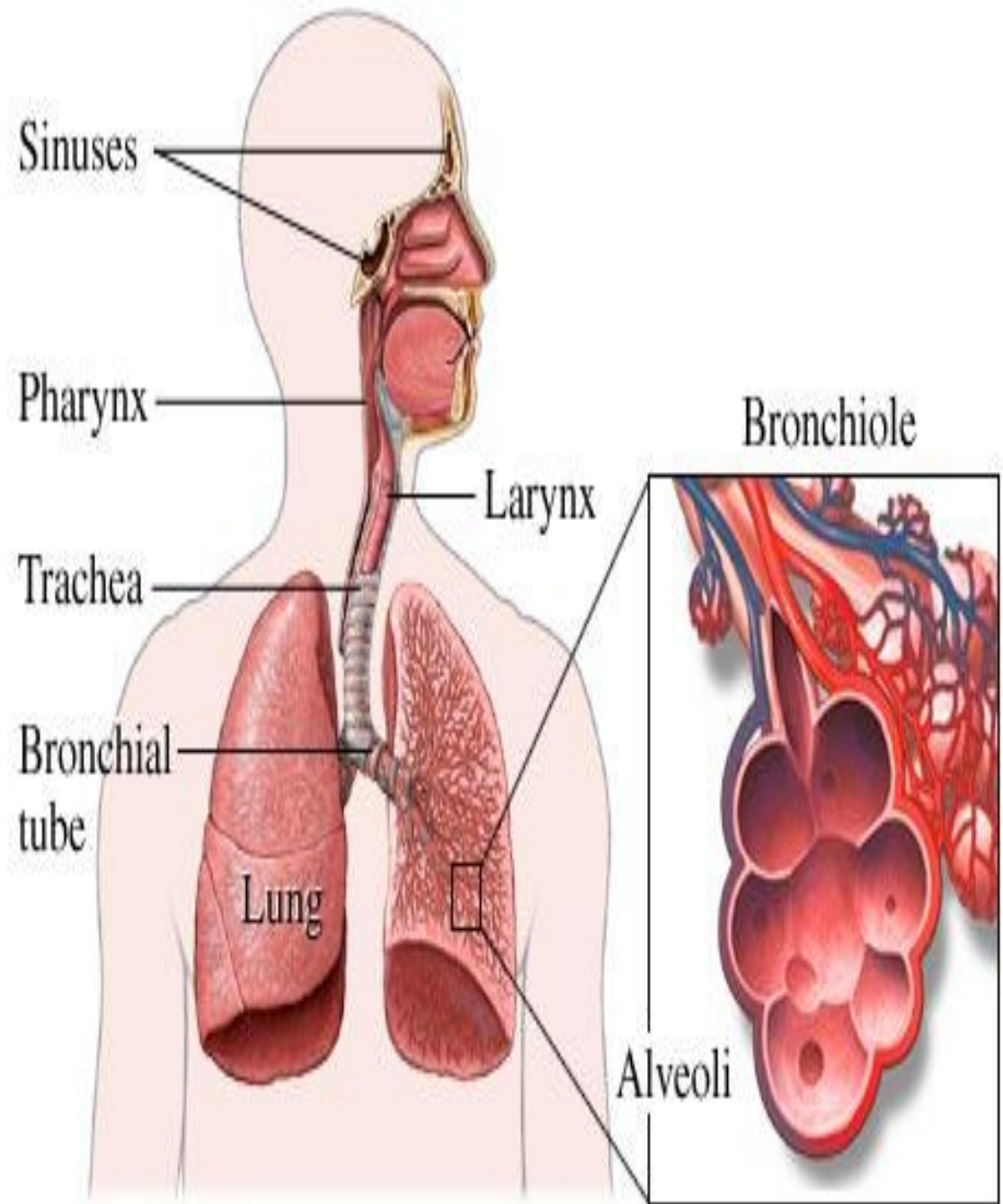


Human respiratory system (HRS)

