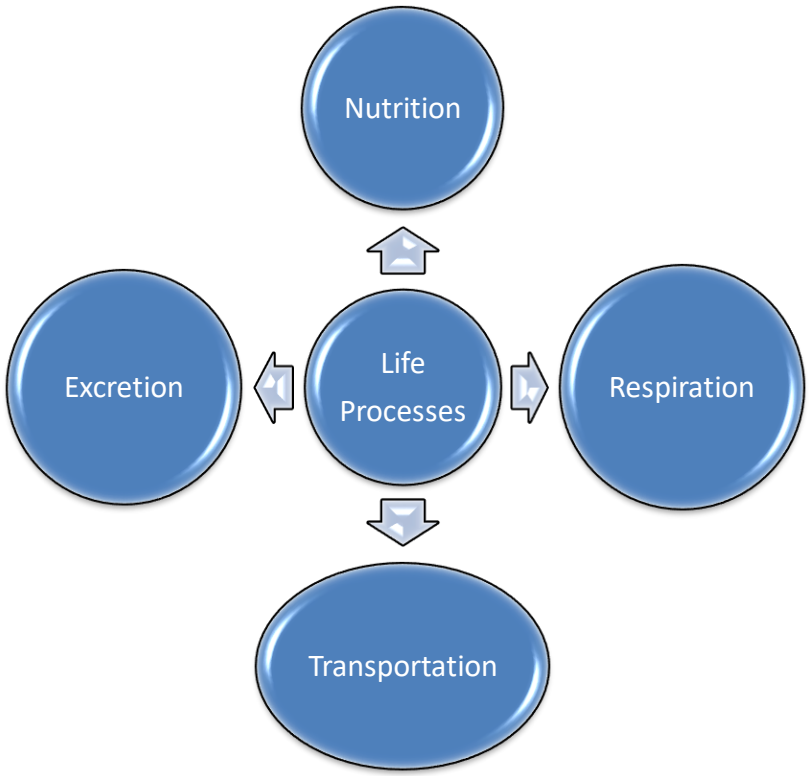
SCIENCE

(Biology)

Life Processes

The basic functions performed by organisms to maintain their life on Earth are called **life processes**.

All living things perform certain life processes like growth, excretion, respiration, circulation etc. All the processes like respiration, digestion, which together keep the living organisms live and perform the job of body maintenance are called life processes.

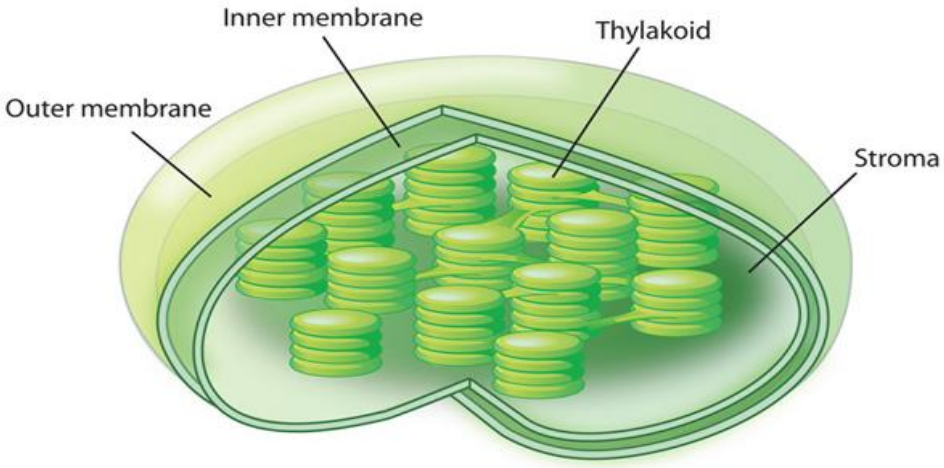


Nutrition

1. Autotrophic Nutrition

- It is the mode of nutrition in which organisms synthesise their own food from simple inorganic substances such as water and carbon dioxide.
- Green plants are autotrophs. They synthesise food by the process of photosynthesis.
- **Photosynthesis** is a physiological process by which plant cells containing chlorophyll produce food in the form of carbohydrates using carbon dioxide, water and light energy. Oxygen is released as a by- product of this process.
- **Chlorophyll** is the green pigment found in green plants.
- Chlorophyll is present in chloroplasts.
- **Chloroplast** is a membrane-bound oval cell organelle.
- It is enclosed by a double membrane. Its interior contains closely packed flattened sacs called **thylakoids**. Chlorophyll is present in the thylakoids.
- Thylakoids are arranged in piles called **grana** lying in a colourless ground substance called **stroma**.
- Cells present in the spongy mesophyll layer and the palisade layer contain chloroplasts;

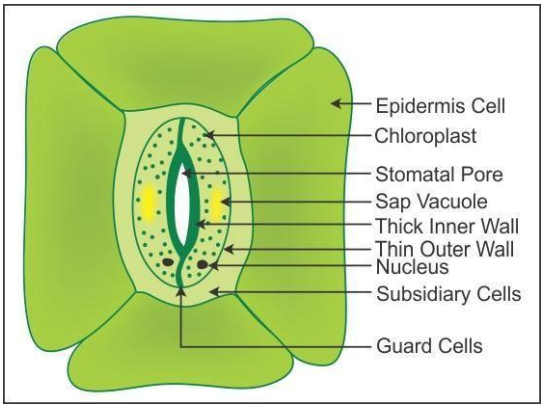
therefore, they are the site of photosynthesis.



