

**University of Cihan-Sulaimaniya**  
**College of Science**  
**Department of ANS**  
**Second year student**



# **Human Anatomy**

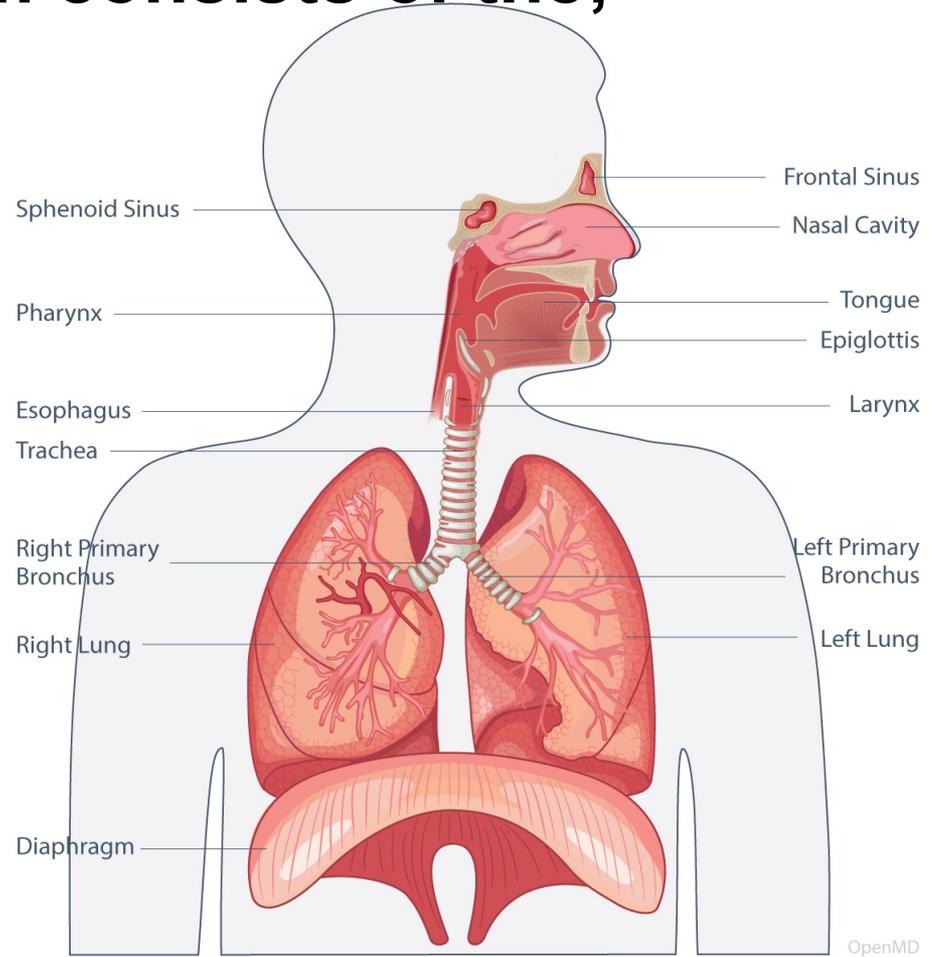
## **Week Five**

### **Respiratory System**

13 - 10 - 2024

# The respiratory system consists of the;

- 1- Nose
- 2- Pharynx
- 3- Larynx
- 4- Trachea
- 5- Bronchi
- 6- Lungs



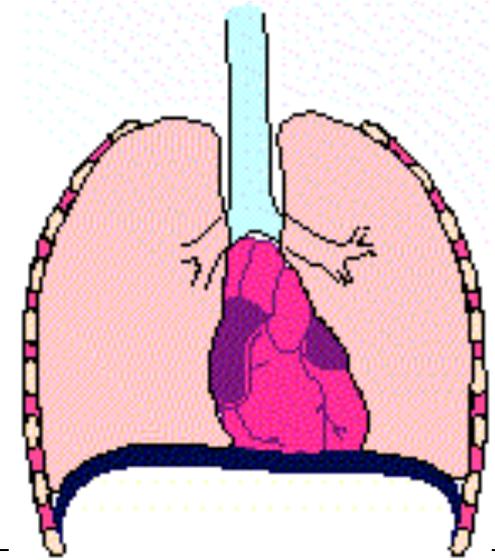
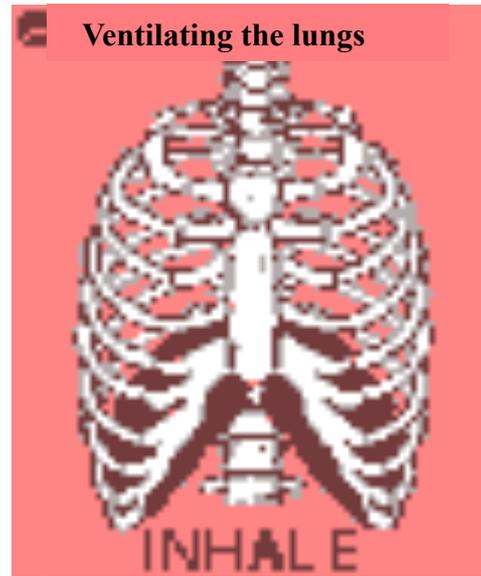
## The primary function of this system is to:

1. Furnish oxygen for individual tissue cells
2. To take away the waste products and carbon dioxide produced by those same cells.

# External and internal respiration...

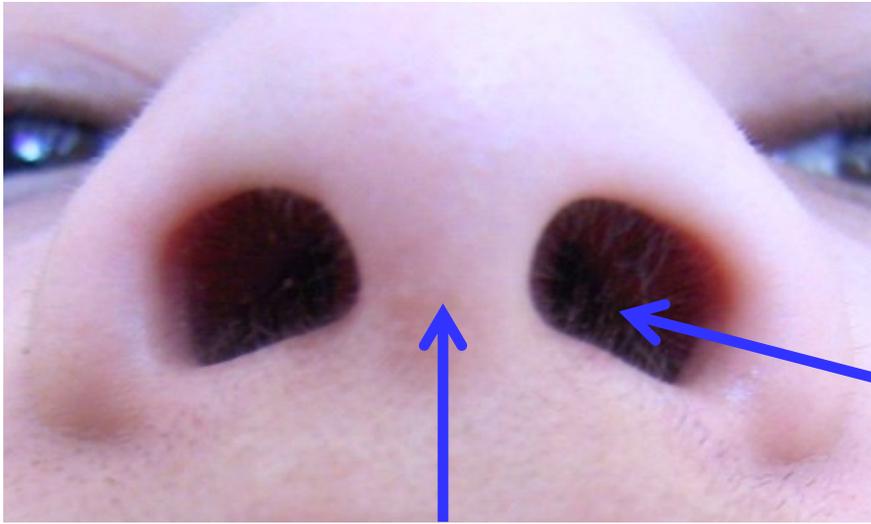
## External respiration

Is the process of inhaling oxygen into the lungs, and exhaling carbon dioxide. That process includes the ventilation of the lungs and the exchange of air in the lungs and blood within the capillaries of the alveoli of the lungs.