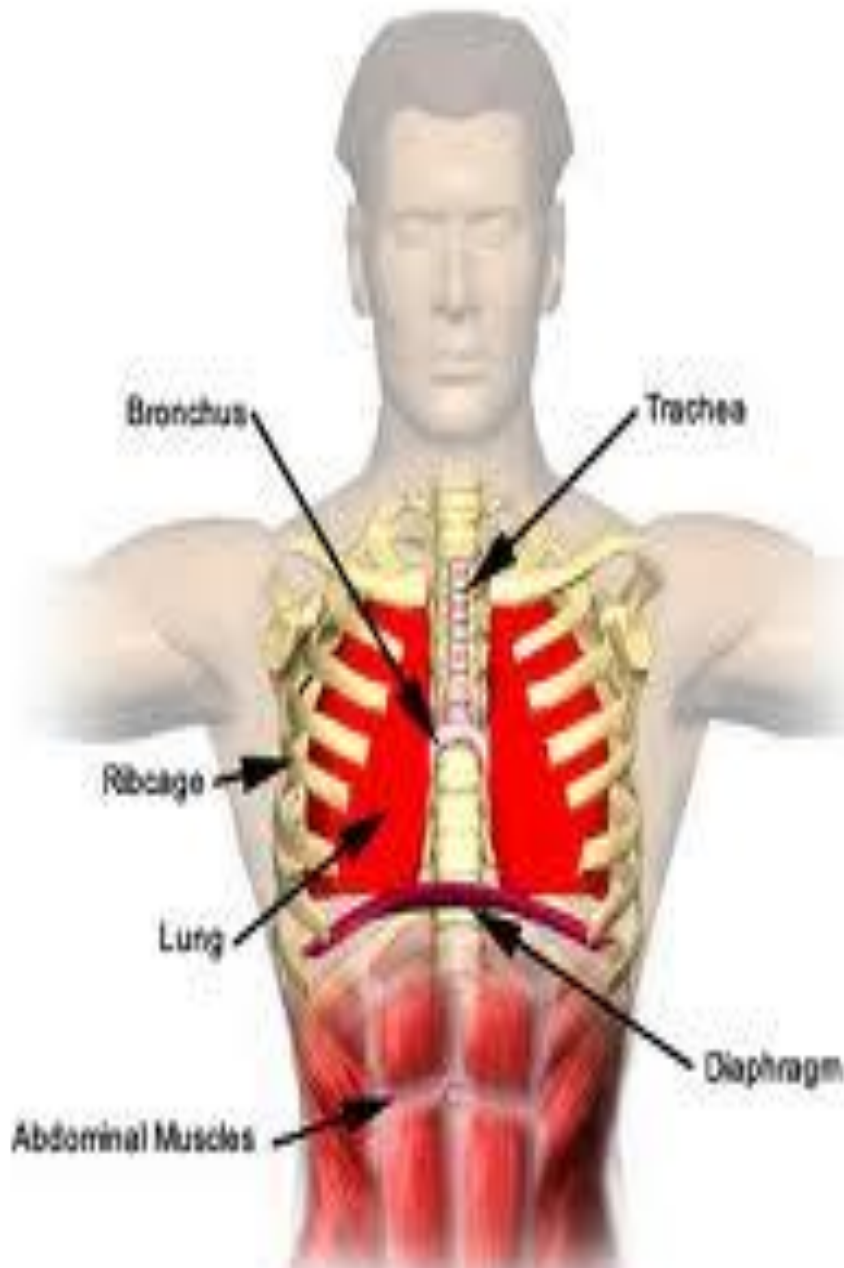


Respiration

- ***Respiration*** is the exchange of gases between an organism and its environment
- In humans the respiratory and circulatory systems cooperate in the transport of gases to the cells



