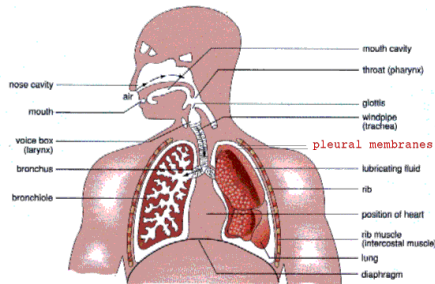


The Respiratory System



Why do we breathe?

- Cells carry on cellular respiration in order to **produce ATP**, which is used by cells for energy.
- The energy needed to produce ATP comes from glucose. This process requires **oxygen** and produces **carbon dioxide**

Cellular Respiration

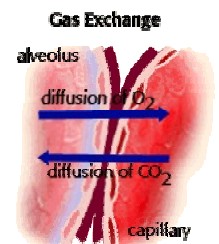
- Cellular respiration:



- Breathing is needed to obtain **oxygen**, and get rid of the CO_2

Function of the respiratory system

- **Gas exchange**
 - CO_2 must be able to leave each cell
 - O_2 must be able to enter each cell
- **Involves Diffusion**
 - Both simple diffusion and facilitated diffusion



Levels of Respiration

Where does gas exchange occur?

- **External** – Exchange of CO_2 for O_2 between the air and the blood (in the alveoli of the lungs)
- **Internal** – Exchange of CO_2 for O_2 between the blood and the cells (in the body capillaries)
- **Cellular** – Series of complex reactions that take place in the mitochondria to make ATP (uses O_2 and produces CO_2)

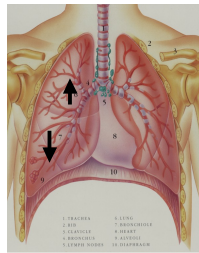
The Requirements

- There are TWO requirements for a respiratory system
 1. **Respiratory surface** – There must be a large surface area available for gas exchange to take place efficiently
 2. **Moist environment** – O_2 and CO_2 diffuse into and out of cells as dissolved gases.

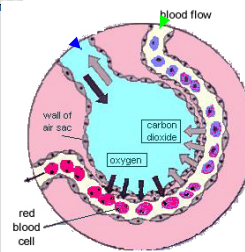
The Lung System

Three Basic Elements

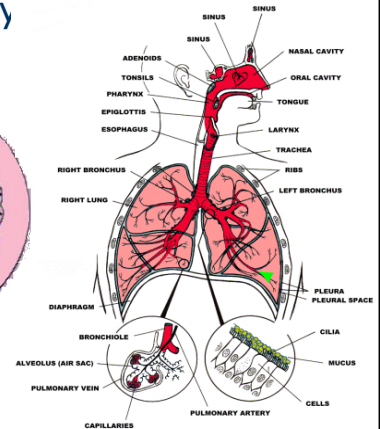
1. A means of forcing air to come in contact with lung surface (**diaphragm and rib muscles**)
2. A moist surface area for gas exchange (**alveoli**)
3. A means of carrying the gases between lungs and other cells (**Circulatory system**)



Respiratory Tract



THE RESPIRATORY SYSTEM



Pathway of a breath of air to the lungs
(Page 335 & 337 in textbook)

1. Air enters via the **nostrils** or the **mouth**
2. **Nasal cavity** or **oral cavity**
 - Cilia in the nasal cavity help to filter out dust
 - Air is warmed and moistened
3. **Pharynx** (throat)
 - collects incoming air from the nose and mouth
4. **Glottis**
 - Opening to the trachea (windpipe)
 - Closed by the **epiglottis** when eating

5. **Larynx** (voice box)

- Contains the vocal cords

6. **Trachea**

- Carries air to the bronchi
- Supported by semi-circular cartilage rings

7. **Bronchi**

- Carry air into each lung
- Branches off into smaller **bronchioles**

8. **Alveoli (air sacs)**

- Moist sacs – are the site of actual gas exchange
- One cell thick and surrounded by a dense network of capillaries