Chloroplast

Stomata

- Stomata are minute openings present in the epidermal layers of leaves.
- They are responsible for gas exchange during photosynthesis.



Process of Photosynthesis

- The **palisade layer** is the centre for photosynthesis. Light energy is trapped in the chlorophyll of the mesophyll cells in the palisade layer of leaves.
- The chemical equation for photosynthesis is

$$\underset{\text{Carbon Dioxide}}{6\,CO_2} + \underset{\text{Water}}{6\,H_2O} \xrightarrow[Chlorophyll]{Sunlight} \underset{\text{Carbohydrate}}{C_6H_{12}O_6} + \underset{\text{Oxygen}}{6\,O_2}$$

Light is absorbed by chlorophyll.

Light energy absorbed is converted into chemical energy.

At the same time photolysis of water takes place i.e. a water molecule is split into hydrogen and oxygen.

Carbon dioxide is converted into glucose by using ATP and NADPH produced during the light reaction.

Chlorophyll, light, carbon dioxide and water are necessary for photosynthesis.

2. Heterotrophic Nutrition

- It is the mode of nutrition of organisms which cannot synthesise their own food, but they are dependent on other organisms for food.
- Organisms exhibiting heterotrophic nutrition are called **heterotrophs**.

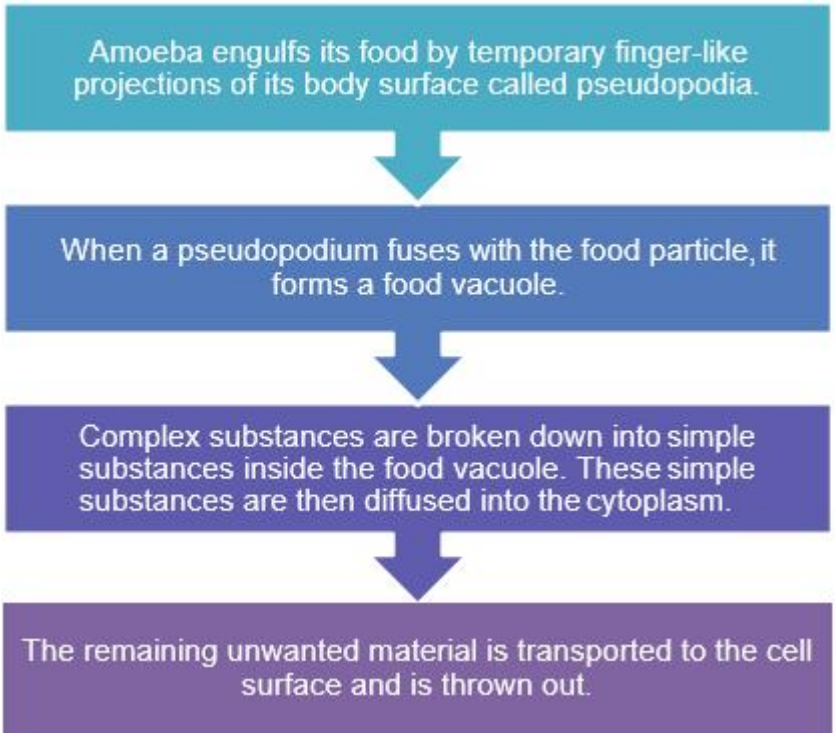
  Examples: yeasts, fungi, bacteria, human beings, tiger, monkey, birds, lion, cow etc.

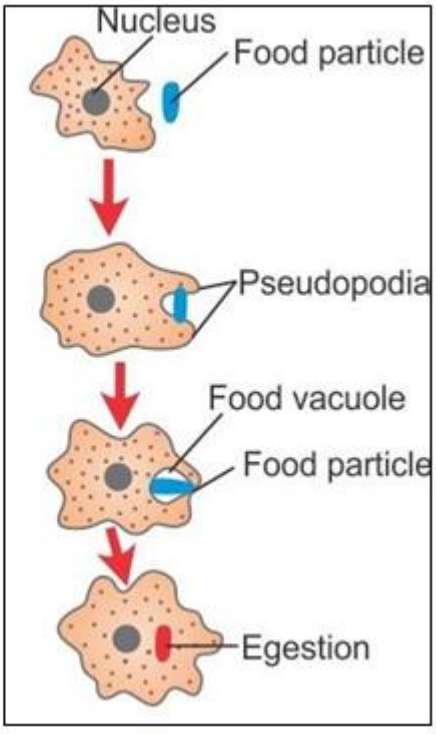
Types of Heterotrophic Nutrition

- **Saprotrophic Nutrition:** Organisms obtain their food from dead, decaying plants and animals. Example: Mushrooms
- **Parasitic Nutrition:** Organisms obtain their food from the bodies of other living organisms. Parasites usually harm the host while obtaining their food.
- Example: Leech
- **Holozoic Nutrition:** It is a mode of nutrition in which organisms feed on solid food. The food is complex organic material which when ingested is broken down into simple inorganic substances by the process of digestion.

  Example: Humans

3. Nutrition in Amoeba





Nutrition in Paramecium

- The food is taken in at a specific spot, i.e. the oral groove.
- The food is brought close to the oral groove by the cilia present on the body surface of paramecium.