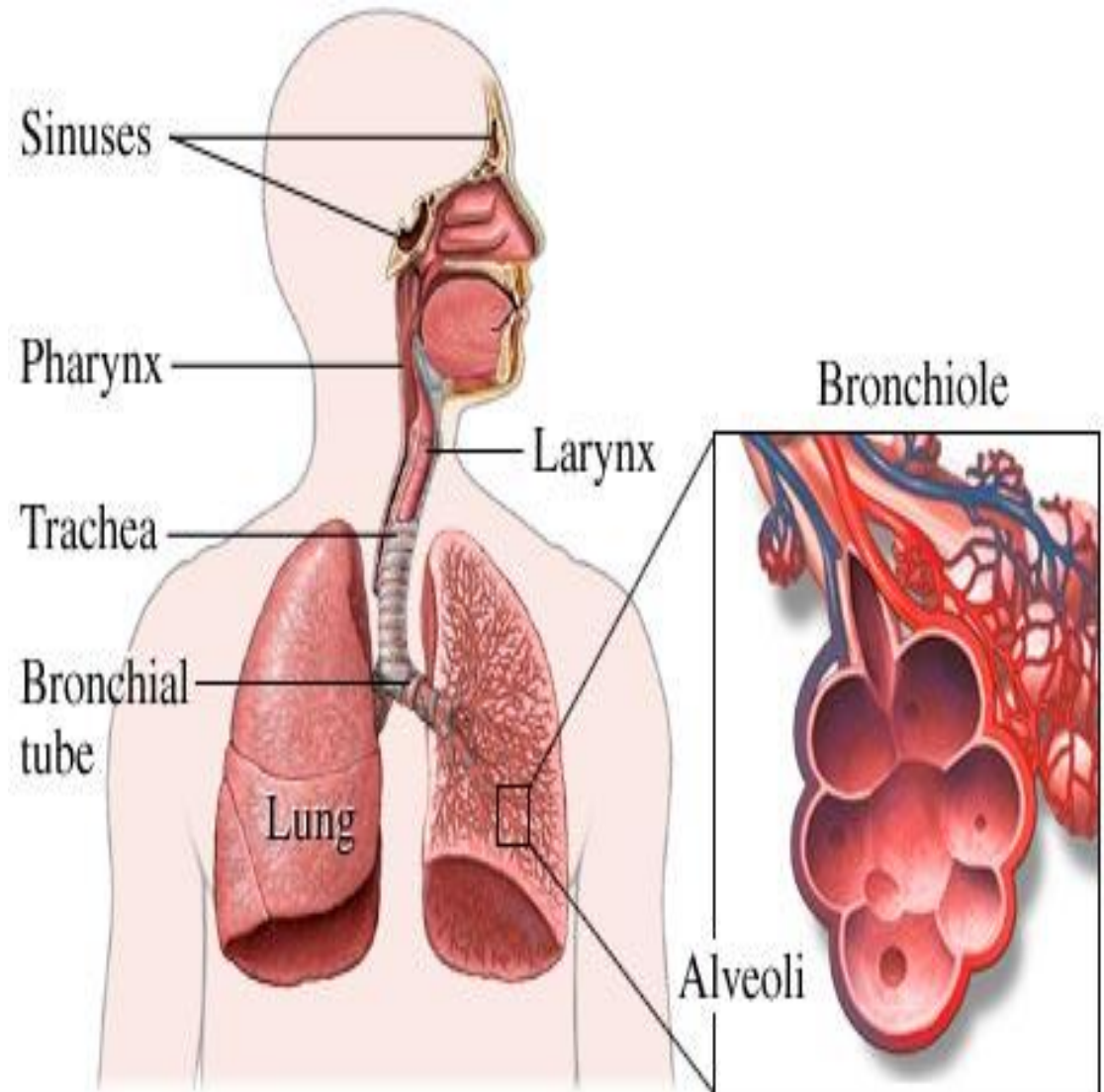
Respiration



- There are 2 ways in respiration:
- - Gas exchange between the lungs, and blood is called **external respiration**
- - The passing of gases from the blood to the tissues is **internal respiration**

