

CHAPTER 10: Respiration in Organisms

- Respiration is a process which involves breathing and exhalation etc.
- **NEED OF RESPIRATION:**
- 1.) Cells are the structural and functional unit of life which require food as a source of energy.
 - 2.) The energy required to do this is derived from food which is stored in food.
 - 3.) Energy is derived from the food by the process of respiration.
 - 4.) Breathing: the process of taking in air which contains oxygen and exhaling out carbon dioxide is called as breathing.
 - 5.) Cellular respiration: The mechanism in which energy is given out by degradation of food is called cellular respiration which takes place in all living organism.
 - 6.) Aerobic respiration: The process of conversion of glucose into carbon dioxide, water and energy in presence of oxygen is called aerobic respiration.
 - 7.) Anaerobic respiration: The process of conversion of glucose into alcohol, carbon dioxide and energy in absence of oxygen is called anaerobic respiration.
 - 8.) Anaerobes: these are organisms which live in absence of oxygen e.g., yeast
 - 9.) Anaerobic respiration in muscle cells: At the time of any stressful physical activity there is a temporary deficit of oxygen in the muscle cells. Here in this process glucose is partially broken down in the muscle cells in absence of oxygen to produce lactic acid and energy.
- **Breathing:**
- It involves two processes:
- a.) Inhalation: The process of taking in air mainly oxygen into the body is called inhalation.
 - b.) Exhalation: The process of giving out carbon dioxide out of the body is called exhalation.
 - c.) Breathing rate: The number of breaths per minutes is breathing rate.
 - d.) Breath: One breath is defined as a combination of alternate inhalation and exhalation.
 - e.) Whenever a person is doing some physical activity more energy is required, hence the breathing rate increases.
 - f.) The average rate of breathing in a healthy adult in resting state is 15-18 breaths a minute.
- **Process of breathing:**
- Air is taken in through the nose and it enters the nasal cavity.
 - From the nasal cavity air is passed on to the lungs in the chest cavity via the wind pipe.
 - Diaphragm: it is made up of a large muscle which separates the chest cavity and abdominal cavity.
 - To perform the action of breathing the rib cage and diaphragm are essential.
 - On inhalation of air, the ribs move up and diaphragm moves outwards which increases the space in the chest cavity and pushes the air into the lungs.
 - Totally opposite process takes place during exhalation, where the ribs move down and the diaphragm moves up leading to contraction of the chest cavity and the air being pushed out of the lungs.
 - Smoking is dangerous as it damages the lungs and can cause lung cancer.
 - The air is contaminated with pollutants like smoke, dust, pollens, etc. which when inhaled frequently pass the nose hair barrier and enter the nasal cavity.

- This causes irritation and causes sneezing.
- Inhaled air contains 21% oxygen and 0.04% carbon dioxide while the exhaled contains 16.4% oxygen and 4.4% carbon dioxide.

➤ **BREATHING IN OTHER ANIMALS:**

✓ Cockroach:

- Small insects like cockroaches have spiracles and tracheal tubes.
- **SPIRACLES:** these are small openings present on the side of the body.
- **TRACHEAE:** They are complex network of air tubes present in insects.
- Air enters the trachea through the spiracles, after which it mixes with the body tissues.
- In a similar manner carbon dioxide from the cells enters the tracheal tubes and then enters the spiracles from where it moves out of the body.

✓ Earthworms:

- These worms breathe through the passage of skin which is wet, moist and slimy.
- The pores on the skin make it easy for the gases to pass in and of the body.

✓ Frogs:

- They have unique features.
- They have lungs but can also breath through the skin making amphibian life easy.

➤ **BREATHING UNDER WATER:**

- For adapting to aquatic life style, the organisms like fishes have developed gills.
- The gills are outward projections present on the skin which acquire oxygen dissolved in water with the help of blood vessels.

➤ **Respiration in plants:**

- Plants breath in oxygen and expel out carbon dioxide.
- The cells use up the oxygen to carry out aerobic respiration and break the glucose down to produce carbon dioxide, water and energy.
- Stomata present on leaf surfaces helps in the exchange of these gasses.
- The roots can acquire air from the soil. Soil has air spaces in them.

➤ **Conclusion:**

Respiration is an important biological process to derive energy.