## Internal respiration

Is the metabolic process by which living cells use blood flowing through the capillaries, absorbing the oxygen ( $O_2$ ) they need and releasing the carbon dioxide ( $CO_2$ ) they create.



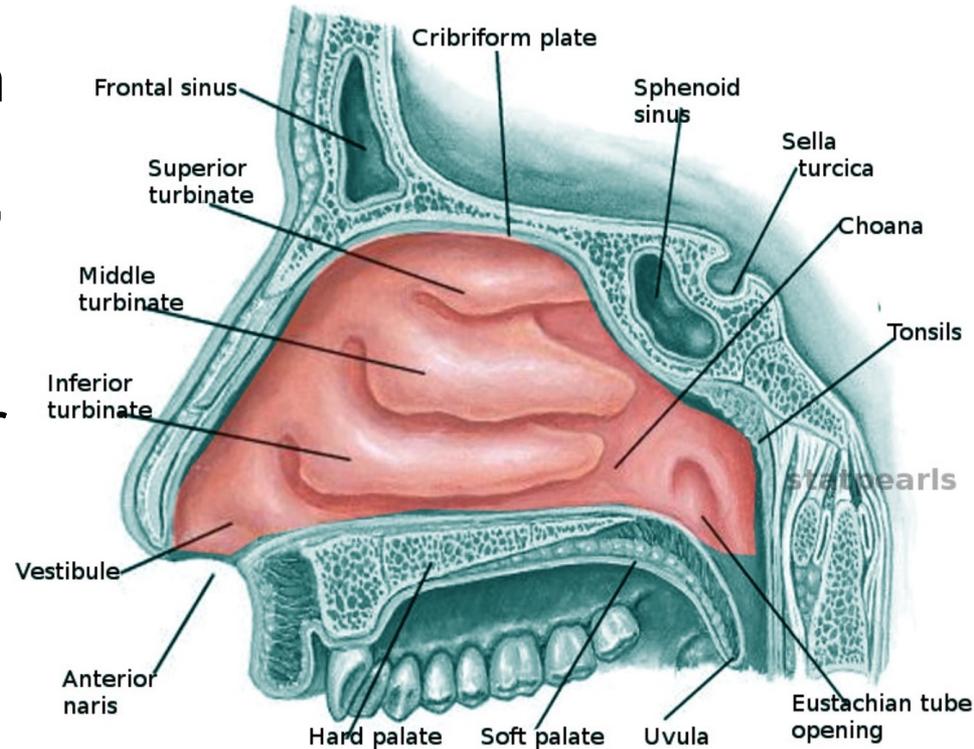
# The nose...

The external opening of the nose is the nostrils or anterior nares.

The dividing partition between the nostrils is the **nasal septum**, which forms two nasal cavities.

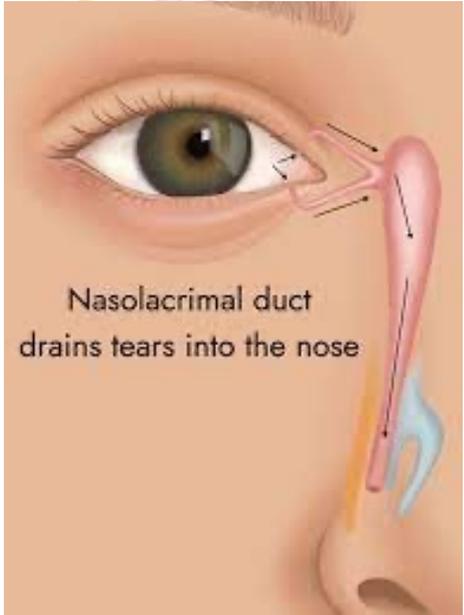
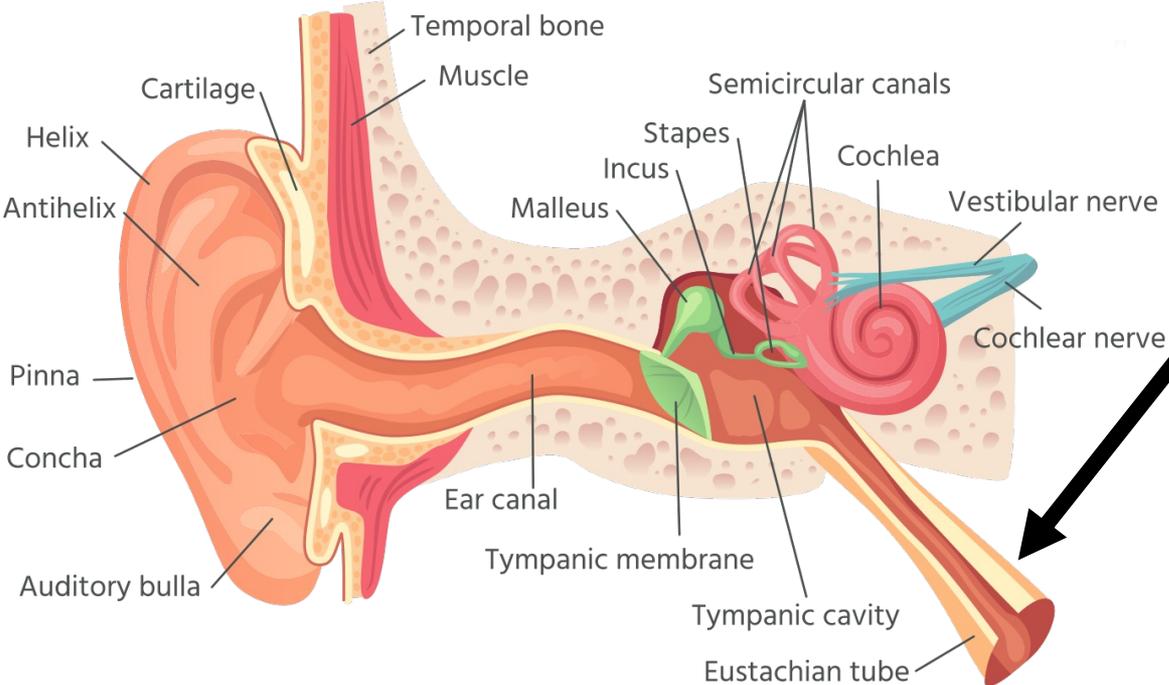
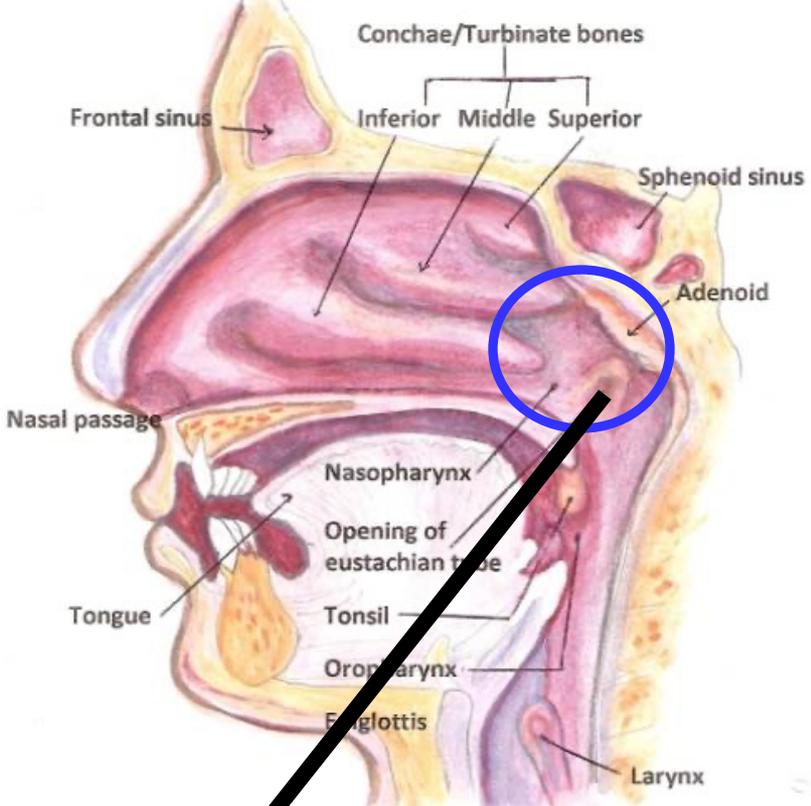
Each cavity is divided into 3 air passages:

