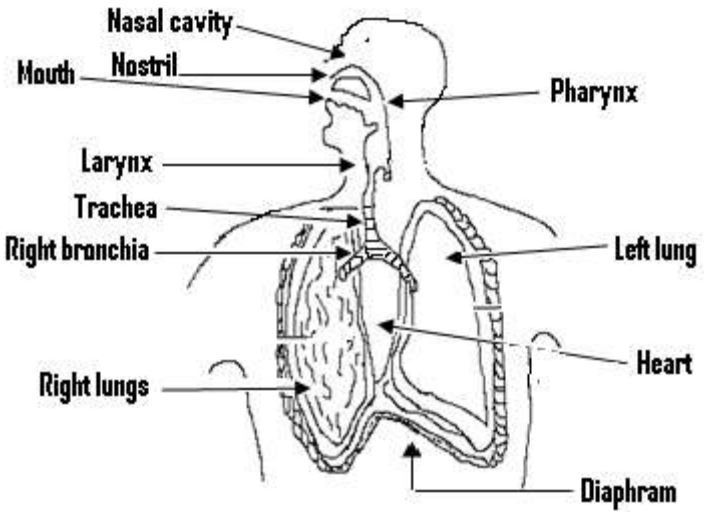
Chapter Eighteen

Respirations



Respiration:

–This is defined as the process by which oxygen is used to release energy stored in food.

- Living organisms need energy for their activities and processes such as reproduction, excretion, movement and digestion.

- But this energy is stored in the food we eat, and before it can be used by the cells of the body, it must be released from the food by the process of respiration.

– For respiration to be continous, there must be a constant supply of oxygen.

–The breathing of human beings and many animals is one form of respiration, occurring within the tissue of the body is another form of respiration, called internal respiration.

– A third form of respiration called cellular respiration occurs within the cell itself.

- Carbon dioxide and water are produced at the end of respiration, and the energy produced appears in the form of heat.

–- Respiration can be represented by the equation given next:

$C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_20$ + Energy.

i.e Glucose + Oxygen →Carbon dioxide+ Water + Energy.

–Since in photosynthesis carbon dioxide and water combine to form carbohydrate (glucose) and oxygen, and in respiration oxygen and glucose combine to form carbon dioxide and water, then respiration can be said to be opposite to photosynthesis.

–The equation for photosynthesis is given by:

$6H_2O + 6CO_2 \rightarrow C_6H_{12}0_6 + 6C0_2$.

i.e Water + carbon dioxide -> Carbohydrate+ oxygen.

Types of respiration:

–There two types and these are:

(a) Aerobic respiration.
(b) Anaerobic respiration.

Aerobic Respiration:

–This is the type of respiration which occurs in the presence of oxygen.

- Most plants and animals respire aerobically.

Anaerobic Respiration:

–This is the type of respiration which occurs without oxygen.

–This type of respiration is practiced by very few living organisms, such as yeast.

– The conversion of carbohydrate by yeast to carbon dioxide and alcohol is referred to as fermentation.

External and Internal respiration:

- Respiration occurs in two stages and these are external and internal respiration.

External Respiration:

– The breathing of human beings and many animals is a form of respiration called external respiration.

- External respiration refers to the taking in of oxygen and the bringing out of carbon dioxide and water vapour.

–This process is normally referred to as breathing.

– External respiration or breathing occurs between the lungs and the outside environment.

Internal Respiration:

–The blood stream acts as a transportation system, carrying oxygen to all the cells and carbon dioxide away from them.

– Internal respiration occurs when the oxygen in the blood diffuses into the cells, for them to use to oxidize food substances so as to release energy, carbon dioxide and water.

– Since internal respiration occurs within the tissue, it is also referred to as tissue respiration.

- Internal respiration follows immediately after external respiration.

–The heart pumps blood containing oxygen to all parts of the body and as the blood flows through the body capillaries, the oxygen passes through the thin wall into the tissue cells.

– At the same time, the blood picks up carbon dioxide from these cells and carries it back to the lung for it to be excreted.

The Respiration System:

–The body of man is divided into the thoracic cavity(thorax) and the abdominal cavity.

–The respiratory system can be found in the thorax(i.e the chest).

–The main organs of the respiration are the lungs, and we have the right and the left lungs, both of which lie within the chest.

–The spongy lungs tissue is divided into many small air sacs called alveoli.

– Of equal importance are the ribs that form the chest cage and the muscles that move them.

The breathing process or mechanism:

- Breathing is made up of two separate acts and these are:

(1) Inspiration or inhaling i.e. breathing in.
(2) Expiration or exhaling i.e. breathing out.

– For breathing to occur, the chest muscles must act so as to expand and contract the chest cavity, causing the lungs to fill or empty.

- A pause occurs between inspiration and expiration.

Inspiration:

–For a person to breath in, his chest must expand for the lungs to fill the chest cavity completely.

– The lungs expansion lowers the pressure within them, creating a slight vacuum that pulls air into the lungs from the atmosphere.