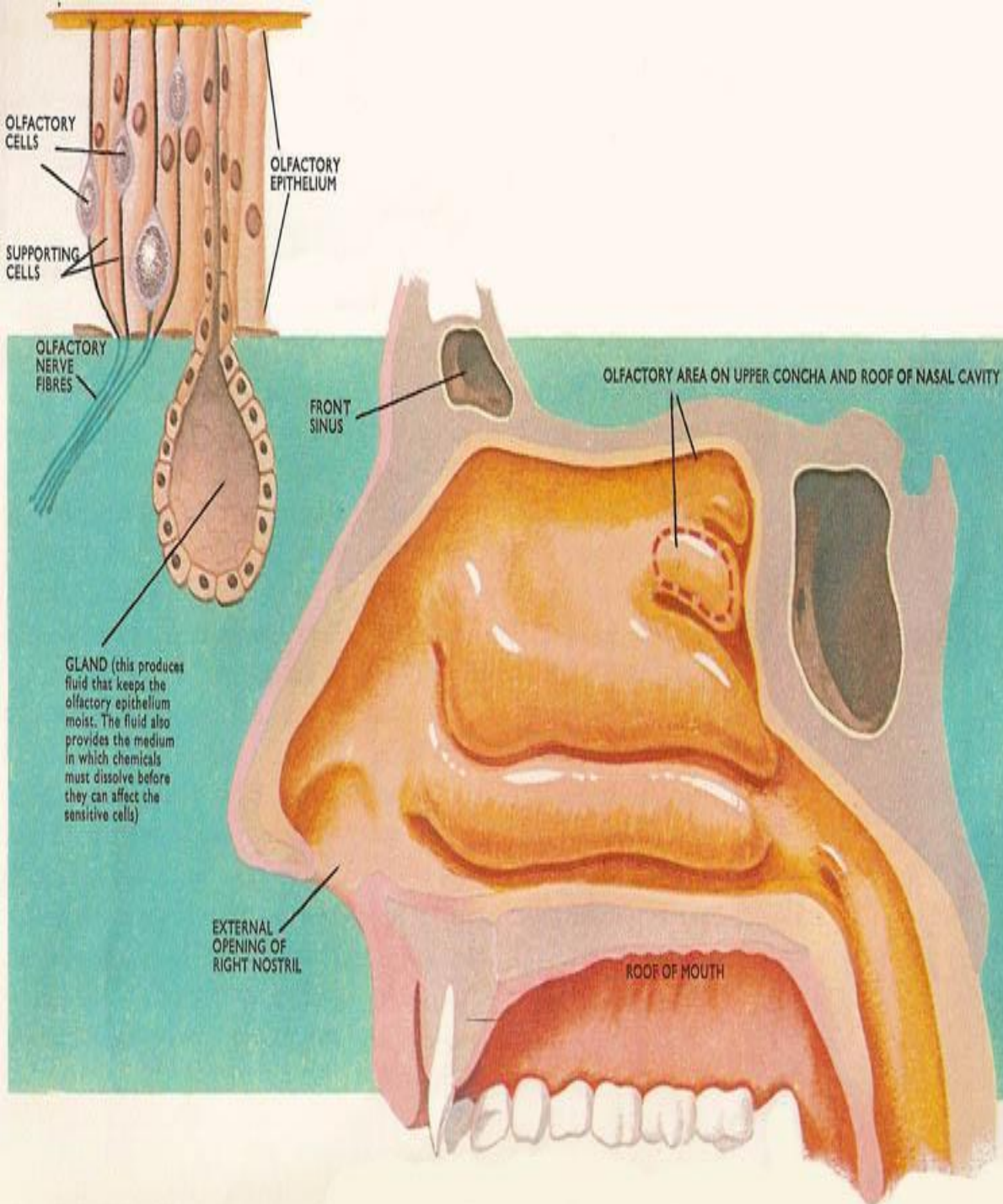
Organs of the respiratory system

- The organs are:
- - Nasal cavity
- Pharynx
- - Larynx
- - Trachea
- - Bronchi (bronchioles)
- - Lungs



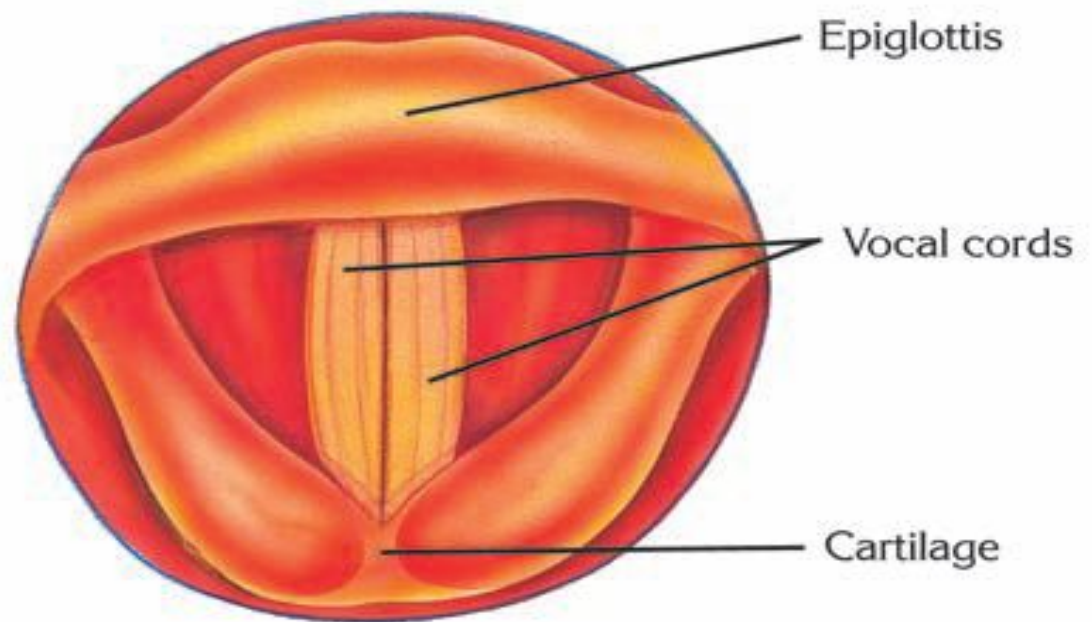
Nasal cavity

- Air passes through nasal cavity
- The air taken in to the nasal cavity is warmed and moistened
- Most foreign substances are eliminated by mucosa and hair