- 1- Superior conchae
- 2- Middle conchae, and
- 3- Inferior conchae

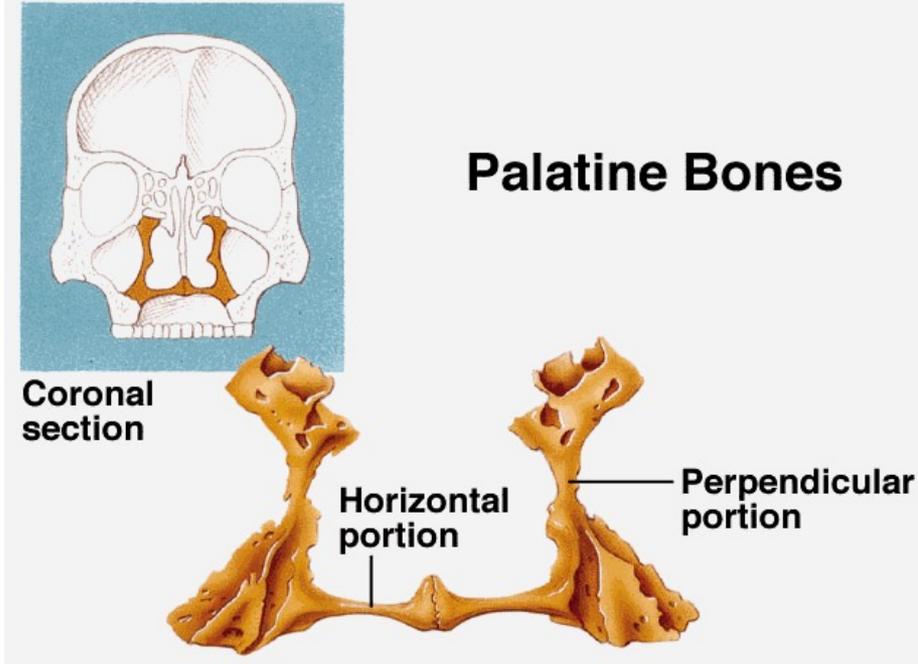


Nasal concha. Image courtesy O.Chaigasame

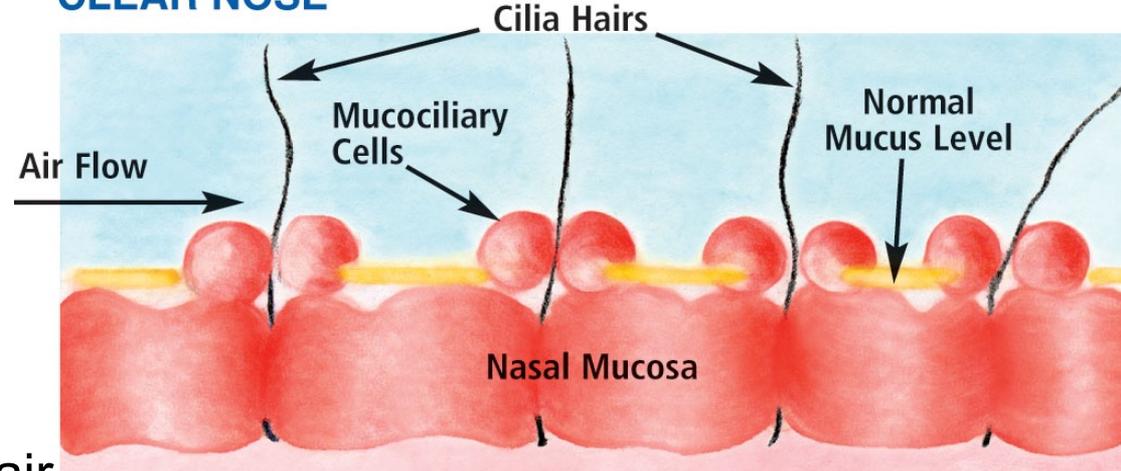
The conchae passages lead to the passageway called the **pharynx**. Here, the ear is connected to the **sinuses**, the ears through the eustachian tubes, and even the eyes through the nasolacrimal ducts.



The **palatine** (palate) bones and maxilla (upper jaw bone) separate the nasal cavities from the mouth cavity. Cilia (hairs) line the mucous membrane.



