Photosynthesis: Light Dependent Reactions

Light Dependent Reactions occur in the thylakoid, a part of the chloroplast. This process requires sunlight, water, and chlorophyll.

The Process of Light Dependent Reactions

- Sunlight enters the thylakoid and is absorbed by chlorophyll.
- Water is broken down into hydrogen and oxygen.
- Oxygen is released into the atmosphere.
- Hydrogen is carried away by NADP+, which becomes NADPH.

  NADPH is a molecule that carries hydrogen and energy. It is often referred to as a "backpack" that carries energy to the next step in the process.

The Role of NADPH

NADPH	Description
Energy Carrier	Carries energy from light dependent reactions to light independent reactions
Hydrogen Carrier	Carries hydrogen from water to the Calvin cycle

Photosynthesis: Light Independent Reactions

Light Independent Reactions, also known as the Calvin Cycle, occur in the stroma, a fluid-filled region of the chloroplast. This process does not require sunlight.

The Process of Light Independent Reactions

- Carbon dioxide from the atmosphere enters the stroma.
- NADPH from light dependent reactions provides energy for the process.
- Carbon dioxide is fixed into a glucose molecule through a series of reactions.

  Carbon fixation is the process of converting low-energy, inorganic molecules into high-energy, organic molecules.

The Calvin Cycle

Step	Description
Carbon Fixation	Carbon dioxide is converted into a glucose molecule
Energy from NADPH	Energy from NADPH is used to drive the process
Glucose Production	Glucose is produced and released into the plant

Key Terms

- **Chlorophyll**: a green pigment that absorbs sunlight
- **Thylakoid**: a part of the chloroplast where light dependent reactions occur
- **Stroma**: a fluid-filled region of the chloroplast where light independent reactions occur
- **NADPH**: a molecule that carries hydrogen and energy
- **Calvin Cycle**: a series of reactions that occur in the stroma to produce glucose