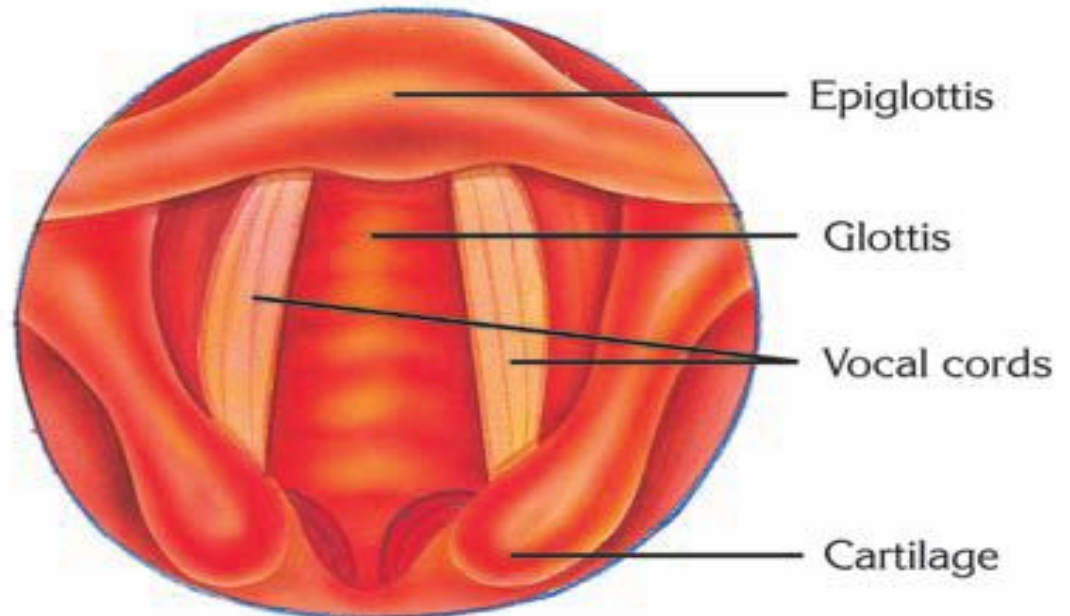


Larynx

- Air passes from nose into larynx
- It is located at the back of the mouth, at the top of the trachea
- It has ***vocal cords*** which protect trachea and function in producing sound



