



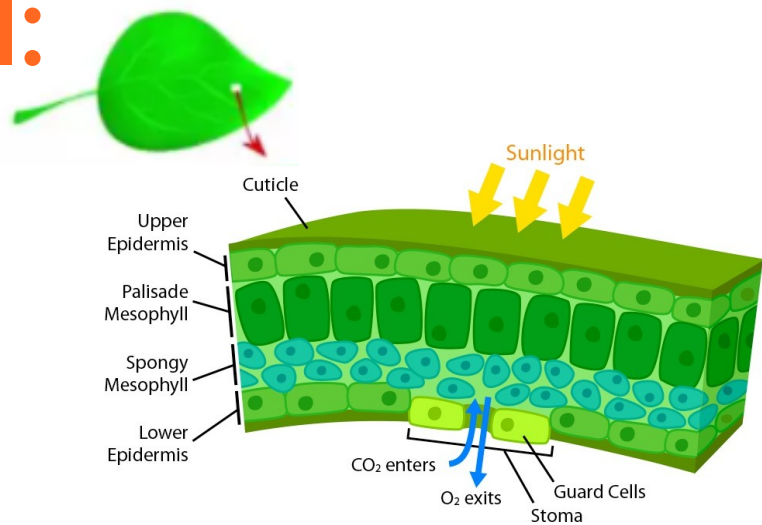
Biology 11 Tutorial

Photosynthesis

Mesophyll:

The leaves of plants have layers, the **mesophyll** is where photosynthesis occurs in eukaryotes. The tiny pores in the leaf called **stomata** is where the exchange of CO_2 and O_2 occur for photosynthesis.

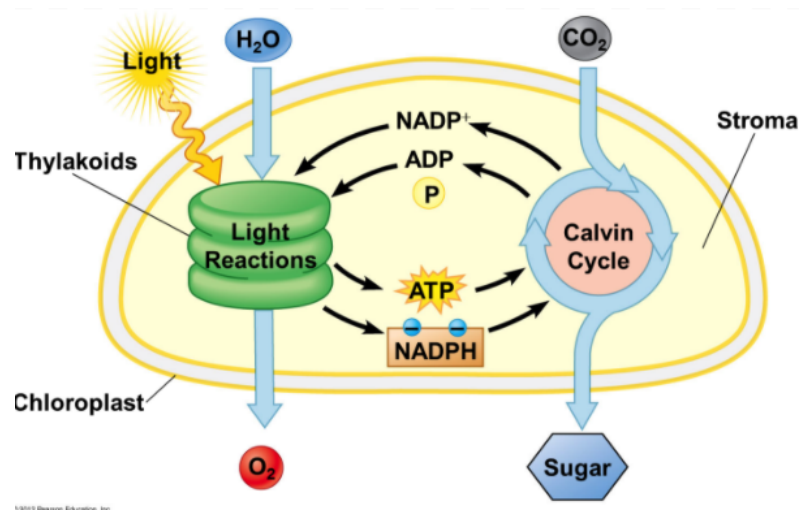
The process occurs in 2 parts, the "photo" part is called **light dependent reactions** or LDR for short and the "synthesis" part is called the **Calvin cycle**.



The cells of the mesophyll contain the majority of **chloroplast** where stacks of **thylakoids** containing a pigment called **chlorophyll** are used to capture the sun's energy in the form of photons.

