors.

Nasal Cavity:

- Lies in and posterior to the external nose
- Is divided by a midline nasal septum
- Opens posteriorly into the nasal pharynx via internal nares
- The ethmoid and sphenoid bones form the roof
- The floor is formed by the hard and soft palates
- Lateral Wall
- The lateral wall has three projections of bone called the superior, middle, and inferior nasal conchae, the space below each concha is called a **meatus**.



The Paranasal Sinuses

The paranasal sinuses are cavities found in the interior of the maxilla, frontal, sphenoid, and ethmoid bones.

Functions

- Decrease skull bone weight
- Warm, moisten and filter incoming air
- Add resonance to voice.
- Communicate with the nasal cavity by ducts.

Pharynx

Funnel-shaped tube of skeletal muscle that connects to the:

- Nasal cavity and mouth superiorly
- Larynx and esophagus inferiorly
- Extends from the base of the skull to the level of the sixth cervical vertebra.

It is divided into three regions

- Nasopharynx
- Oropharynx
- Laryngopharynx

The Larynx

The larynx is an organ that provides a protective sphincter at the inlet of the air passages and is responsible for voice production.

The functions of the larynx are:

It keeps the air passages open during breathing and digestion and is the key organ for producing sound.

Epiglottis: This leaf-shaped lamina of elastic cartilage lies back the root of the tongue.

Trachea

The trachea is a mobile cartilaginous and membranous tube. It begins in the neck as a continuation of the larynx at the lower border of the cricoid cartilage at the level of the sixth cervical vertebra.

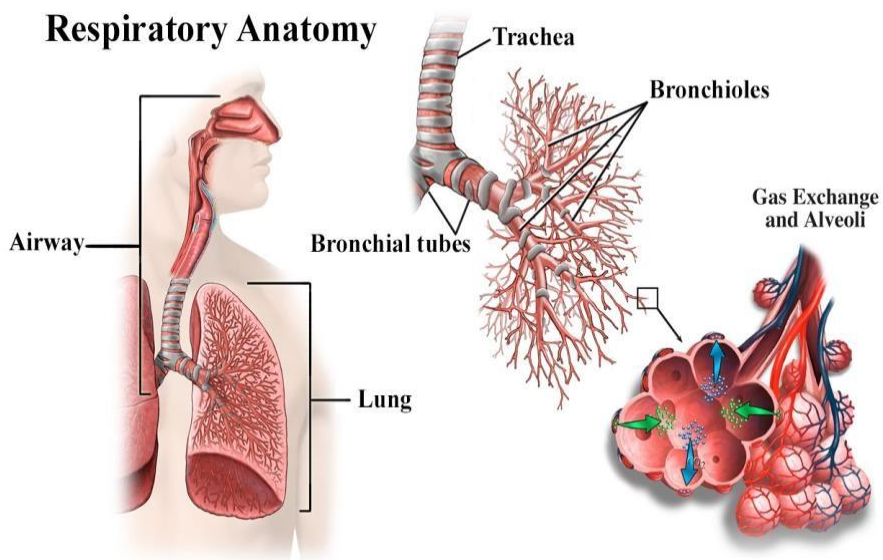
The Bronchi

The trachea divided back the arch of the aorta into the right and left principal (primary, or main) bronchi. The bronchi divide dichotomously, giving rise to several million terminal bronchioles that terminate in one or more respiratory bronchioles. Each respiratory bronchiole divides into 2 to 11 alveolar ducts that enter the alveolar sacs. The alveoli arise from the walls of the sacs as diverticula.

ALVEOLI - The lungs' microscopic air sacs, alveoli, are elastic, thin-walled structures arranged in clumps at the ends of respiratory bronchioles.

Functions of Alveoli

Around the alveoli are networks of capillaries. Oxygen passes from the air in the alveoli into the blood by diffusion through the alveolar and capillary walls. Carbon dioxide diffuses from blood into the alveoli.



Lungs

During life, the right and left lungs are **soft** and **spongy** and **very elastic**. Inside the lungs, oxygen is exchanged for carbon dioxide waste through the process called **external respiration**.

The right lung has three lobes – an upper, middle and lower one. The right lung usually weighs between 155g – 720g in males and 100g to 590g in females. The left lung has two lobes – an upper lobe and a lower lobe. It does not have a middle lobe like the right lung. It weighs between 110g – 675g in men and 100g – 590g in women.

Microanatomy

The lungs are a part of the lower respiratory tract, and they house the bronchial tubes that branch from the trachea. The main bronchus tube divides multiple times after entering the lungs and forms bronchioles that eventually form the minute air sacs called alveoli. The alveoli is the location of gaseous exchange between the respiratory system and blood capillaries. From the hilum, the lymphatic vessels, nerves, bronchus, and pulmonary arteries and veins enter the lungs.