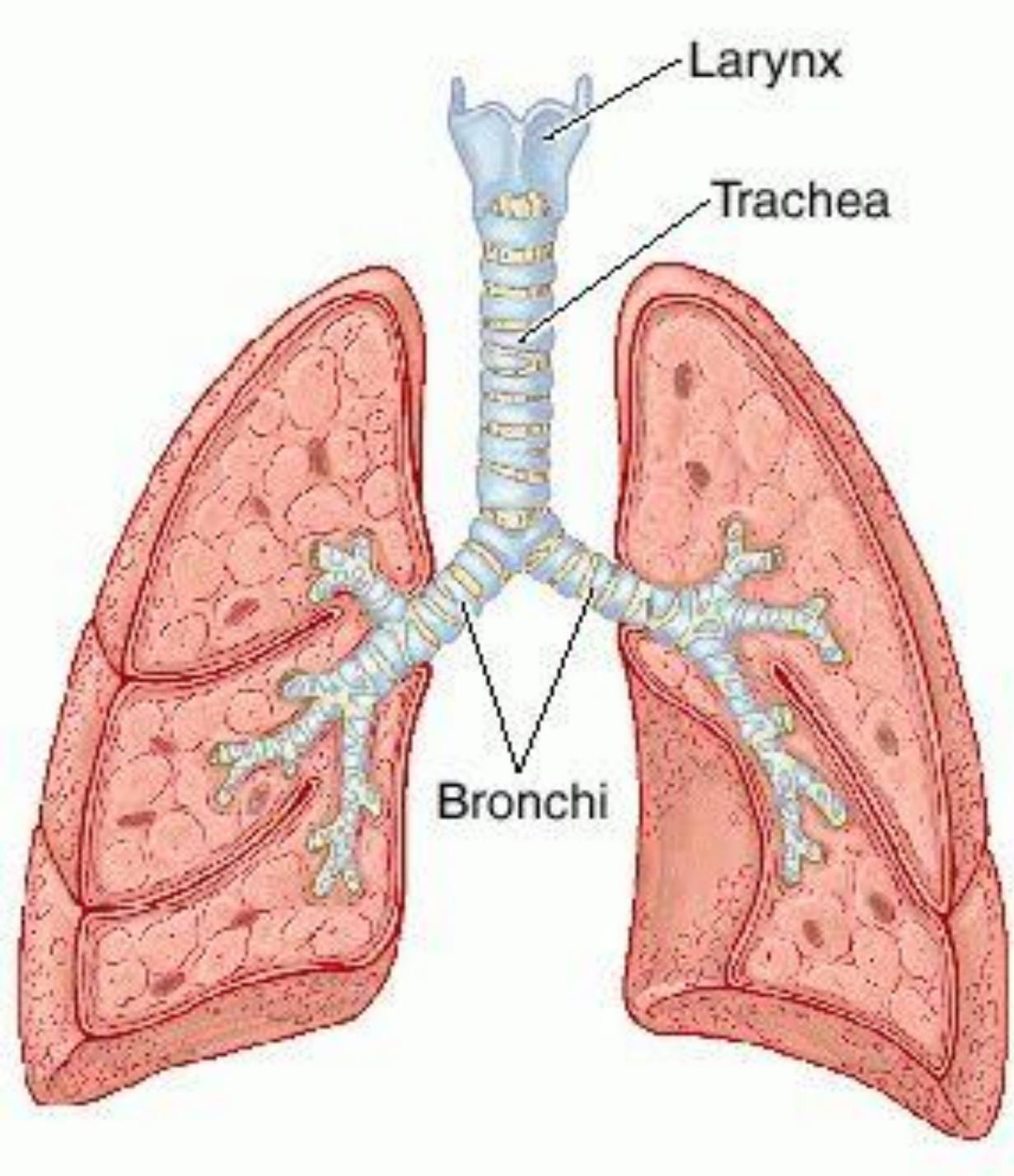
(a) Closed



(b) Open

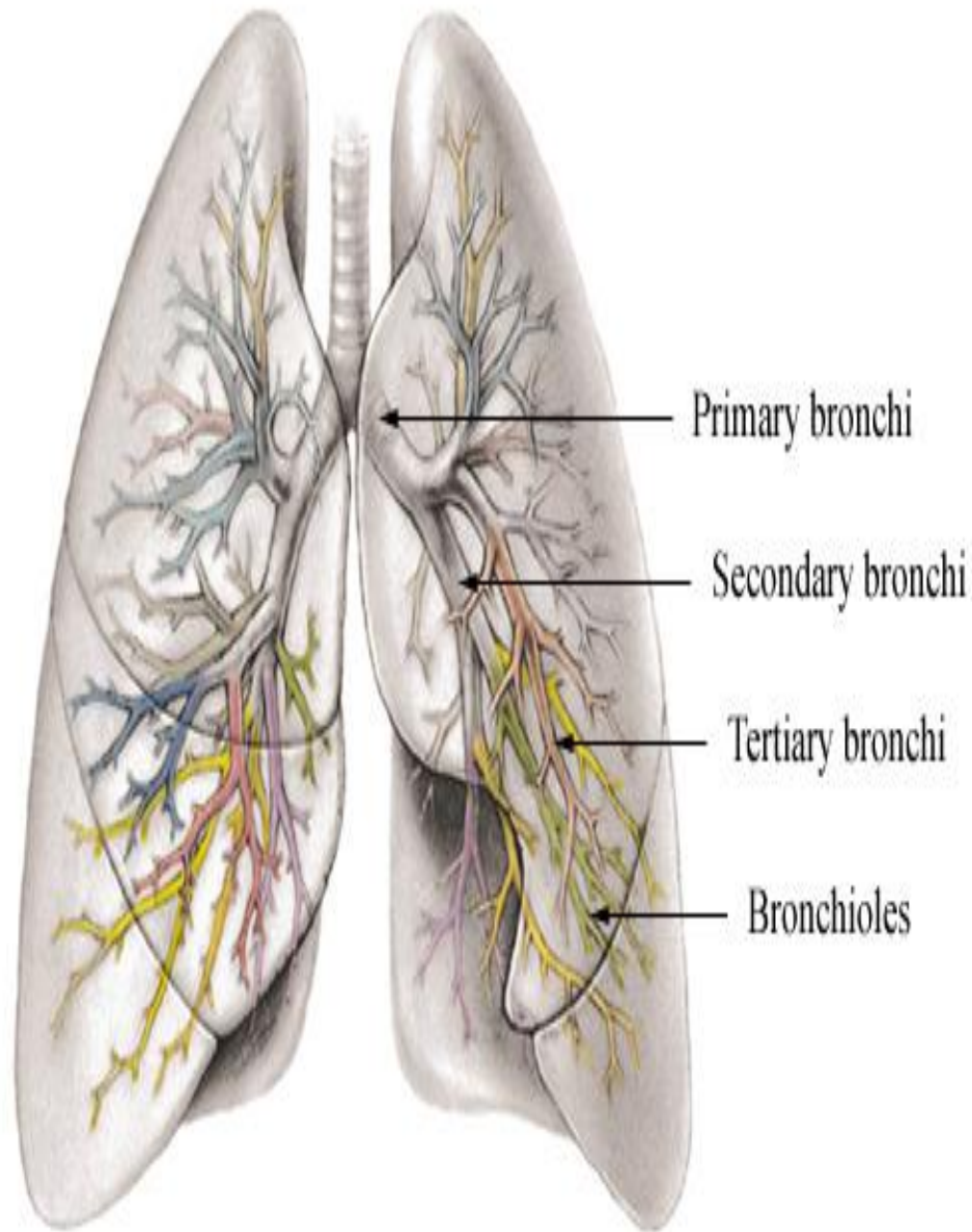
Trachea

- The larynx directs air into the trachea
- The pipe-like organ, the walls of which is composed of cartilage

