

Topic: Photosynthesis

Photosynthesis is the process by which green plants, algae, and some bacteria convert sunlight, carbon dioxide, and water into glucose and oxygen. This process occurs in the chloroplasts of plant cells, which contain the pigment chlorophyll. Chlorophyll absorbs light energy, which is then used to drive the chemical reactions of photosynthesis.

Photosynthesis can be divided into two main stages:

1. Light-dependent reactions: These reactions occur in the thylakoid membranes of the chloroplasts and require sunlight. They produce ATP and NADPH, which are used in the next stage.
2. Light-independent reactions (Calvin cycle): These reactions occur in the stroma of the chloroplasts and do not require sunlight. They use ATP and NADPH to convert carbon dioxide into glucose.

Importance of Photosynthesis:

- It is the primary source of energy for most life on Earth.
- It produces oxygen, which is essential for the survival of most organisms.
- It helps regulate the Earth's climate by absorbing carbon dioxide.

Topic: Cellular Respiration

Cellular respiration is the process by which cells break down glucose to produce energy in the form of ATP. This process occurs in the mitochondria of eukaryotic cells and involves three main stages:

1. Glycolysis: This occurs in the cytoplasm and breaks down glucose into pyruvate, producing a small amount of ATP.
2. Krebs cycle (Citric Acid Cycle): This occurs in the mitochondrial matrix and produces ATP, NADH, and FADH₂.
3. Electron Transport Chain (ETC): This occurs in the inner mitochondrial membrane and produces the majority of ATP through oxidative phosphorylation.

Importance of Cellular Respiration:

- It provides energy for cellular activities.
- It produces carbon dioxide as a byproduct, which is used in photosynthesis.
- It is essential for the survival of aerobic organisms.