

كلية المستقبل الجامعة قسم الفيزياء الطبية
المرحلة الثالثة

ANATOMY

(L10)

The Respiratory System

Dr Abdulhusein Mizhir Almaamuri

The Respiratory System

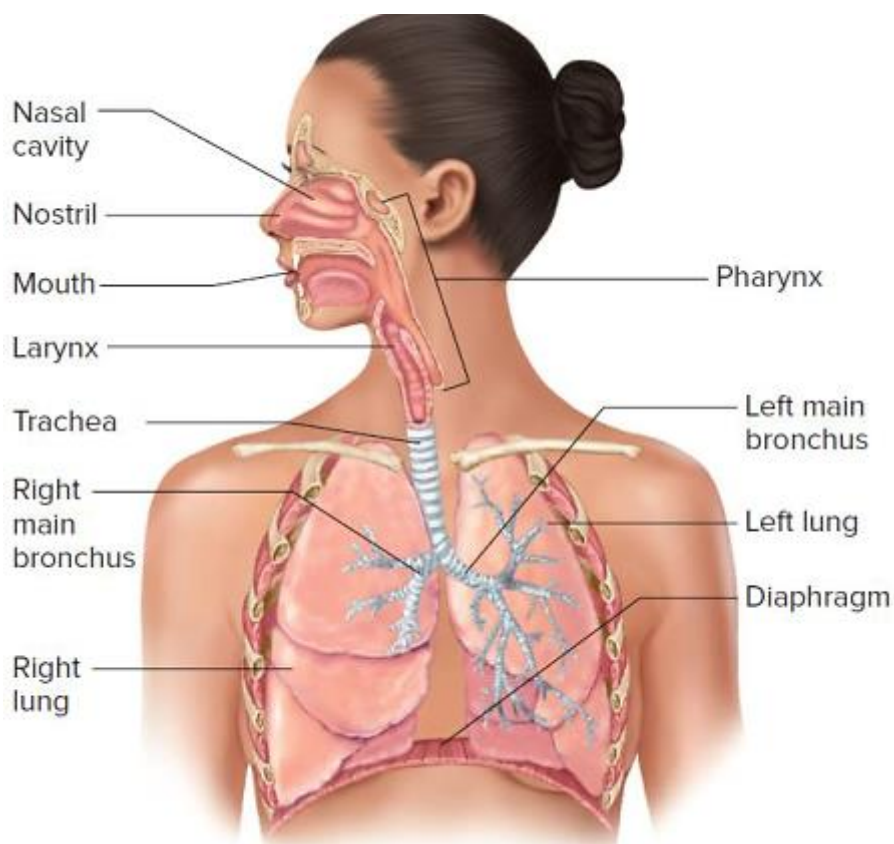
Respiratory system functions mainly as gas exchange system for O₂ and CO₂ which is called cellular respiration (energy production), it is closely tied to circulatory system

General Functions of Respiratory System:

1. O₂ and CO₂ exchange between blood and air
2. speech and vocalization
3. sense of smell
4. helps control acid base balance of body
5. breathing movements help promote blood and lymph flow

Principal Organs of Respiratory System nose

Pharynx larynx trachea primary bronchi
lungs: bronchioles alveoli/respiratory membrane



these organs can also be subdivided into:

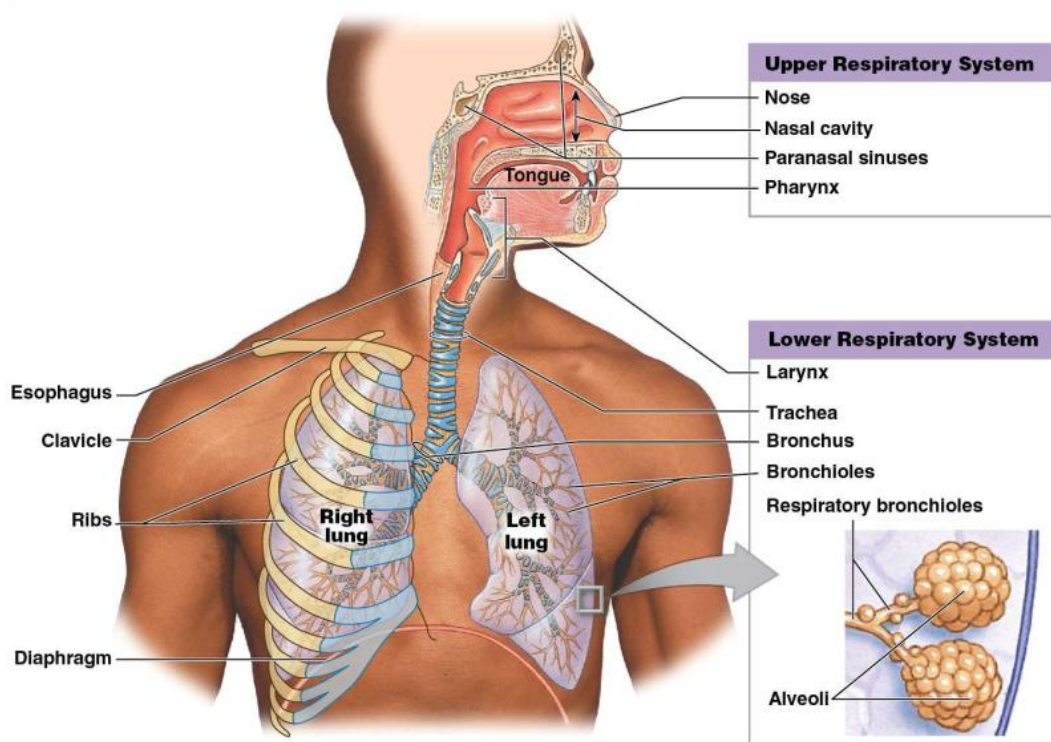
conducting division : passageways that serve only for airflow

