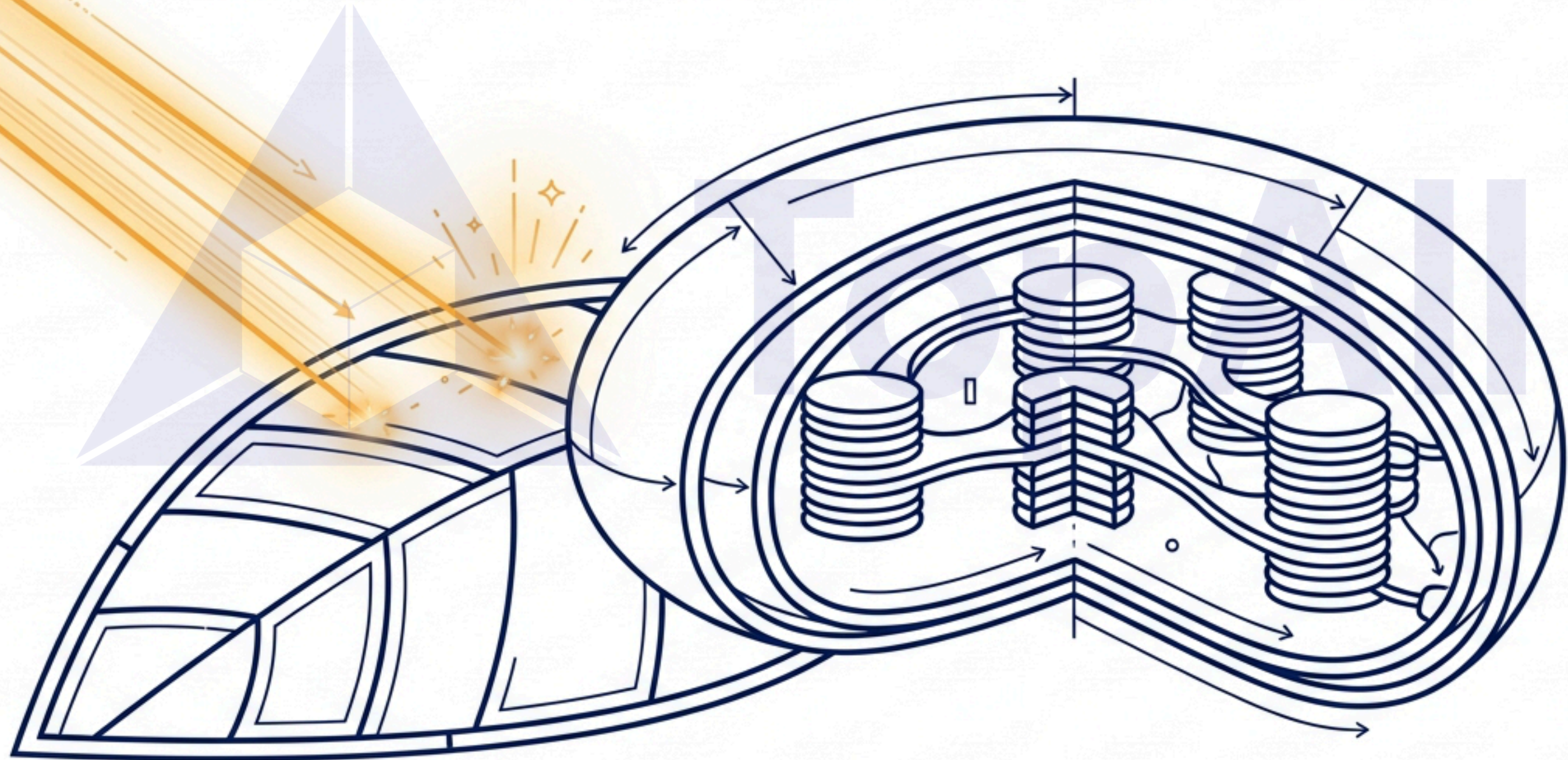


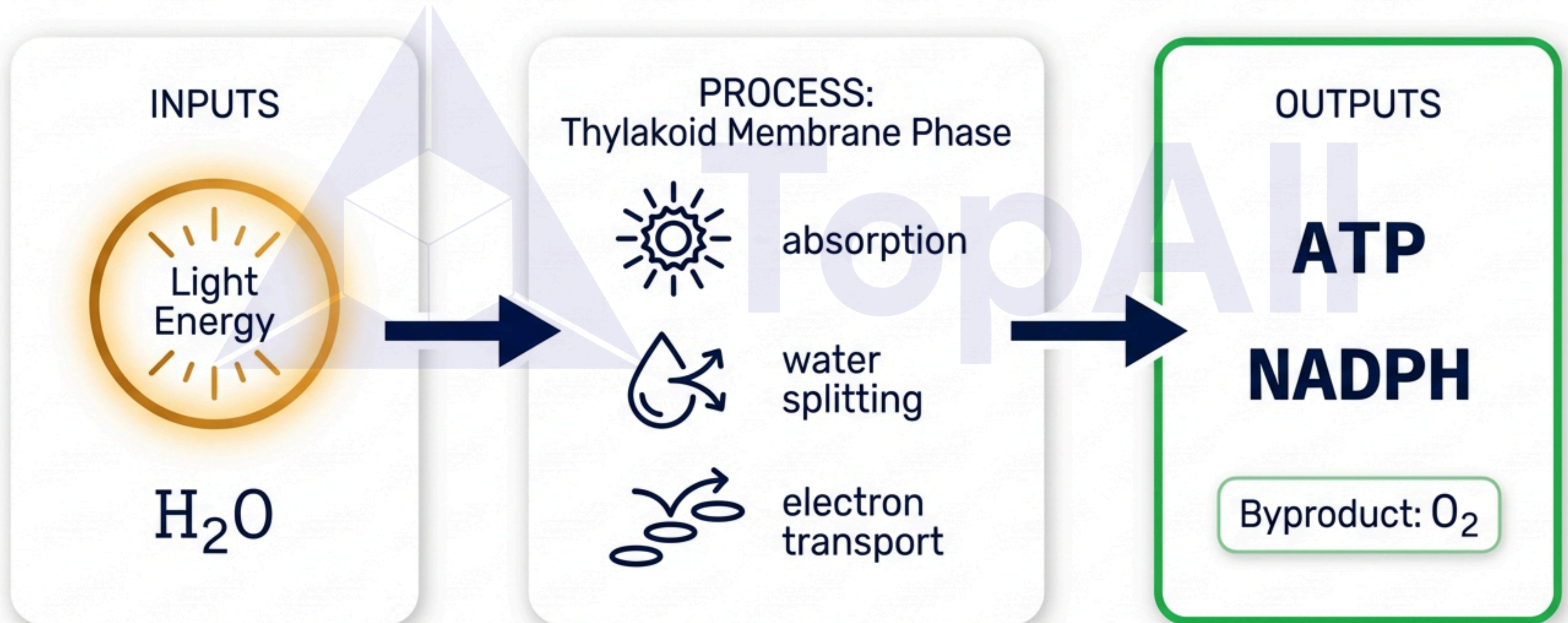
How Plants Capture Sunlight

An Explainer on the Photochemical Phase of Photosynthesis



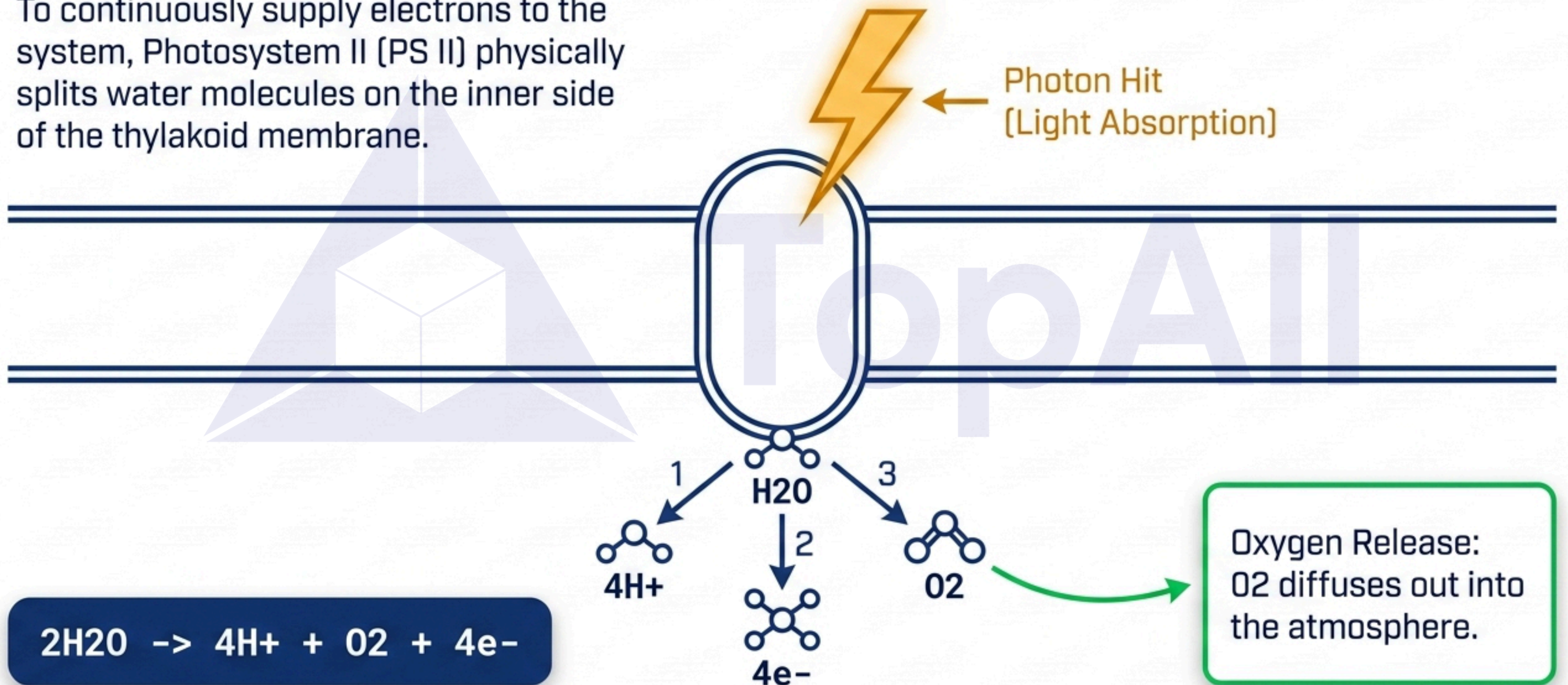
The Photochemical Phase: A Systems Overview

The light reaction is a physico-chemical process directly driven by light energy to create high-energy chemical intermediates.



The Engine of Photosynthesis: Splitting Water

To continuously supply electrons to the system, Photosystem II (PS II) physically splits water molecules on the inner side of the thylakoid membrane.