### CLEAR NOSE

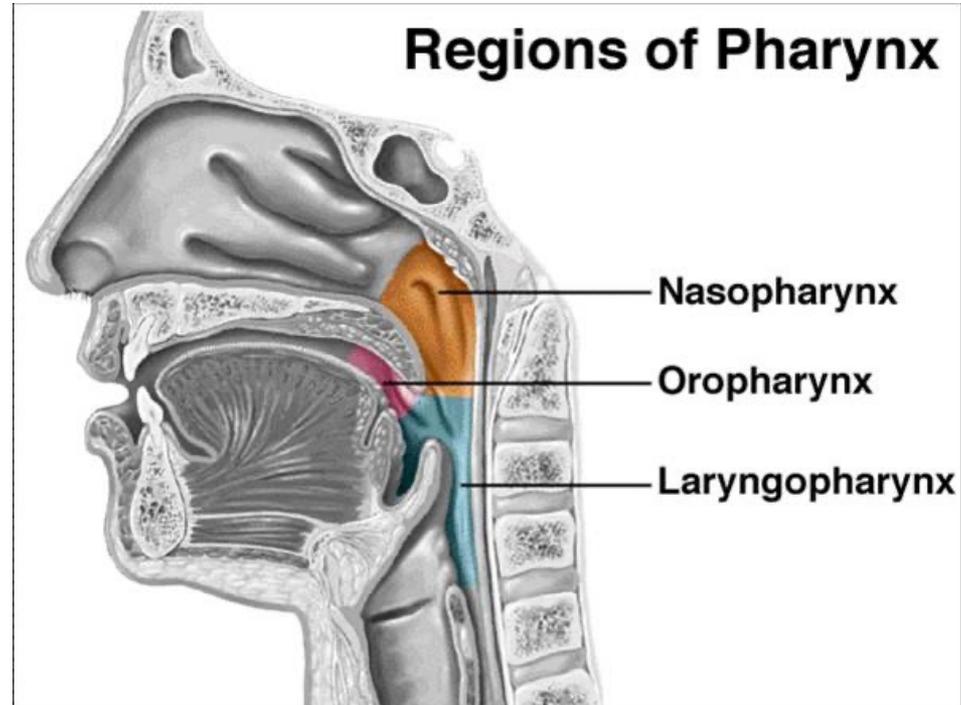


### The nose has 5 functions:

- 1.It serves as an air passageway.
- 2.It warms and moistens inhaled air.
- 3.Its cilia and mucous membrane trap dust, pollen, bacteria, and foreign matter.
- 4.It contains olfactory receptors, which smell odors.
- 5.It aids in phonation and the quality of voice.

# The pharynx

Or throat. It is a muscular and membranous tube that is about 5 inches long, extending downward from the base of the skull. It eventually becomes the esophagus.



- 1- The nasopharynx is behind the nose
- 2- The oropharynx is behind the mouth
- 3- The laryngopharynx is behind the larynx

There are **7** openings into the pharynx.

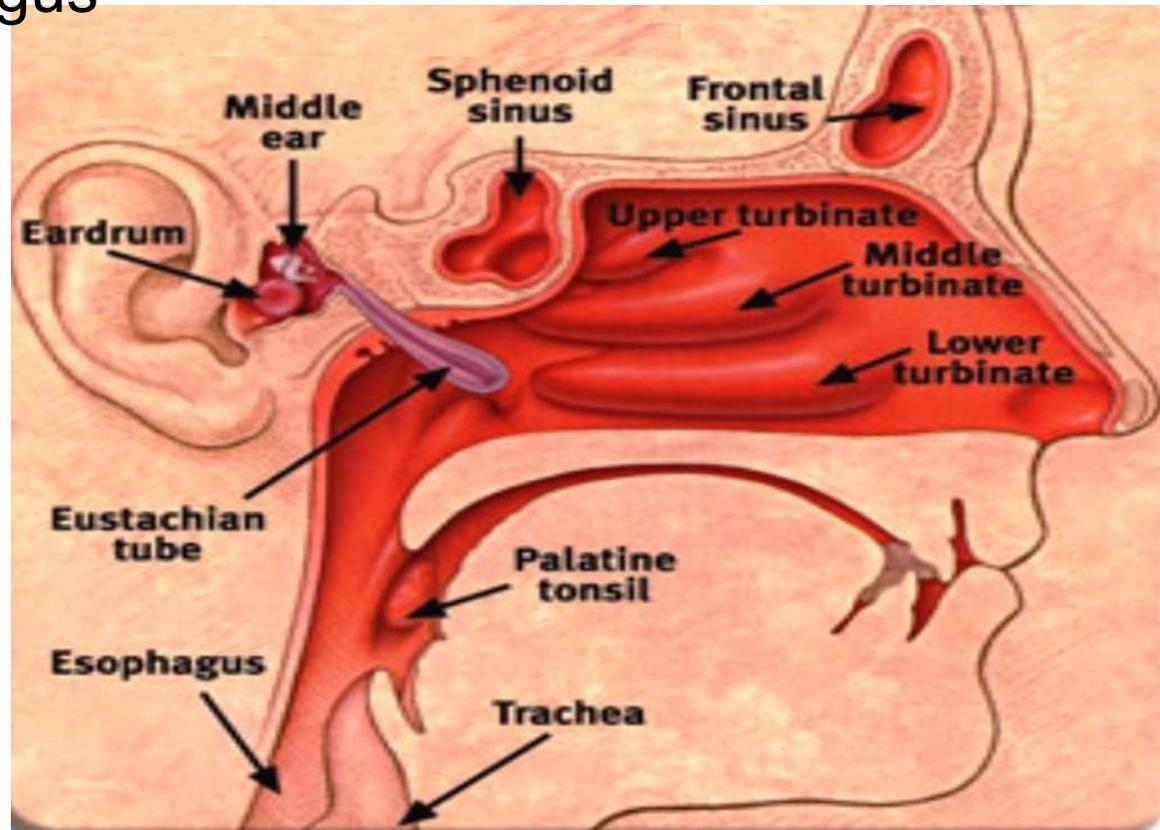
**Two** openings from the eustachian tubes of the ear,