respiratory division : alveoli and gas exchange areas, and

upper respiratory tract : nose pharynx larynx

lower respiratory tract : respiratory organs of the thorax, the lower respiratory tract fills most of the Thorax (Thoracic Cavity), major portion is occupied by lungs.

Lungs located in pleura cavity, visceral pleura covers outer surface of lungs, additional space given to heart.



All organs between the two lungs are located in the mediastinum

The mediastinum includes: heart (heart has its own sac = pericardium) esophagus, trachea, major blood vessels attached to heart.

1. **Nose** : separated from mouth by hard and soft palate, each nasal cavity is divided into 3 passageways by turbinates, which create narrow,

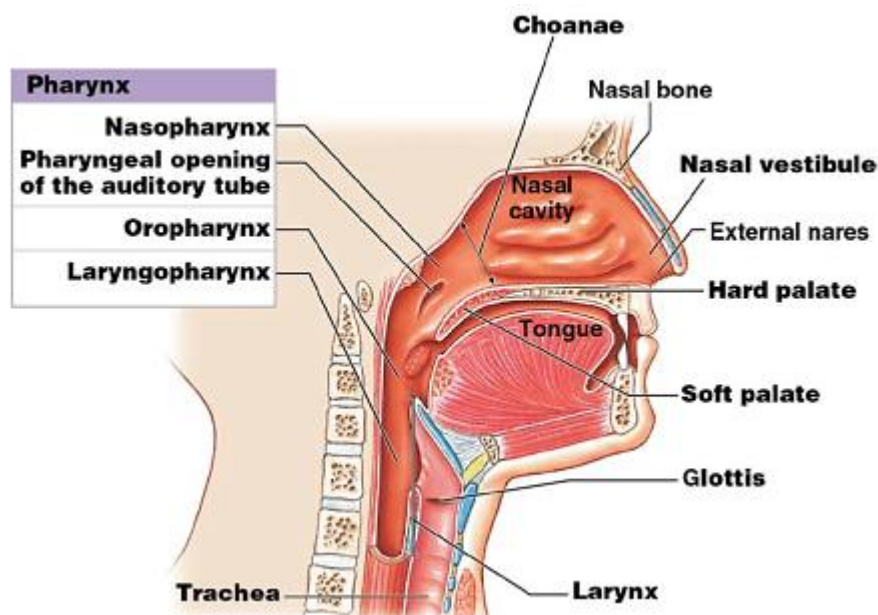
turbulent passageways to insure that all air makes contact with mucous membranes which are heavily vascularized, so

remove bacteria, debris and particles

warms and moisturizes air entering lungs

also contains receptors for smell

paranasal sinuses are accessory structures which may function as sound resonance (other animals), warm and moisten air and lighten skull.



2. **Pharynx (throat)** from base of skull to junction with esophagus and trachea, made of muscle and lined with mucous membrane and considered as junction between digestive and respiratory systems.

divided into three regions:

- a. **Nasopharynx** b. **Oropharynx** c. **Laryngopharynx**

3. **Larynx (voice box)** is the enlarged beginning portion of trachea

composed of cartilage and muscles.

4. **Trachea** extends from larynx to bronchi, surrounded by “C” – shaped bands of cartilage and so holds walls open, prevents collapse, lined by pseudostratified ciliated columnar epithelium.

