Biology 20

Unit C: Photosynthesis and cellular respiration

Light reactions in the thylakoid

Oxygen from pondweed in light

- Pondweed under a bright lamp releases a string of bubbles.
- Move the lamp away and the string slows.



Light, then two chemical products

- Chlorophyll and other pigments absorb light in the thylakoid.
- NADP is reduced to NADPH.
- Chemiosmosis at the membrane stores energy in ATP.

Key terms

thylakoid

The membrane sac inside a chloroplast where the light reactions occur.

chemiosmosis

ATP formation as hydrogen ions flow through ATP synthase in a membrane. ($NADP^+ + H^+$ becomes NADPH)

NADPH

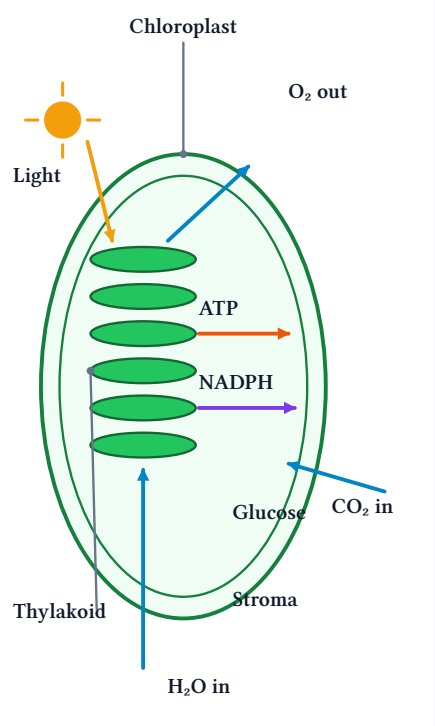
The reduced form of NADP, carrying chemical reducing power from the light reactions.

pigment

A molecule, such as chlorophyll, that absorbs visible light.

Light reactions happen in the thylakoid

- Light hits the stack of green thylakoid discs.
- Water enters the thylakoid and oxygen leaves. ATP and NADPH move into the stroma.
- The fluid around the stack is the stroma. Carbon dioxide enters it, and glucose is made there.



Factor and prediction

- Name light distance or brightness as the factor you change.
- Predict the bubble count in one minute.

Where each product forms

- Point to the thylakoid for NADPH and ATP.
- Save glucose for the stroma lesson.

Light reactions

- Place the light reactions in the chloroplast.
- Name NADPH, ATP, and oxygen.

The stroma uses NADPH and ATP

- NADPH and ATP are ready for carbon dioxide.
- Glucose is the product of that next set of reactions.

Image credits

Krzysztof Ziarnek, Kenraiz, Elodea canadensis kz03, CC BY-SA 4.0