**Two** openings from the posterior nares of the nose.

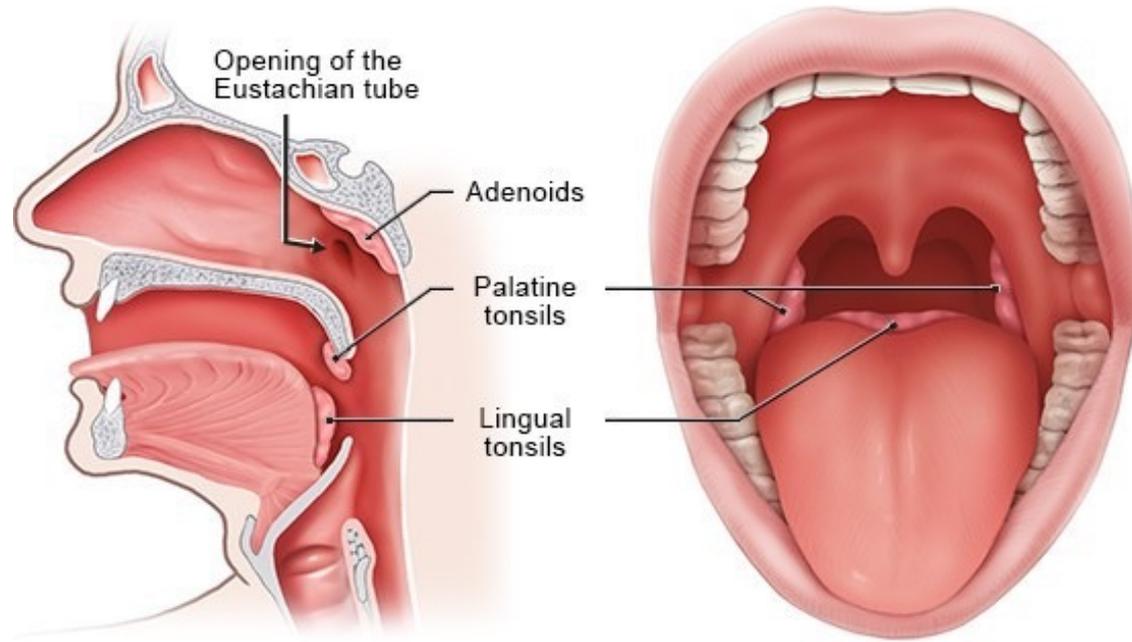
**One** opening from the mouth

**One** opening from esophagus

**One** opening from larynx



- 1. The pharyngeal tonsils**
- 2. The palatine tonsils**
- 3. The lingual tonsils**

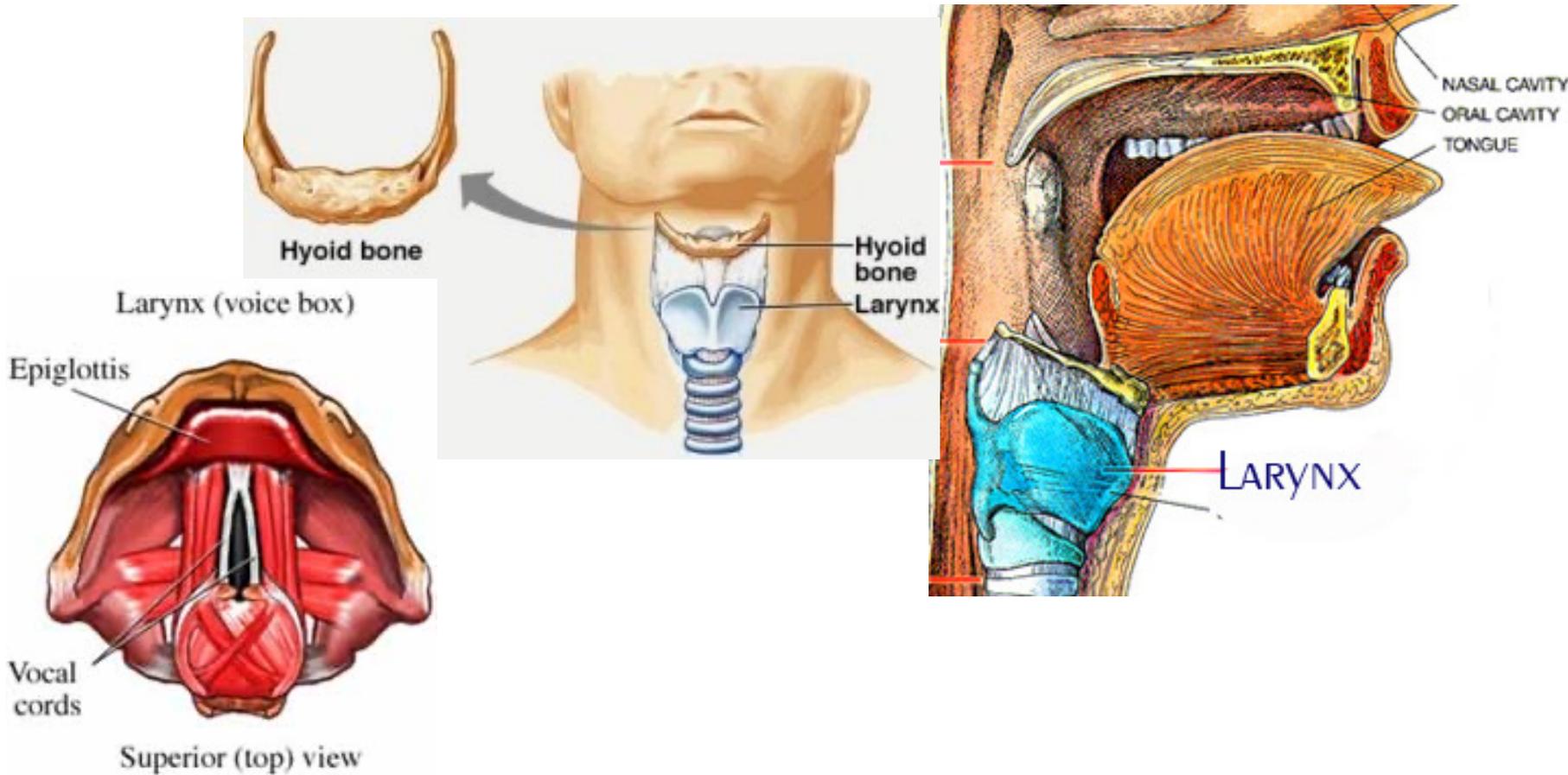


## **The pharynx has 3 functions:**

- 1. Serves as a passageway for air**
- 2. Serves as a passageway for food**
- 3. Aids in phonation by changing its shape.**

# The larynx...

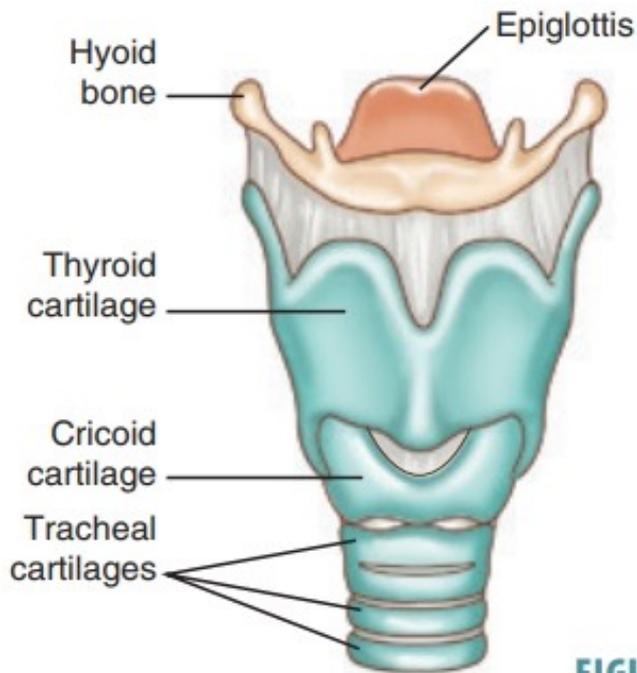
The larynx, commonly called the **voice box**, is located at the upper end of the trachea, below the root of the tongue and hyoid bone. It is lined with mucous membrane.



