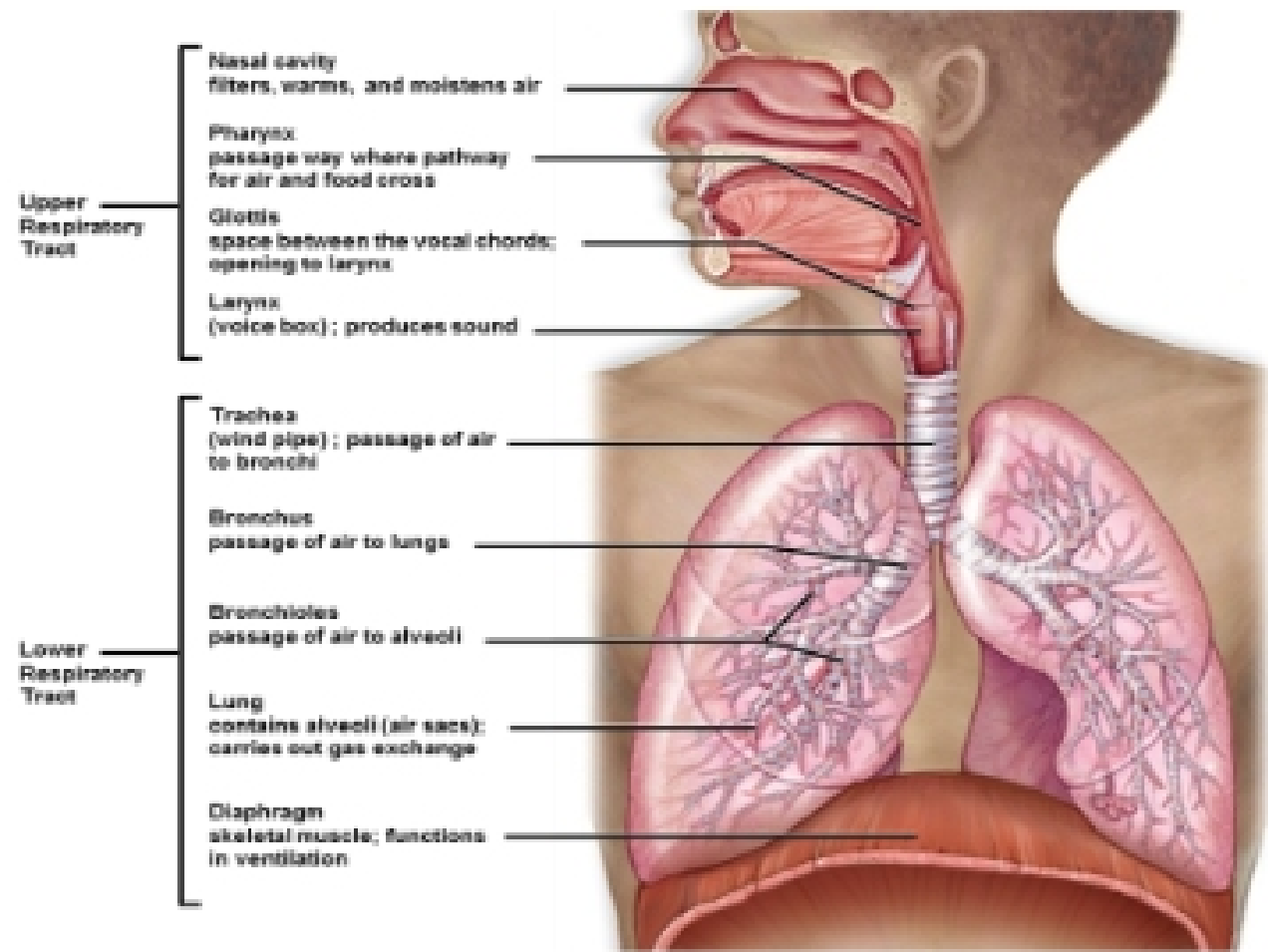


Chapter 9: Respiratory System

Pathway which air follows:

- Nose
- Pharynx
- Larynx
- Trachea
- Bronchus
- Bronchioles
- Alveoli



1. Nose

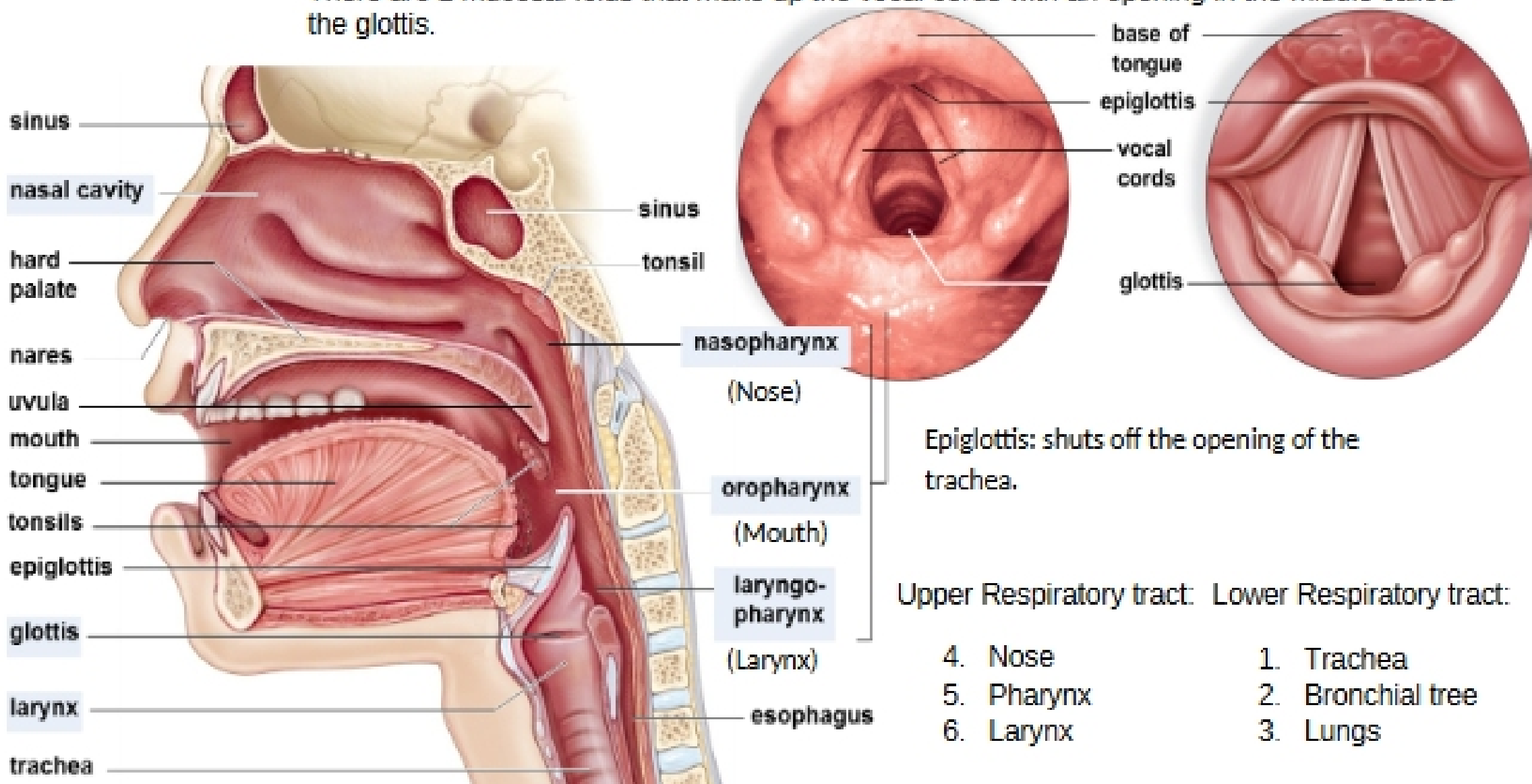
- The nose opens at the nostrils/nares and leads into the nasal cavities. (lago/oropharynx)
- Hair and mucus (contains hydroactive enzymes breakdown bacteria) in the nose filter the air.
- The nasal cavity has a lot of capillaries that warm and moisten the air.
- Specialized cells act as odor receptors. (nerve cell endings that recognize different cells)

2. Pharynx

- The pharynx is a funnel-shaped cavity commonly called the throat.
- It has 3 portions based on location: nasopharynx, oropharynx, and laryngopharynx.
- Tonsils provide a lymphatic defense during breathing at the junction of the oral cavity and pharynx.