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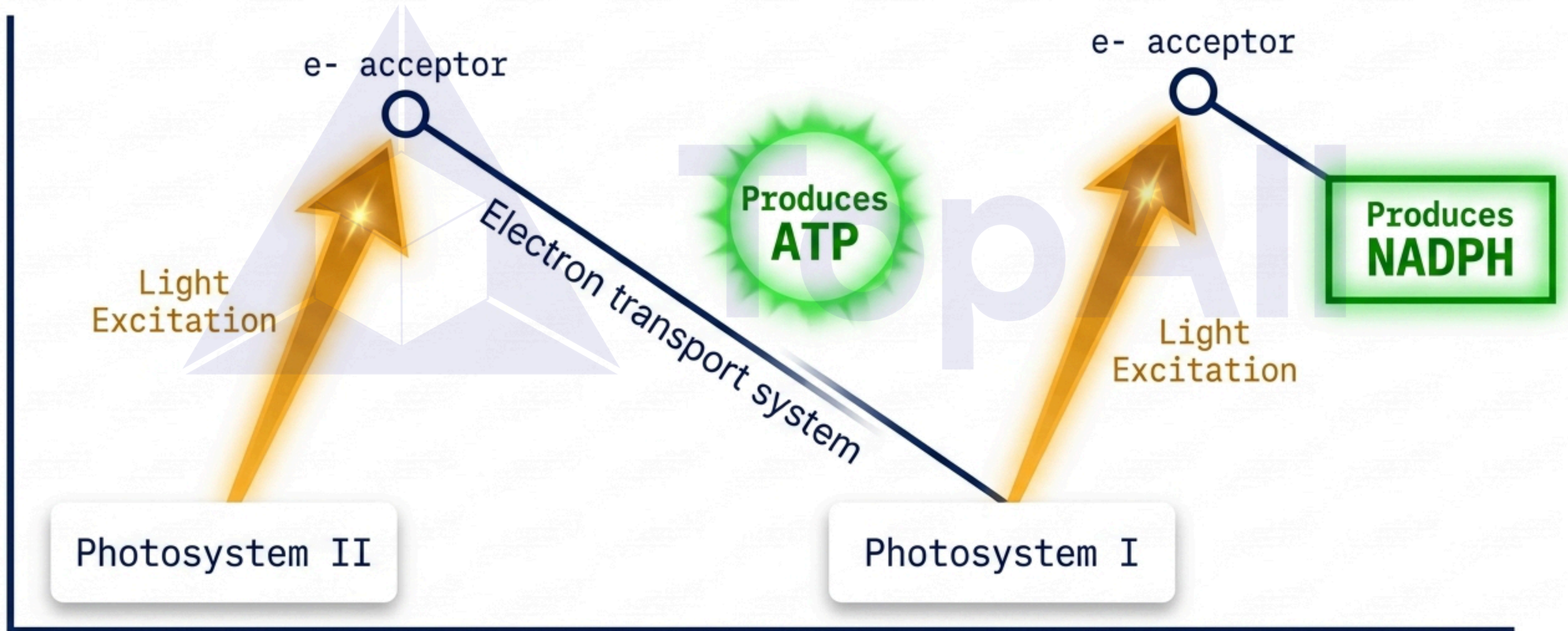
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The Z-Scheme: Forming ATP and NADPH

Electrons move through an electron transport chain on a redox potential scale. They are not consumed, but passed along to synthesize cellular energy.