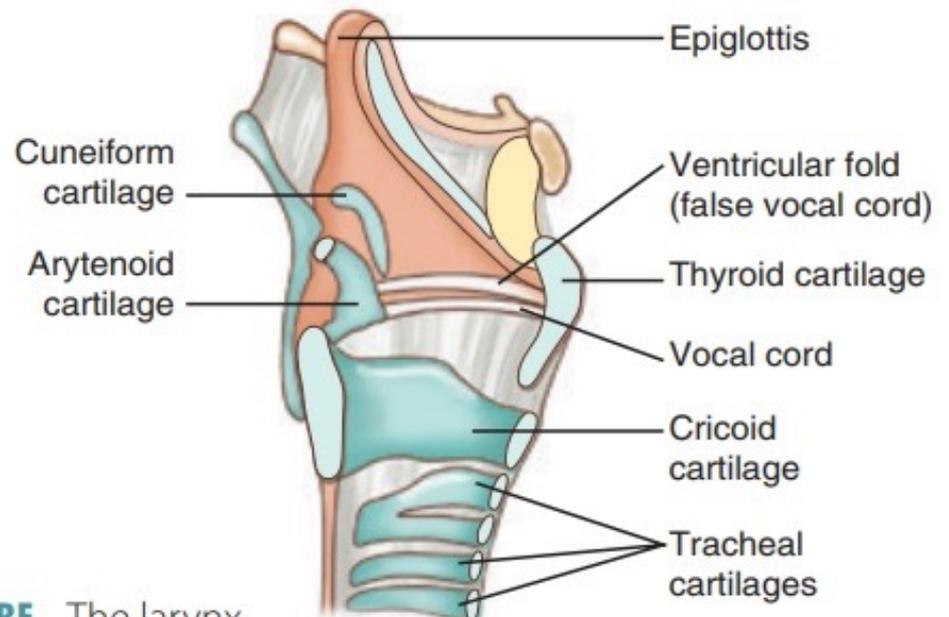
The larynx contains vocal cords, which produce sound.

# Cartilages of the larynx

1. The **thyroid cartilage** or Adam's apple is usually larger in the male, allowing longer vocal cords and contributing to a deeper male voice
2. The **epiglottis** covers the entrance of the larynx while swallowing
3. The **cricoid cartilage**
- 4- Arytenoid cartilage
- 5- Corniculate cartilage
- 6- Cuneiform cartilage