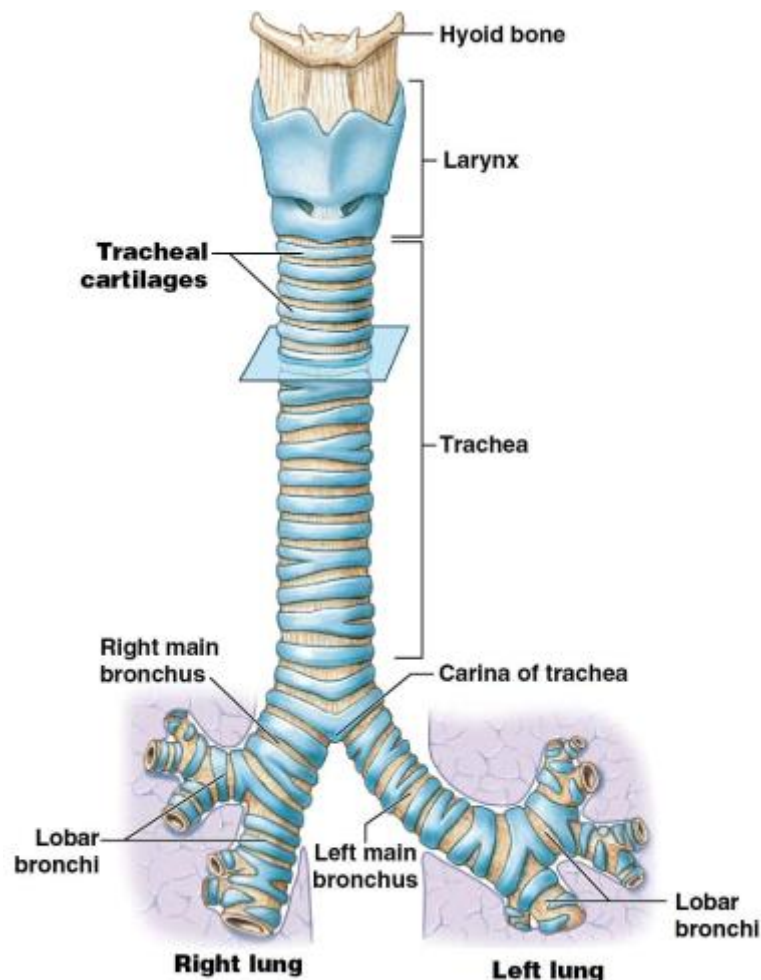
5. **Bronchi** : the trachea divides into two branches = bronchi which enter each lung. The right lung has 3 lobes and the left lung has 2 lobes.

bronchi resemble trachea in structure, also supported by C-shaped cartilages and have lots of elastic connective tissue

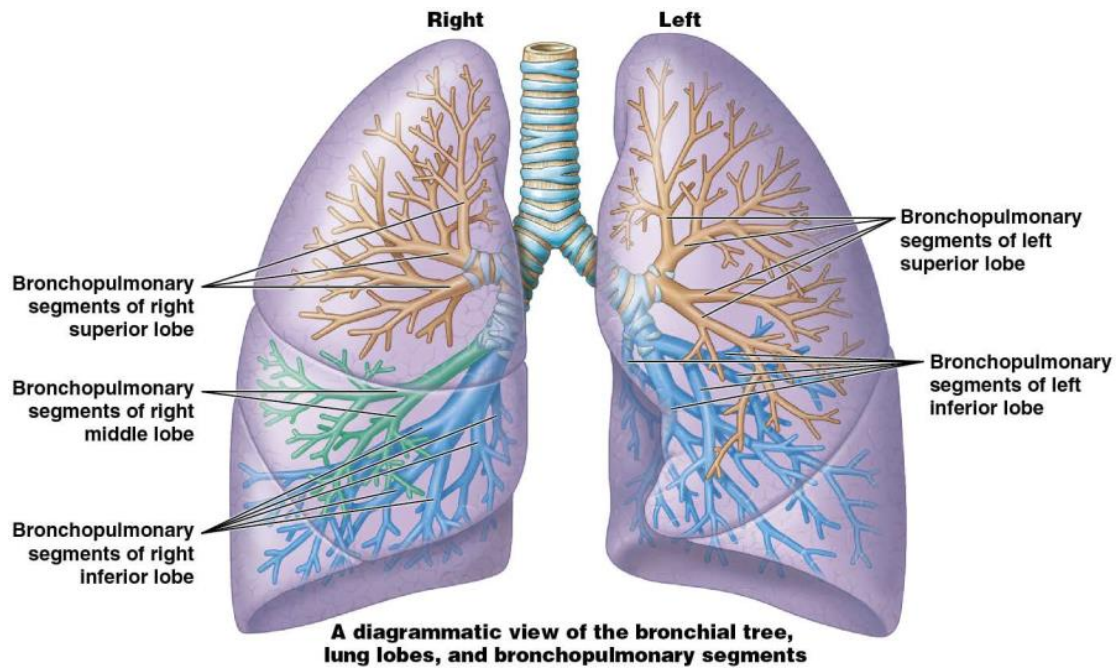
Each bronchus enters lung and continues to divide into smaller and smaller branches called bronchi, then bronchioles.

Because of this extensive branching so called **bronchial tree** :

2 primary bronchi, branches into 5 secondary bronchi (1 for each lobe of lung) each of these branches into tertiary bronchi. Secondary and tertiary bronchi kept open by complete rings of cartilage.



6. **Bronchioles** are smallest branches of “respiratory tree”, <1mm diameter, no supportive cartilage



Alveoli : the smallest bronchioles (respiratory bronchioles) have clusters of tiny sacs branching off called alveoli, “grapelike clusters”

300-500 Million alveoli/lung, single cell layer thick (squamous epithelium), enveloped by capillaries, are functional unit of respiratory system, actual site of gas exchange with blood.