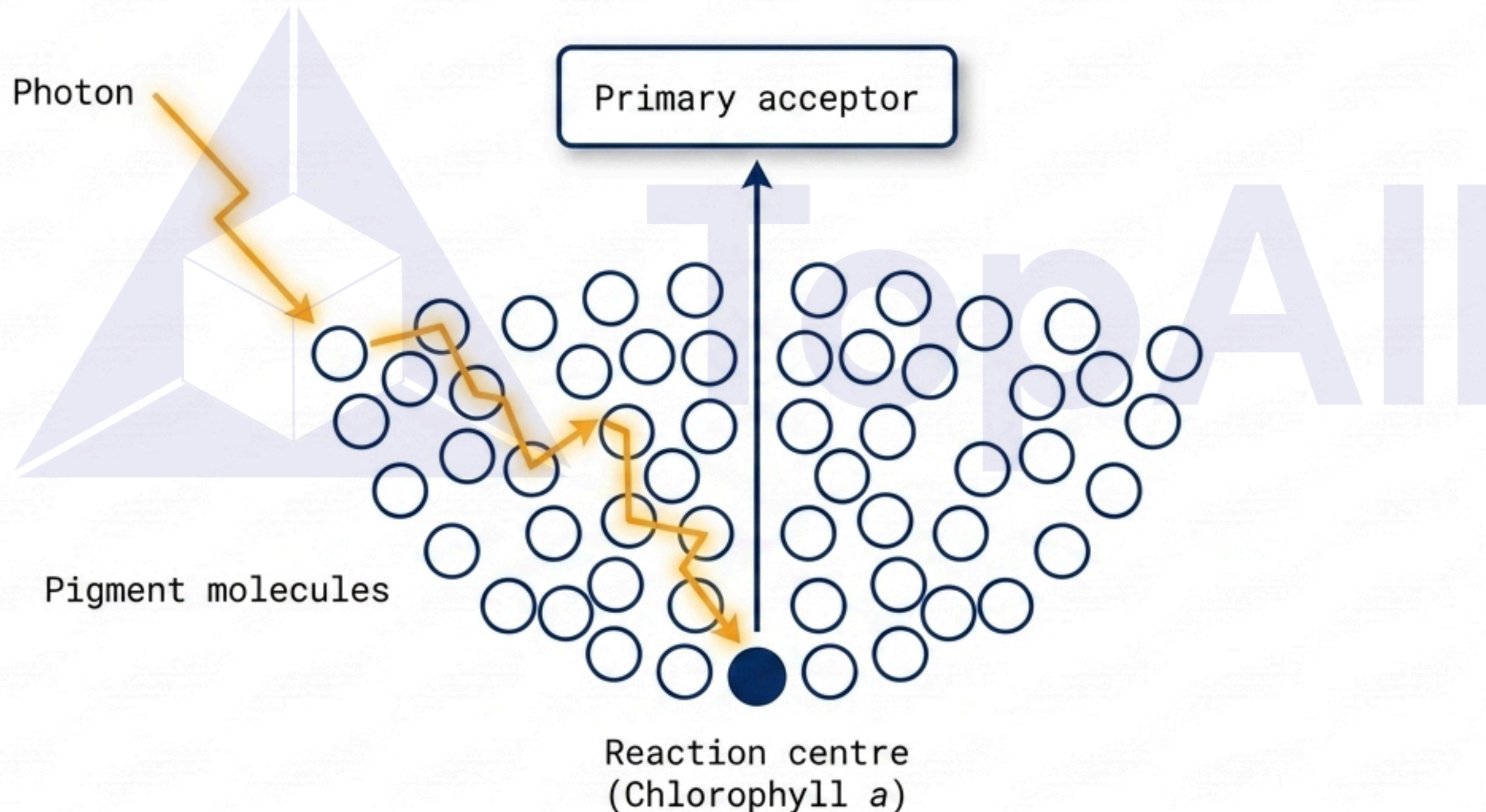
Decoding the Photosystems

The two discrete light harvesting complexes are named for their order of discovery, not their sequence of operation in the light reaction.

Photosystem I (PS I)	Photosystem II (PS II)
Order of Discovery First	Order of Discovery Second
Sequence of Operation Second step in Z-Scheme	Sequence of Operation First step in Z-scheme
Associated Mechanism Reduces NADP^+ to NADPH	Associated Mechanism Splits H_2O to replace electrons

Architecture of the Light Harvesting Complex

Hundreds of accessory pigment molecules act as an antenna, making photosynthesis highly efficient by absorbing diverse light wavelengths and funneling the energy.



Key Takeaway: The Reaction Centers

The single chlorophyll a molecule forming the reaction center differs uniquely between the two photosystems based on its peak light absorption capabilities.

P680

The reaction center in Photosystem II. It has an absorption maximum at 680 nm (red light).

P700

The reaction center in Photosystem I. It has an absorption peak at 700 nm.

These specific wavelengths trigger the electron excitation that powers the entire botanical blueprint.



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