**Larynx**  
(anterior view)

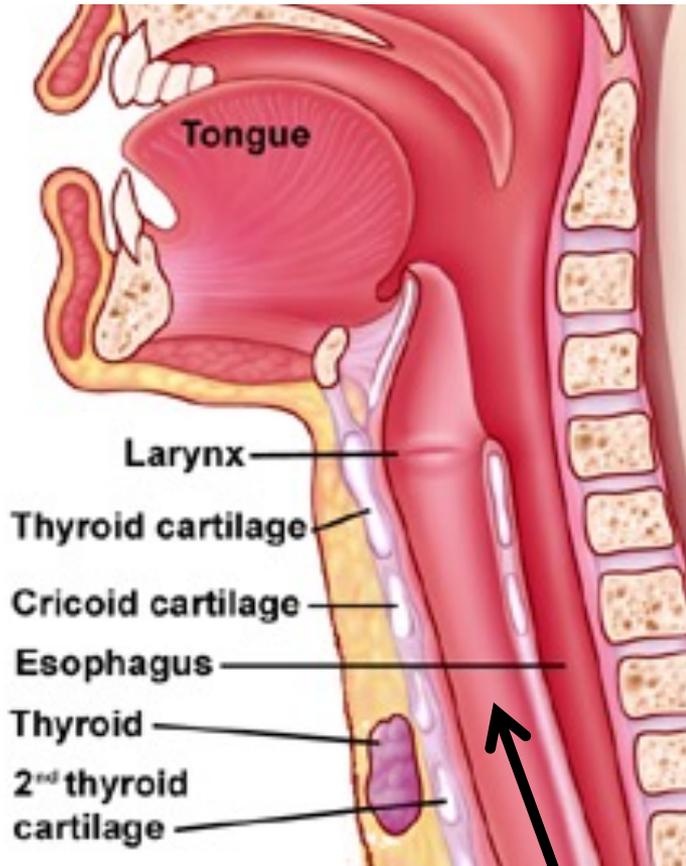


**FIGURE** The larynx.

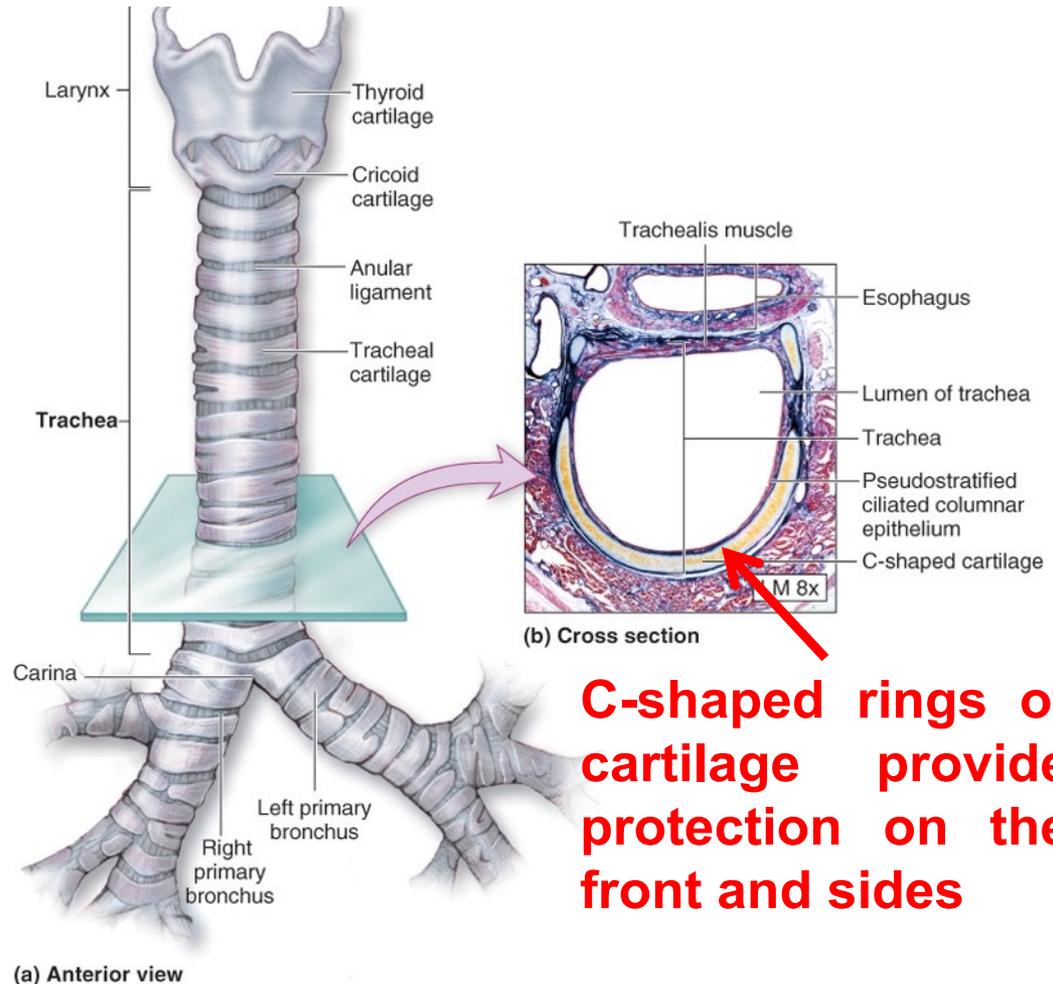
**Larynx**  
(sagittal view)

# The trachea

The trachea or windpipe is a smooth, muscular tube leading from the larynx to the main bronchi.



**Trachea**



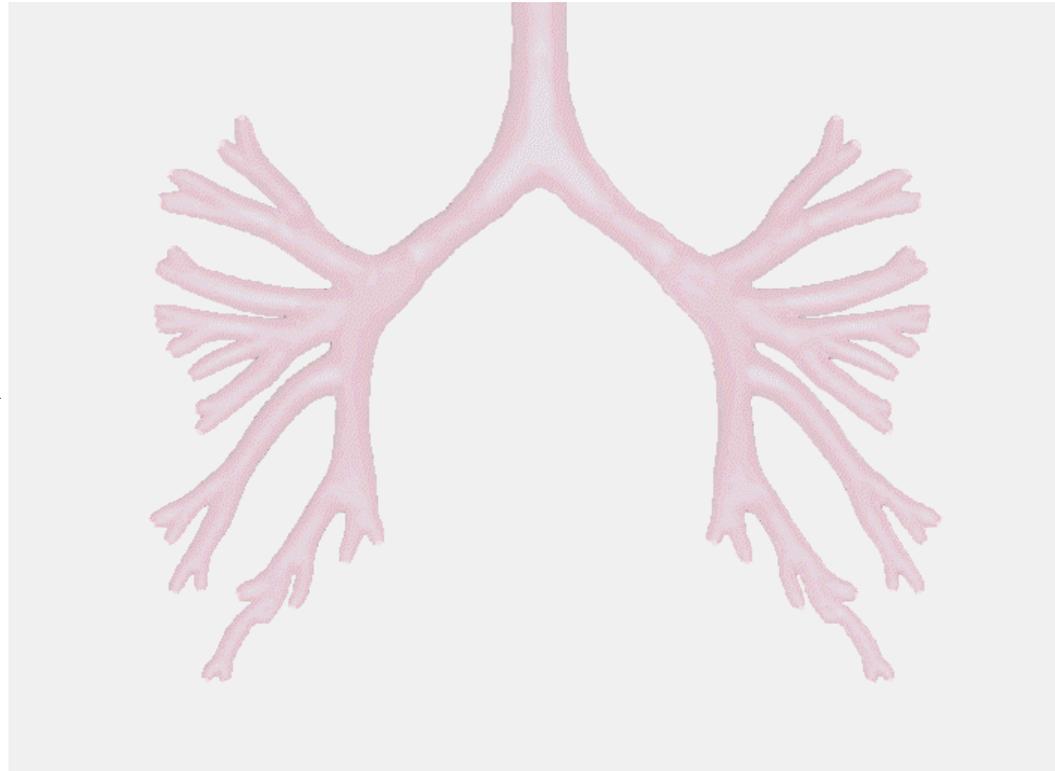
**C-shaped rings of cartilage provide protection on the front and sides**

Cartilage rings prevent crushing of the trachea

# The bronchi

The bronchi are the two main branches at the bottom of the trachea, providing passageway for air to the lungs. The trachea divides into the right bronchus and the left bronchus, and then divides further into the bronchial tree.

As the branches of the bronchial tree get smaller, the 2 primary bronchi become bronchioles, and then very small alveolar ducts.