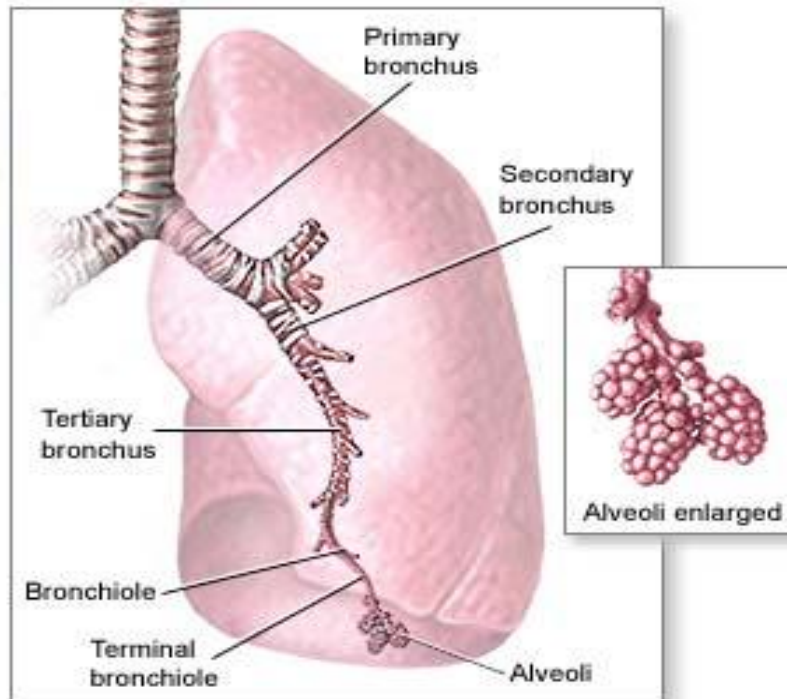
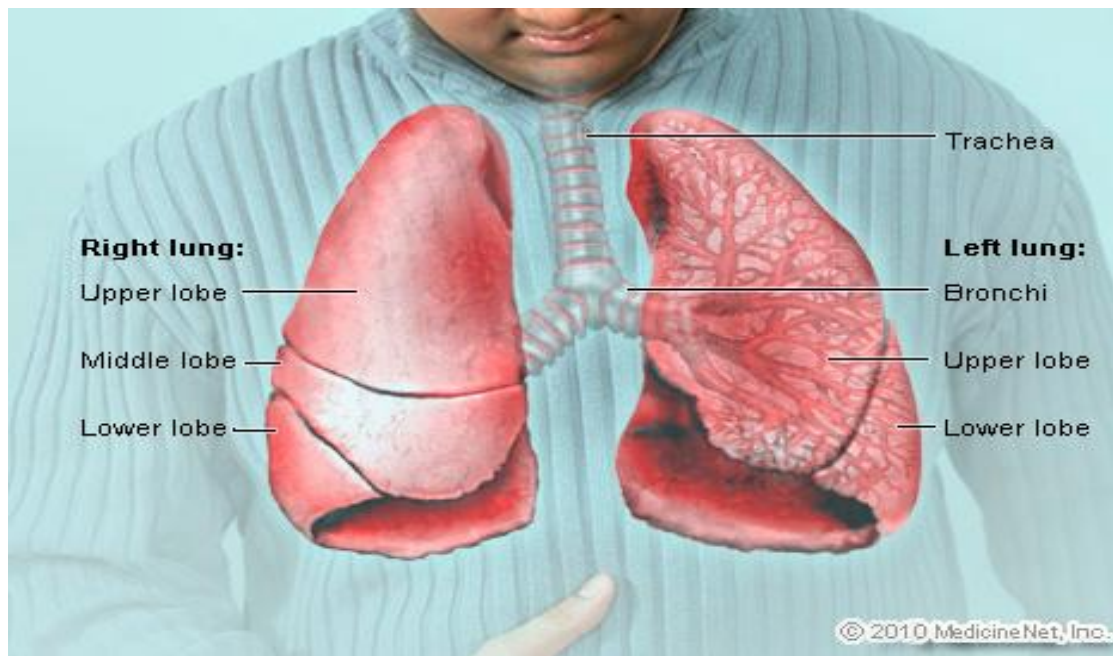


Bronchi (bronchioles)

- Trachea is divided into left and right **bronchi** (they enter into the lungs)
- These bronchi divide into **bronchioles** (branched tubes that lead from the bronchi to the alveoli in the lungs)