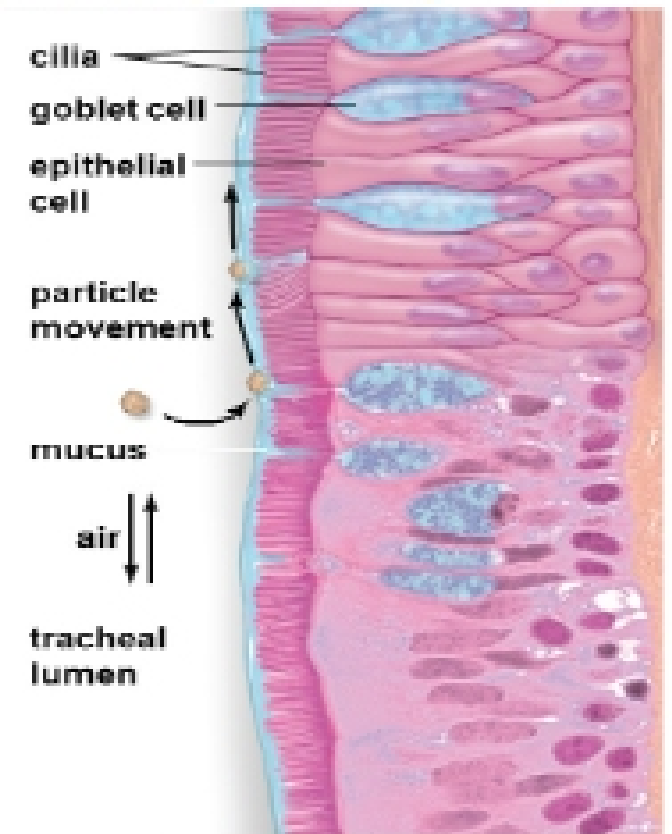
3. Larynx

- The larynx is a triangular, cartilaginous structure passing air b/w pharynx & trachea.
- It is called the 'voice box' and houses vocal cords.
- There are 2 mucosal folds that make up the vocal cords with an opening in the middle called the glottis.



4. Trachea

- The trachea is a tube, often called the windpipe that connects the larynx with the primary bronchi.
- It is made of connective tissue, smooth muscle, and cartilaginous rings.
- The trachea is lined with cilia and mucus that help to keep the lungs clean.



Bronchial Tree:

The bronchial tree starts with 2 main...

