

Life Process

1. Photo = Light

Synthesis = Process / system / Reaction

i.e. Photosynthesis means – Light Process.

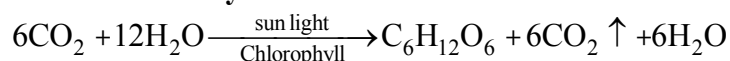
2. Wave Lengths of visible light is 400 – 700 nm
3. Amount of CO₂ present in atmosphere 0.03%
4. Photolysis: Photo = light; Lysis = Breaking down
5. Formation A.T.P. is called Phosphorylation

- AMP + Phosphate → ADP (Adenosine Di phosphate)
- ADP + Phosphate → ATP (Adenosine Tri Phosphate)

➤ **How AMP is formed?**

Adenosine + Phosphate → AMP

➤ **Equation of Photo Synthesis**



Photolysis of water: The splitting of water molecule into H⁺ OH⁻ ions by light activated chlorophyll is called photolysis of water

Dark reaction: The Reduction of CO₂ into Glucose is called dark Reaction.

Pigment: Pigment is a complex molecule that absorbs light of specific wavelength in the visible Region. Chloroplast is green in colour because of a pigment called chlorophyll. The Pigment present in chloroplast converts light energy into chemical energy

Ex: Formula of chlorophyll. A is **C₅₅H₇₂O₆N₄ Mg**.

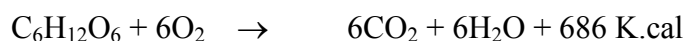
RESPIRATION:

It is derived from Greek word called Respirare = to breaks

- Oxidation of food materials into **CO₂ + H₂O** for the production of Energy is called Respiration; as these processes occur in the cell hence it is cellular respiration. (Food material like carbohydrates and Fats) Respiration is of two types. They are

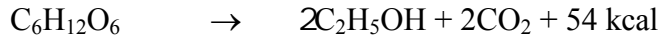
Aerobic Respiration and Anaerobic Respiration

- Oxidation of food materials into CO₂ and H₂O for the production of Energy (in the form of A.T.P.) in the presence of Oxygen (air) is called **Aerobic Respiration**



Anaerobic Respiration:

Oxidation of food materials into Ethyle alcohol and CO₂ in the absence of oxygen is called **Anaerobic Respiration**.



Stages of Aerobic Respiration:

1. Glycolysis:

Glyco = Sugar; Lysis = Breakingdown

i.e. Breaking down of sugar (Glucose) molecule is called Glycolysis or

- The Oxidation of glucose into two molecules of pyruvic acid is called Glycolysis.
- Glycolysis takes place in Cytoplasm of the cell.

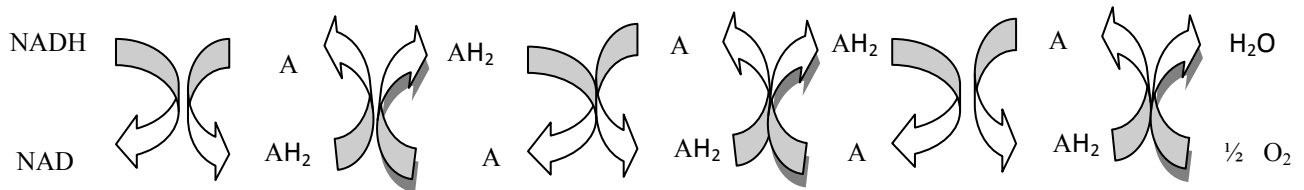
2. Krebs Cycle: Oxidation of pyruvic acid to CO_2 and water in the presence of O_2 is called Krebs cycle. It takes place in Matrix of mitochondria.

- Krebs Cycle requires O_2

During Krebs cycle 2. A.T.P. are formed

2. Electron Transport: It is the 3rd stage of Aerobic Respiration. It takes place in membrane of mitochondria.

During Glycolysis and Krebs cycle some electrons carriers and reach to O_2 and formed water. This process is called electron transport



Fermentation: In the absence of oxygen pyruvic acid is completely oxidized into Ethyl Alcohol (Ethanol). This process is called Fermentation. It takes place in cytoplasm of the cell (Yeast)

- Molasses, Grape Juice, Germinating barley or wheat grains are used as raw materials for production of Alcohol and other beverages.