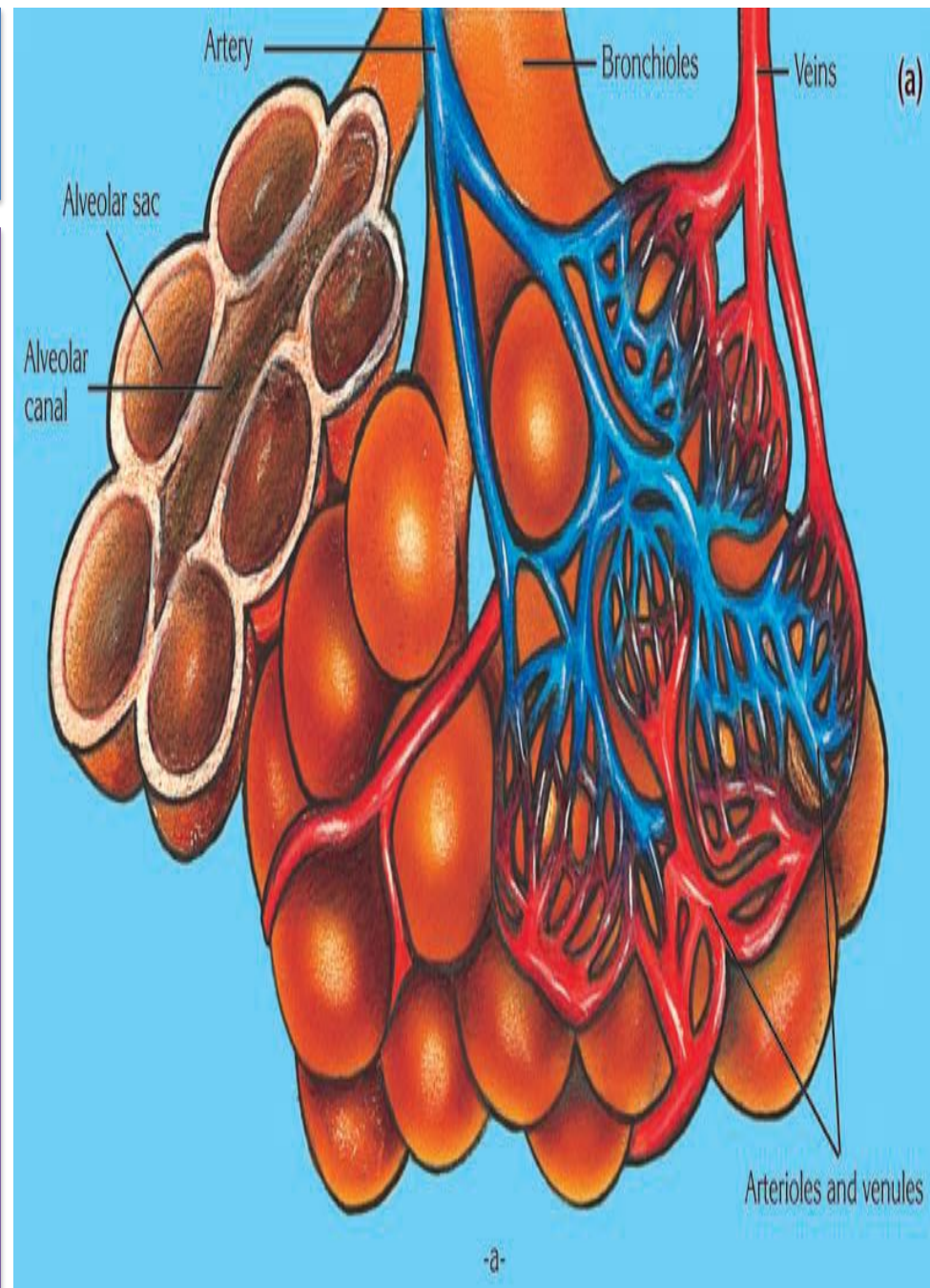
Lungs



- Lungs are paired organs
- The right lung has 3, and the left lung has 2 lobes
- Lungs are surrounded by a membrane known as the **pleura**
- The lungs consist of many similar units, known as **alveoli** (approximately 300 million alveoli)

ALVEOLI

- Alveoli are surrounded by a network of capillaries
- The alveoli are the site of gas exchange in the lungs
- Oxygen molecules in air pass into the capillaries, where they combine with hemoglobin compounds to form ***oxyhemoglobin***
- Simultaneously, **CO₂** pass out of the capillaries into the alveoli and is exhaled



Terminology

English	Russian	Kazakh
Alveoli	альвеола	Альвеолалар
Trachea	Трахея	кеңірдек
Bronchi	бронх	
lisp	Шепелявый	сақау
exhale	выход	Дем шығару
Gills	Жабры	желбезек
Gas exchange	газообмен	Газ алмасу
Inhale	вдох	Демді ішке алу
To respire	дышать	Тыныс алу