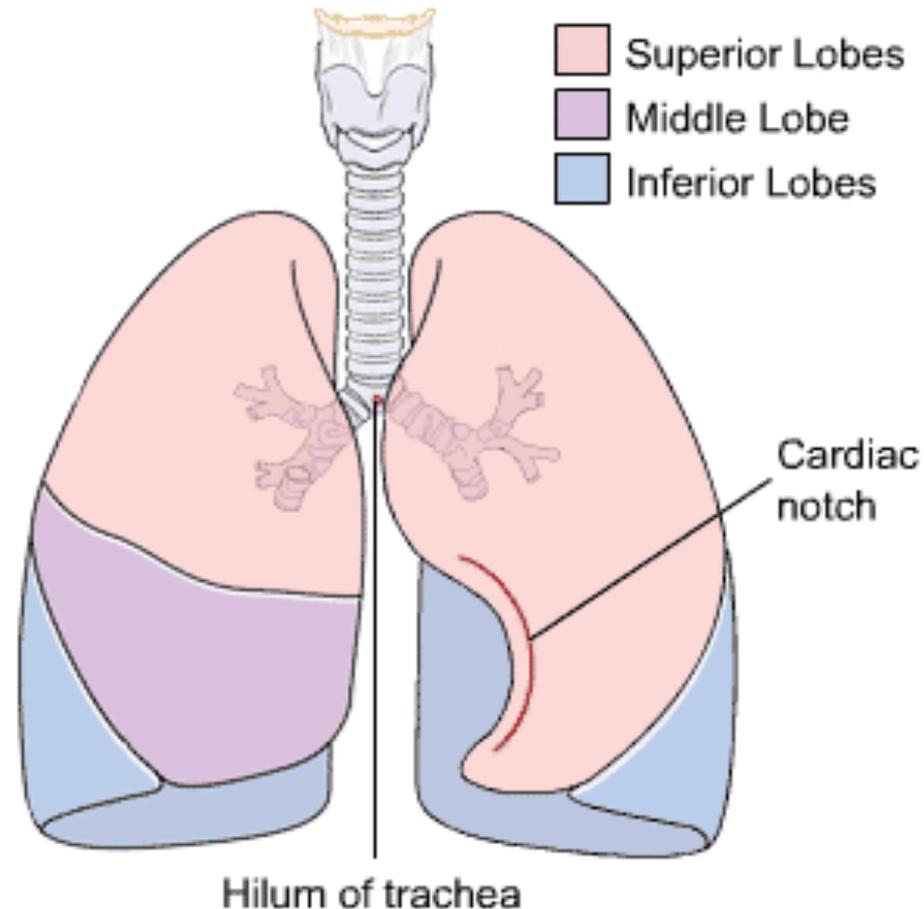


# The lungs

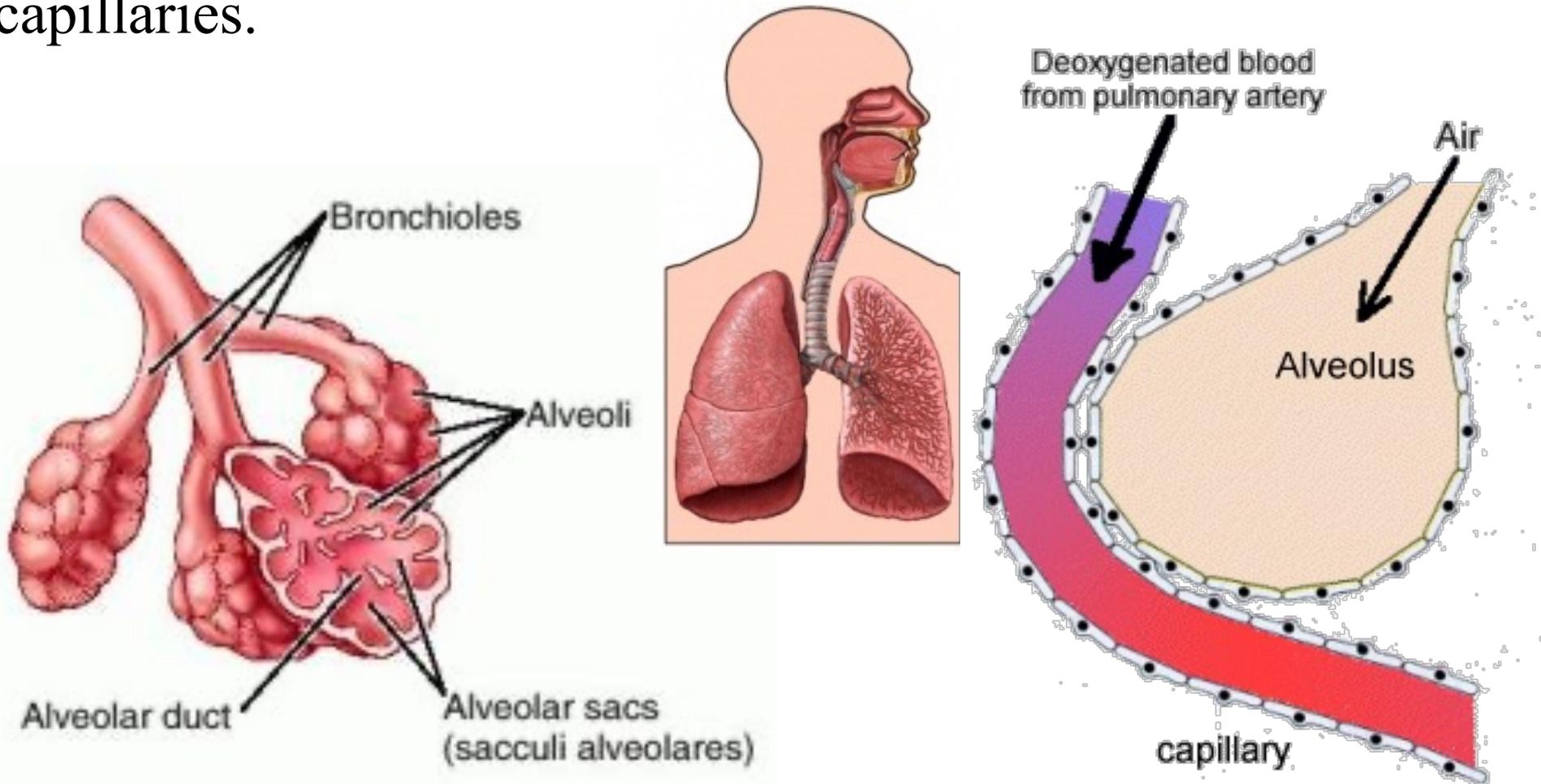
The lungs are two spongy organs located in the thorax. They consist of elastic tissue, filled with an interlacing network of tubes and sacs that carry air and blood vessels that carry blood.

Each lung is divided into lobes;  
The right lung has **3 lobes**  
The left lung has **2 lobes**.

The left lung has an indentation called the cardiac depression or cardiac notch



At the end of each bronchiole are the alveoli. The lungs contain about 300 million alveoli sacs, which are the air cells where the exchange of oxygen and carbon dioxide takes place with the capillaries.



## Anesthetic Drugs

- The intravenous induction agents thiopentone, propofol and etomidate produce an initial transient apnea. Ketamine preserves respiratory drive and is better at maintaining the airway, although secretions increase.
- Thiopentone increases airway reactivity.
- Volatile anesthetics depress respiratory drive in decreasing order as follows: Enflurane>Desflurane>Isoflurane>Sevoflurane>Halothane.
- Atracurium and tubocurarine release histamine and may result in bronchospasm. They are best avoided in asthma.
- Opioid drugs and benzodiazepines depress respiratory drive and response to hypoxia and hypercapnia. Morphine may result in histamine release and occasionally bronchospasm.

Nonsteroidal anti-inflammatory drugs (NSAIDs) may exacerbate asthma. Pethidine is a useful alternative analgesic for asthmatics.