

Photosynthesis

Understanding the Marvels of Photosynthesis


Photosynthesis, the magical process that sustains life on Earth, is a captivating journey that unfolds within the green cells of plants. At its heart are two remarkable stages: the light-dependent reactions and the light-independent reactions.

Light-Dependent Reactions:

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back into the stroma through ATP synthase, ATP is synthesized. Meanwhile, water molecules are split by the process of photolysis, releasing oxygen and electrons. These electrons are used to reduce NADP^+ to NADPH.

Light-Independent Reactions (Calvin Cycle):

Location: The light-independent reactions, also known as the Calvin cycle, occur in the stroma of the chloroplasts.

Photosynthesis

Input: The primary inputs are carbon dioxide (CO_2), ATP, and NADPH from the light-dependent reactions.

Output: The main output is glucose ($\text{C}_6\text{H}_{12}\text{O}_6$).

Description: The Calvin cycle is a series of chemical reactions that use ATP and NADPH from the light-dependent reactions to convert carbon dioxide into glucose.

NADPH

atmosphere

(RuBisCO)

oxygen

3-phosphoglycerate

3-phosphoglycerate

G3P

and

regenerate

The

to capture light energy,

NADPH, and use that energy to synthesize glucose and other organic compounds

from carbon dioxide. This process is essential for providing energy and organic

matter for plants and, ultimately, for all living organisms on Earth.

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Check the correct options to answer the questions.

- 1) Where do the light-dependent reactions of photosynthesis primarily take place?
 - a) nucleus
 - b) mitochondria
 - c) stroma
 - d) thylakoid membrane
- 2) What is the primary output of the light-independent reactions (Calvin cycle)?

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- 1) The light-independent reactions occur in the thylakoid membranes. _____
 - 2) Oxygen is produced during the light-independent reactions. _____
 - 3) ATP and NADPH are products of the light-dependent reactions. _____
 - 4) The Calvin cycle uses ATP and NADPH from the light-dependent reactions to convert carbon dioxide into glucose. _____

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Read each question and write your answer in the space provided.

- 1) Where does the Calvin cycle take place, and what are its primary inputs?

2) **Preview**

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3)

- 4) How does the light-independent reaction (Calvin cycle) contribute to the production of glucose?