- Numbers of A.T.P. are formed in Aerobic. Respiration = 40 A.T.P.
- Glycolysis = 4 A.T.P.
- Krebs cycle = 2 A.T.P.
- Electron Transport = 34 A.T.P.
- Total = **40 A.T.P.**

- Net gain of A.T.P. are in Aerobic Respiration = 38 A.T.P.
- Number of A.T.P. are in Anaerobic Respiration = 10 A.T.P.

i.e. – Glycolysis = 4. A.T.P. + 2 NADH

1 NADH = 3. A.T.P.

$\therefore 2 \text{ NADH} = 6 \text{ A.T.P.}$

$\therefore \text{ Total} = 10 \text{ A.T.P.}$

Net gain of A.T.P. in Anaerobic Respiration = 8 A.T.P.

Respiratory substrates:

Substances which are oxidized in the body during respiration to produce energy are called as Respiratory substrates

Eg: Glucose, Amino Acids and Fatty Acids.

ATP Provides Energy for various reactions and function in the organism.

1. A.T.P is required for the synthesis of carbohydrates, proteins, lipids and Nucleic Acids.
2. A.T.P. is required for transport of ions, conduction of nerve impulses, Amoeboid movement, movement of cilia and flagella
3. A .T.P. is required for muscle contraction and Transport of nutrients.

▪ **Factors of Respiration are –**

1. Oxygen
2. Temperature
3. Enzymes

Optimum temperature: The temperature at which the rate of respiration is maximum is called optimum temperature.

Organs of Respiration in Animals:

Through surface of the body

1. Amoeba - Protozoa
2. Euglena – Protozoa
3. Paramecium – Protozoa

Through skin

4. Earthworm - Annelida
5. Leech – Annelida
6. Neries - Annelida

- | | | |
|-----------------------------|---|--------------|
| 7. Insects – like Cockroach | → | Trachea |
| 8. Scorpion | → | Book lungs |
| 9. Fish | → | Gills |
| 10. Prawn | → | Gills |
| 11. Frog | → | Skin & Lungs |
| 12. Reptiles | → | Lungs |
| 13. Aves | → | Lungs |
| 14. Mammals | → | Lungs |

- Respiration through skin is called **Cutaneous Respiration**
Eg: Earth worm, Leech, frog etc.
- Respiration through gills is called **Bronchial Respiration**

Eg: Fish, Prawn & Larva of Frog (Tadpole)

- Respiration through Lungs is called **Pulmonary Respiration**
Eg: Reptiles, Aves and mammals.
- Respiration through Trachea is called **Tracheal Respiration**.
Eg: Cockroach, House fly, Butter fly etc.i.e. in All insects

Check Yourself

1. Wave lengths of visible light _____
2. Number A.T.P.'s that are utilized during Glycolysis is _____
3. Net gain of A.T.P.'s is Aerobic Respiration _____
4. Net gain of A.T.P.'s is anaerobic Respiration _____
5. Respiratory organ in cockroach is _____
6. _____ is the respiratory organ in scorpion
7. Optimal temperature is _____
8. Full form of A.M.P. is _____
9. Electron transport is takes place is _____
10. A.T.P. is required for synthesis of _____ & _____
11. Which gas was evolved during respiration is _____
12. Fermentation Produces _____
13. Respiration takes place in presence of _____
14. Conversion of CO₂ into Glucose is called _____
15. One NADH oxidizes to give _____ A.T.Ps

Answers

1. 400 – 700 nm
2. 2
3. 38
4. 8
5. Trachea
6. Book Lungs
7. 45°C
8. Adenosine mono Phosphate
9. Membrane of mitochondria
10. Carbohydrates, Proteins, Lipids and Nucleic
11. Oxygen

12. Ethyl Alcohol and CO₂
13. Optimum temperature.
14. Dark Reaction
15. 3