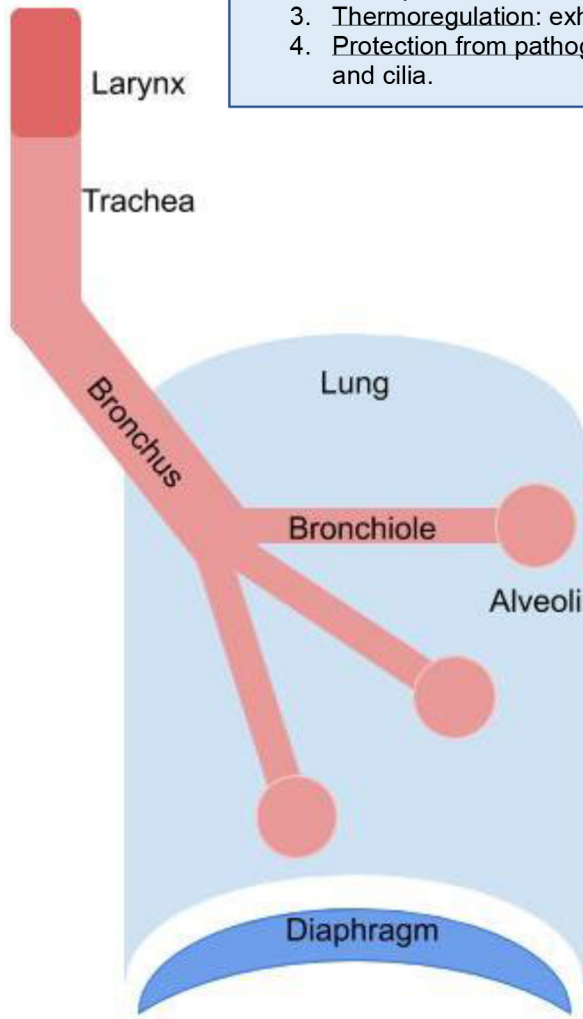


Anatomy of the Respiratory System



Functions of the Respiratory System:

1. **Gas exchange:** O_2 is absorbed and CO_2 is expelled
2. **pH Regulation:** CO_2 acidifies the blood, and thus must be exhaled to maintain constant blood pH.
3. **Thermoregulation:** exhalation of warm air cools the body.
4. **Protection from pathogens:** particulate matter in the air is filtered and cleared by mucus and cilia.



The structure of respiratory system is often described as a tree: a series of progressively smaller branches. This branching maximizes surface area for gas exchange.

The respiratory tree is functionally divided into two zones: conducting and respiratory.

Zones of the Lung

The **conducting zone** is where air is filtered as it moves in and out of the lungs.

Air flows from the nose/mouth → pharynx → larynx → trachea → bronchi → bronchioles.

The **respiratory zone** is the site of gas exchange composed of the alveolar ducts and alveoli



Pulmonary Surfactant:

Surfactant is a lipoprotein fluid secreted by alveoli to reduce surface tension in the airways. This allows lungs to function by increasing elasticity and preventing the alveolar collapse.

Alveoli are the final site of gas exchange. A single alveolus is a small thin sac surrounded by capillaries. As deoxygenated blood passes, red blood cells pick up oxygen and release carbon dioxide via **passive diffusion**.

