# RESPIRATION

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## RESPIRATION

It is a biochemical process of enzyme including oxidative breakdown of organic compounds inside living cells releasing energy in the form of ATP.

## BREATHING

The process of intaking $O_2$ & releasing of $CO_2$ known as breathing .

## RESPIRATION IN PLANTS

◈ **By young roots :**

- Air occurs in soil interspaces. Root hairs as well as epiblema cells of the young roots are in contact with them. They are also permeable to metabolic gases. Oxygen of the soil air diffuses through root hair-epiblema cells and reaches all internal cells of the young root. Carbon dioxide produced by root cells diffuses in the opposite direction.

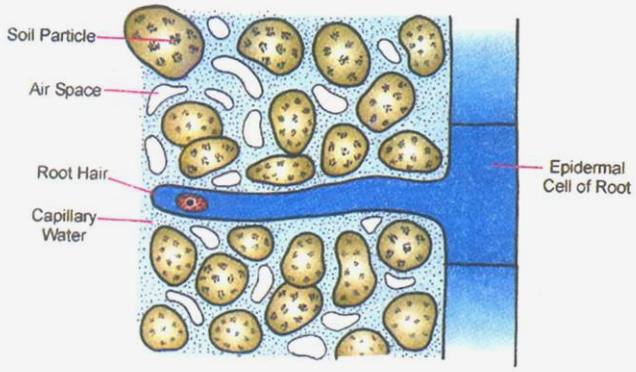


**Figure : EPIBLEMA AND ROOT HAIR TAKE PART IN EXCHANGE OF GASES DIRECTLY IN YOUNG ROOTS**

◈ **By Leaves :**

- **Leaves and Young Stems.** Leaves and young stems are ideally suited to quick exchange of gases. The organs have a covering of nearly impermeable epidermis for reducing loss of water. The epidermis of leaves bears a number of aerating pores called **stomata** (singular stoma or stomata, Gk. *stoma*-mouth). Each aerating or stomatal pore is bordered a pair of **guard cells**. In most of the plants, the guard cells are kidney or bean shaped with inner walls being thicker and less elastic than the outer walls.
- When the stomata are open, gases diffuse into and out of the leaf as per their concentration gradient. A gas which has come from outside first reaches substomatal chambers. From here, it diffuses to all the intercellular air spaces present in between the mesophyll cells. If the stomata are open

during night, oxygen from outside will diffuse into the leaves and young stems while carbon dioxide will diffuse out. It is due to respiratory gas exchange.

## MAMMALIAN RESPIRATORY SYSTEM

The mammalian respiratory system consists of nasal cavity, pharynx, larynx, trachea, bronchi, bronchioles and alveoli.

### ◈ Nostril :

- It is also called external nares.

### ◈ Nasal Chamber :

- Nasal septum divides nasal cavity into two nasal chamber by the nasal septum.

### ◈ Internal nares :

- There are posterior opening of nasal chambers that leads into pharynx.

### ◈ Pharynx :

- The pharynx provides passage to both air and food.

### ◈ Laryngopharynx :

- It is the lower part of pharynx and has a slit like aperature called **glottis**, which can be closed by a leaf like bilobed cartilage **epiglottis**, during swallowing of food bolus.

### ◈ Larynx :

- It is also called **voice box** or **adam's apple** or **pomas adami**.

### ◈ Vocal cord :

In larynx, 2 pairs of vocal cord is found outer pair is **false vocal cord** whereas, inner pair is **true vocal cord** when air is forced through the larynx it cause vibration of true vocal cords and sound is produced.

### ◈ Trachea (Wind pipe) :

- It is long, tubular structure which runs downward through the neck in front of oesophagus. It is supported by cartilage to prevent collapse.

### ◈ Primary bronchi :

- These are one pair of small thin walled tubular structure formed by the division of trachea. It further divides and end at alveoli.

### ◈ Lungs :

- lungs are present in thoracic cavity on either side of heart. covered by pleural membrane.

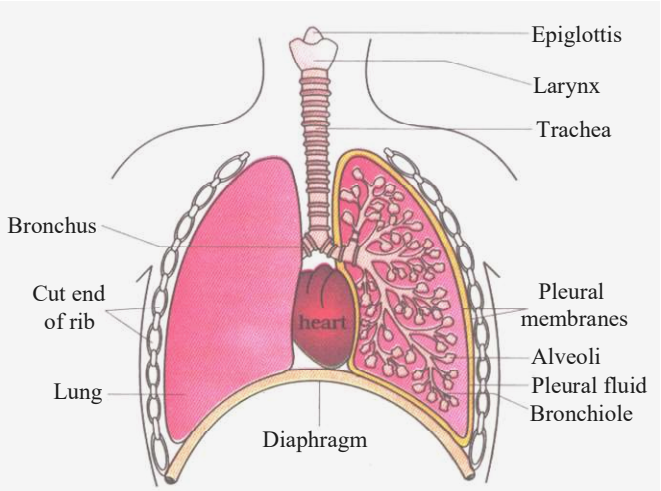


**Figure : HUMAN RESPIRATORY SYSTEM**

## MECHANISM OF RESPIRATION

Respiratory centre is in **Medulla Oblongeta.**

Mechanism of breathing involves Two Phases.

(A) Inspiration

(B) Expiration

### ◈ Inspiration :

- Intercostal and phrenic muscles of diaphragm contract to increase thoracic cavity, therefore outside rushes inside.

◈ **Expiration :**

- Intercostal & phrenic relex muscles.
- Due to decrease of thoracic cavity air pressure within lungs increase, the greater pressure within lungs force ful air from lungs to outside of body.

◈ **Gaseous Exchange :**

- Gaseous exchange occur in Alveoli following pressure gradient $O_2$ from high pressure in alveoli diffuse into blood & $CO_2$ from blood in alveoli.

◈ **Gaseous Transport :**

- $O_2$ is carried by haemoglobin (in RBC). 100 ml of blood can carry ~20 ml of $O_2$ max, $CO_2$ is transported in form of bicarbonates in plasma.