5. Bronchus

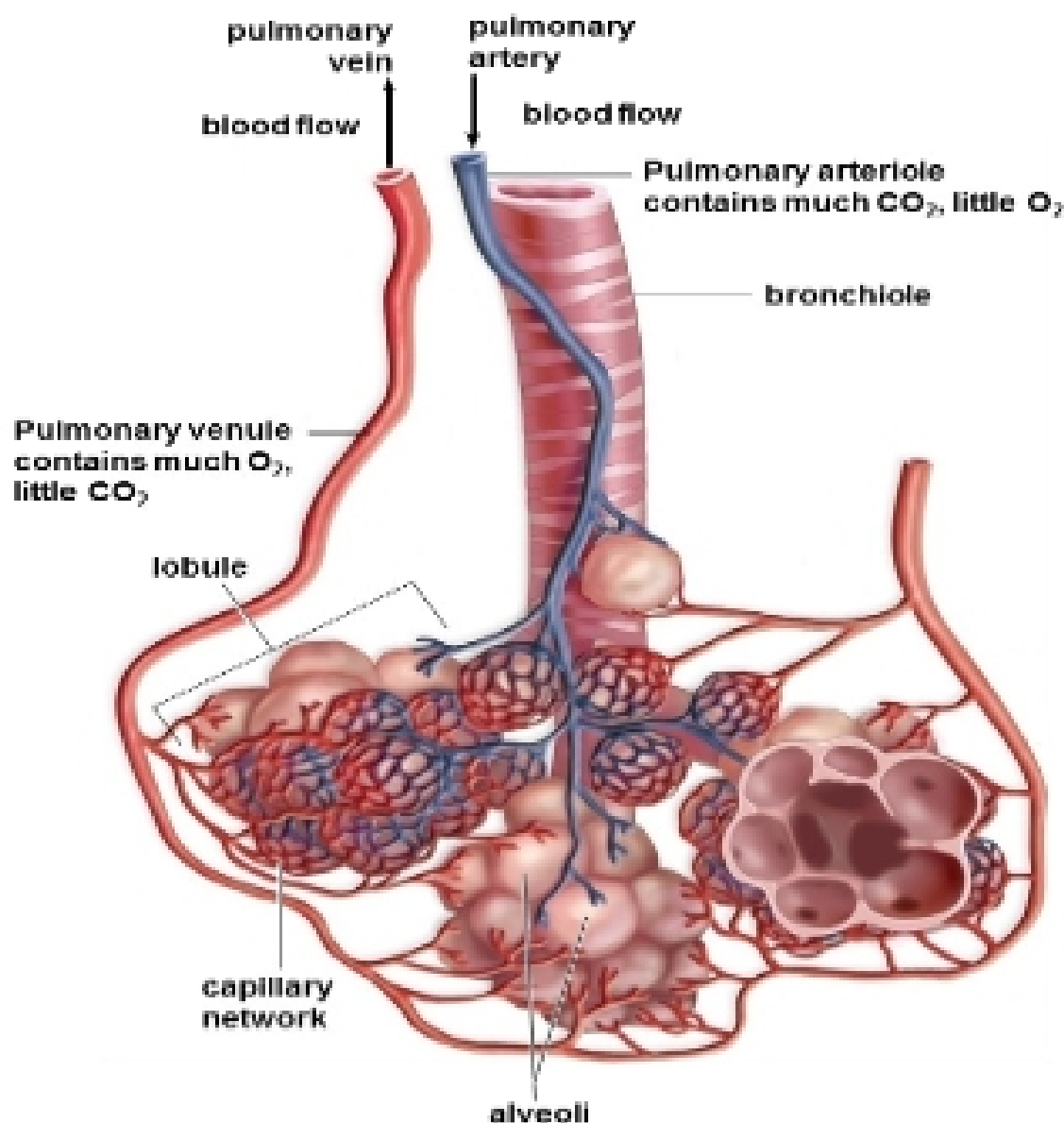
- that lead from the trachea into the lungs.
- The bronchus continue to branch until they are smaller airway passages named bronchi and then as the airway passages make their way out to the lung tissue, the passages become smaller and are referred to as...

6. Bronchioles

- They are about 1 mm in diameter with thinner walls.
- Bronchioles eventually lead to elongated sacs called...

7. Alveoli

- There are 300 million alveoli in the lungs that greatly increase surface area of gas exchange. (Single-layer of epithelial cell for rapid and ready diffusion of gasses)
- Alveoli are enveloped by blood capillaries.
- The alveoli and capillaries are one layer of epithelium to allow exchange of gases.
- Alveoli are lined with surfactant that acts as a film to keep alveoli open.



The secondary bronchi, bronchioles, and alveoli make up the...