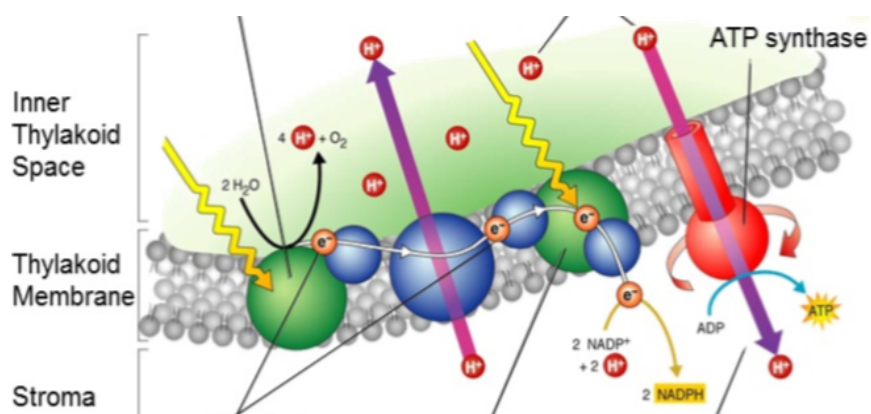
Photosynthesis: 2 part process

PHOTO SYNTHESIS



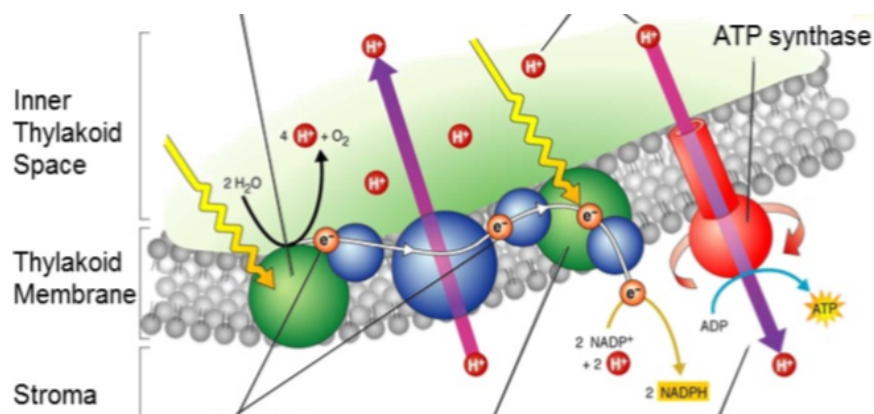
1. Light-dependent Reactions:

- The energy from the sun's light excites **electrons** found within the chlorophyll and sends them along the electron transport chain (ETC). As they move along they disrupt the **concentration** gradient of **hydrogen** ions along the thylakoid membrane.



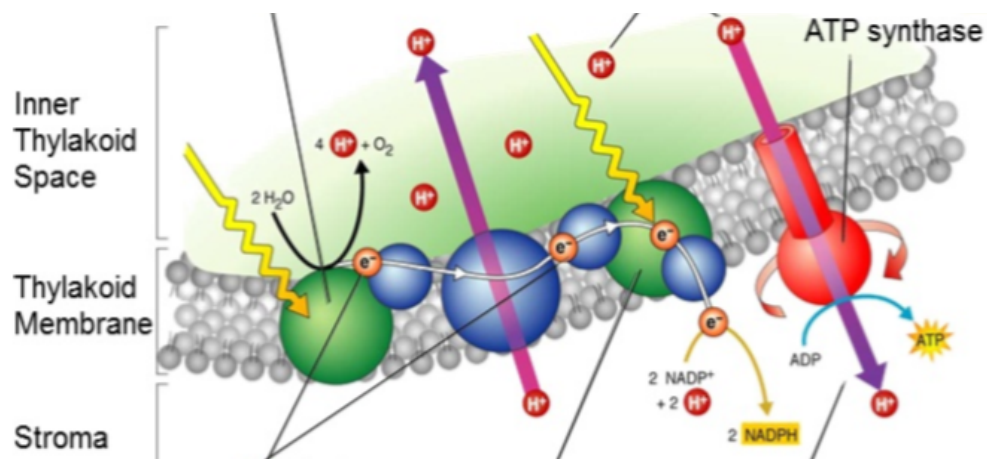
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- **Water** is brought up through the roots of the plant and is **split** using enzymes creating **O₂** which is released through the **stroma** to the atmosphere as well as **hydrogen** ions that further contribute to the imbalanced concentration **gradient**.
- Once the electrons reach the end of the ETC they require a carrier for their **energy** so **NADP⁺** picks up the electrons as well as a **hydrogen** ion creating **NADPH**.



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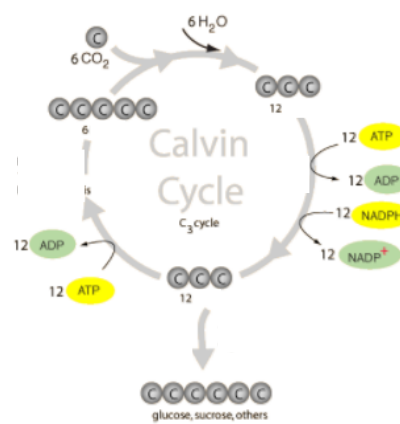
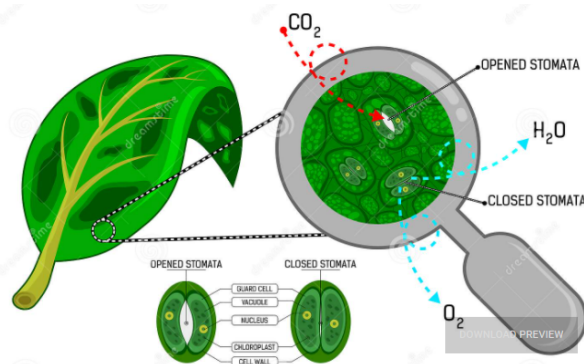
- The imbalance of **hydrogen** ions along the membrane causes H^+ to be pumped through a **protein** channel in the membrane making **energy** that is used to make **ATP** from ADP.
- The captured energy in the **NADPH** and **ATP** are then sent into the stroma and enter the Calvin cycle.



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2. Calvin cycle:

- **CO₂** from the atmosphere is combined to already existing carbon. The energy brought from the LDR is used to move and recombine **carbon** molecules to create **glucose (sugars)**.
- The **ADP** and **NADP⁺** that are left over from the remains of used energy from the ATP and NADPH are sent back to the LDR.



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