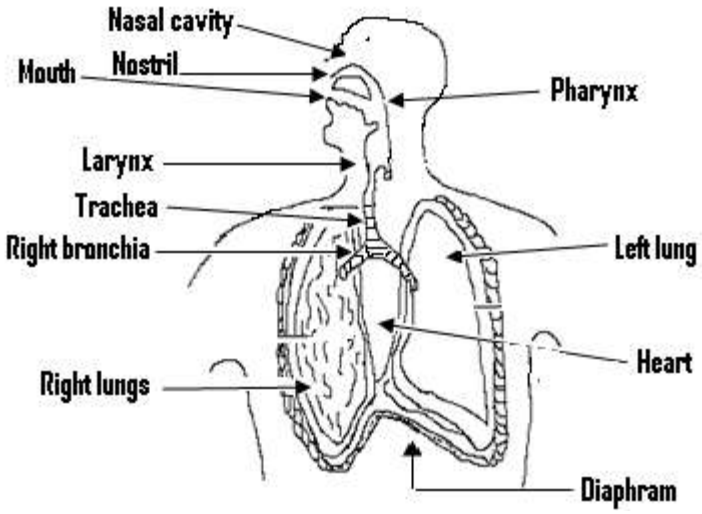
Chapter Thirteen

Respiration and excretion

Respiration:



- Living things need energy in order to live and perform activities such as movement and reproduction.
- This energy is had from the food they eat, and before the energy is released from the food for these living things, oxygen is used.
- Respiration is the process by which oxygen is used to release the energy stored in food.

Types of respiration:

- There are 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 or perform this type of respiration.

Anaerobic respiration:

- This is the type of respiration which occurs without the use oxygen.
- It takes place in a few organisms.

External and internal respiration:

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

External respiration:

- The breathing of human beings and 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.
- This process is normally referred to as breathing.

Internal respiration:

- It is the duty of the blood stream to carry oxygen to all the cells of the body, and to carry carbon dioxide away from these cells.
- Internal respiration occurs when the oxygen in the blood diffuses or moves into the cells, for them to use it.
- At the same time, carbon dioxide from the cells diffuses into the blood, and is carried to the lungs for it to be excreted or removed from the body.

Respiratory system:

- The body of man is divided into the thoraxic cavity (thorax) and the abdominal cavity (abdomen).
- The respiratory system can be found in the thorax (i.e. the chest).
- The main organs of respiration are the lungs, and we have the right and the left lungs, both of which lie within the chest.

- Within the lungs can be found air sacs called alveoli, which contain blood vessels called capillaries.
- Another organ of respiration is the diaphragm.
- Of importance are the ribs and the muscles.

The breathing process:

- Breathing is made up of two separate acts and these are:
  (i) Inspiration (inhaling) i.e. breathing in.
  (ii) Expiration (exhaling) i.e. breathing out.
- For breathing to occur, the chest muscles must act so as to cause the chest cavity to expand or contract.

Inspiration:

- For a person to breath in, his chest must expand for the lungs also to expand to fill the chest cavity completely.
- This results in the movement of air from the atmosphere into the lungs.

Expiration:

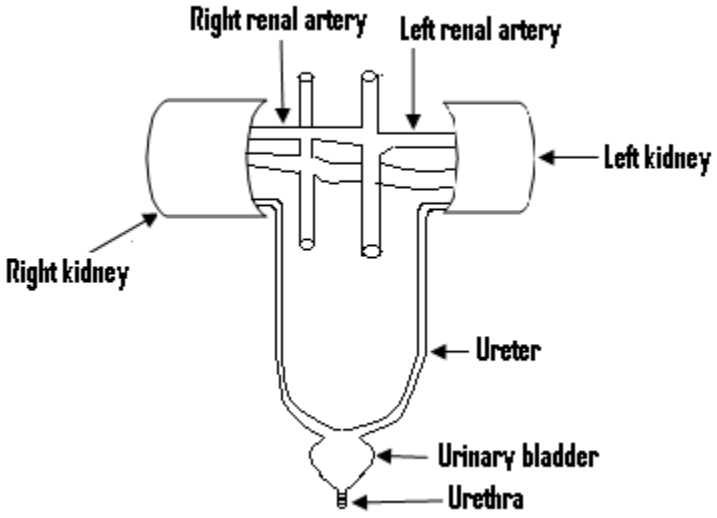
- For a person to breath out, his chest must contract, which causes the contraction of his lungs.
- This causes the air within the lungs to be brought out.

Excretion:

- This is the process whereby waste products are removed from the body.
- In man, the waste products removed are carbon dioxide, excess mineral salts, urea and uric acid.
- The food we take in may be in excess or more than what is needed.
- While some of these food substances taken into the body can be stored, others cannot be stored.
- For example when there is excess glucose within the body, it will be changed into and stored as glycogen.
- For there is an organ within the body where this glycogen can be stored.
- But when there is excess amino acid within the body, it must be removed from the body since there is no organ where it can be stored.

- Also during respiration, carbon dioxide is produced and since this is harmful to the body, then it must be removed from the body.
- The organs which remove or excrete waste substances from the body, are referred to as excretory organs.
- The excretory organs are the kidney, the lungs, the skin and the liver.
- These waste products from the body are called excretory products.

The Kidney:



- The kidney removes excess mineral salts, water and urea from the body.
- This organ has a bean shape and we have two kidneys.
- Blood containing water, oxygen, glucose, urea and salts enter the kidney through the renal artery.
- The oxygen within the blood is used up by the cells of the kidney, for respiration.
- Some of the glucose as well as some of the salts and a large portion of the water, are absorbed by the kidney to produce urine.
- The urine produced is therefore made up of urea, salts, large amount of water and sometimes glucose.
- It then flows through the ureter into the urinary bladder, where it is stored.
- When the urinary bladder is full, the urine is brought out of the body through the urethra.

- By so doing, the excess mineral salt, water, urea and sometimes glucose are removed from the body.

The Skin:

- The skin is considered as an excretory organ because it contains sweat glands, and as such is able to produce sweat which is an excretory product.
- The skin is made up of two main layers and these are :

(1) The outer layer called the epidermis.

(2) The inner layer called the dermis.