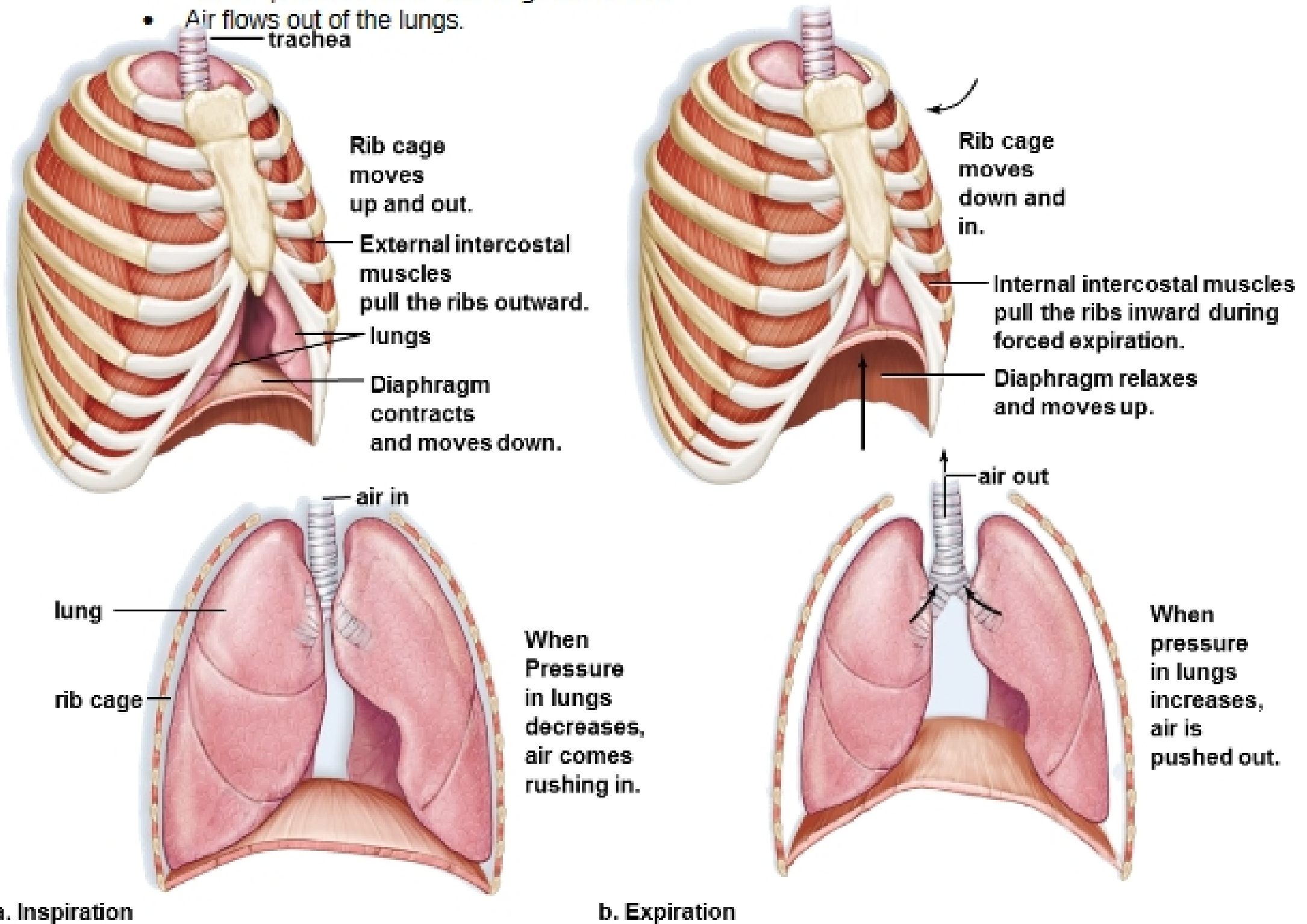
Lungs:

- Right lung is bigger and has 3 lobes; left lung is smaller and has 2 lobes.
- Each lobe is divided into lobules through which they pass.
- Each lung is enclosed by double-layer membranes called pleura.

Smoking reduces lung capacity due to position of tobacco in their alveoli. Athletes have higher lung capacities; have maximum ability of oxygen supply.

2 phases of breathing / ventilation:

- ✓ **Inspiration** – an active process of inhalation that brings air into the lungs (because of contraction)
 - The diaphragm and intercostal muscles contract.
 - The diaphragm flattens and the rib cage moves upward and outward.
 - Volume of the thoracic cavity and lungs increase. (volume is inversely proportional to pressure)
 - The air pressure within the lungs decreases.
 - Air flows into the lungs.
- ✓ **Expiration** – a typically passive process of exhalation that expels air from the lungs
 - The diaphragm and intercostal muscles relax.
 - The diaphragm moves upward and becomes dome-shaped.
 - The rib cage moves downward and inward.
 - Volume of the thoracic cavity and lungs decreases.
 - The air pressure within the lungs increases.
 - Air flows out of the lungs.



a. Inspiration

b. Expiration

Different volumes of air during breathing

- ✓ Tidal volume – the small amount of air that usually moves in and out with each breath.
- ✓ Vital capacity – the maximum volume of air that can be moved in plus the maximum amount that can be moved out during one breath
- ✓ Inspiratory and expiratory reserve volume – the increased volume of air moving in or out of the body forcibly.
- ✓ Residual volume – the air remaining in the lungs after maximal, forceful exhalation.