

Anabolic - Catabolic Reactions

- **Catabolic Reactions**

- Organic compounds are **broken down** to their monomers by catabolic reactions, most of which result in energy release.
- EX: $\text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \longrightarrow 6\text{CO}_2 + 6\text{H}_2\text{O} + \text{Energy (38 ATP/686 Kcal/mol)}$

- **Anabolic Reactions**

- All reactions in a cell that **build** new molecules are known as anabolic reactions.
- EX:
 $6\text{CO}_2 + 6\text{H}_2\text{O} + \text{Light energy (686 Kcal/mol)} \longrightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$

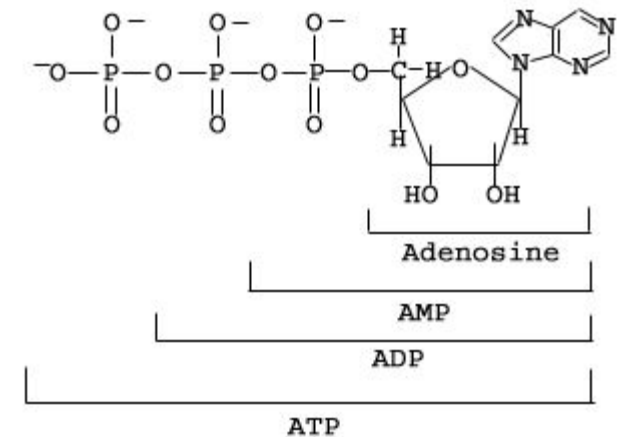
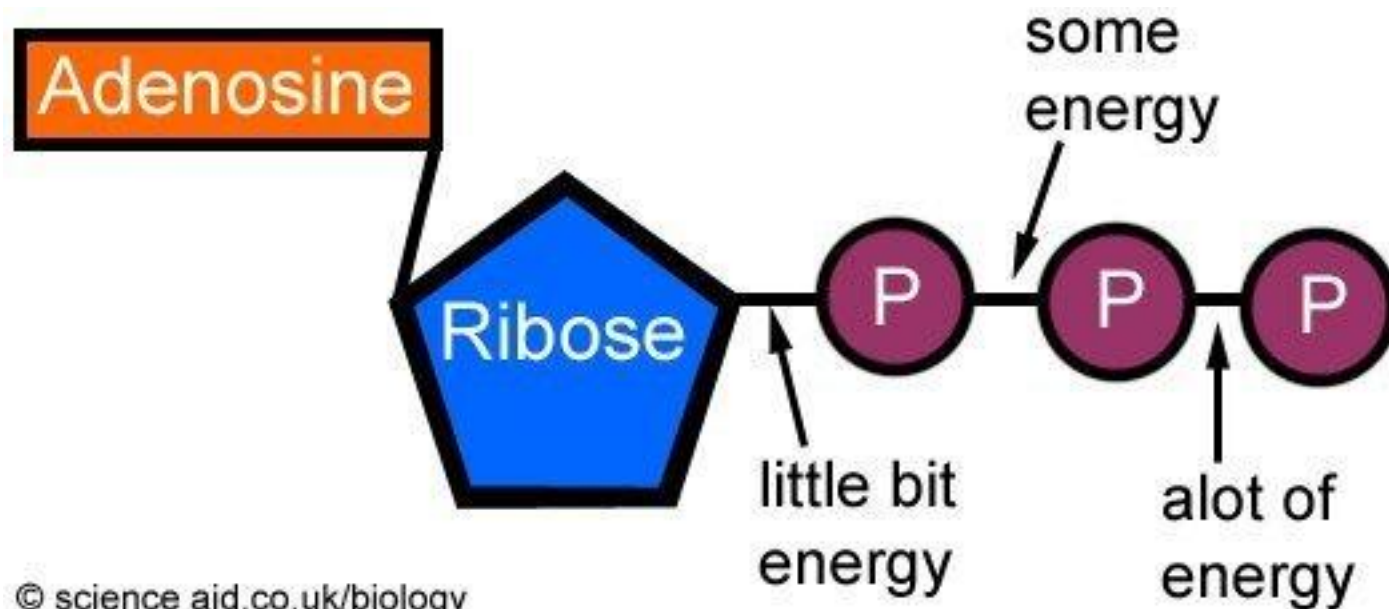
METABOLISM

- Metabolism is **sum** of all biochemical processes in the cell.
- Briefly:

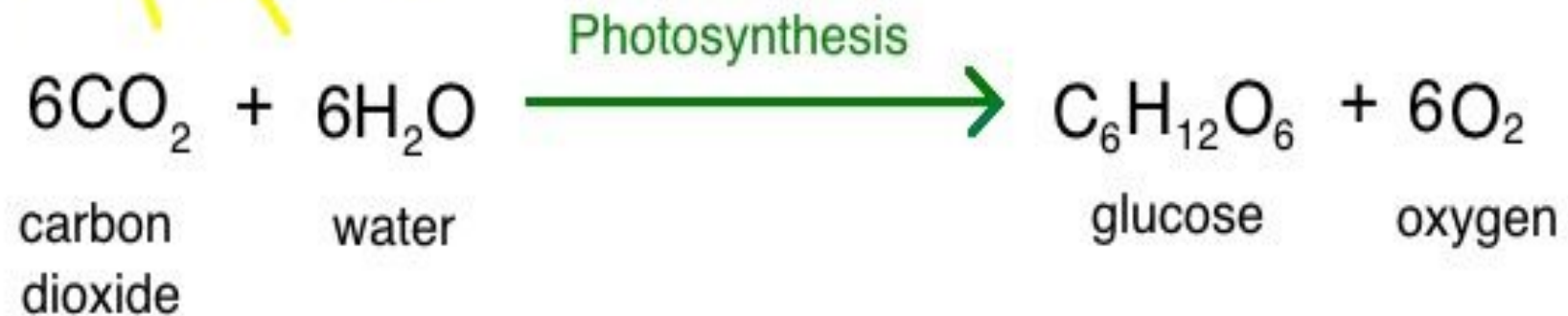
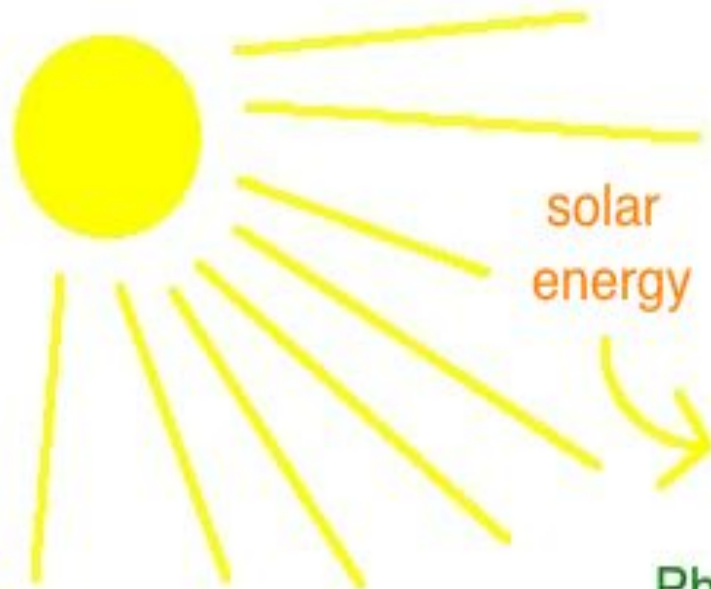
Metabolism = Anabolism + Catabolism

ATP(Adenosine Triphosphate)

- **ATP** is a molecule that used as energy (chemical energy) in the cell.
- ATP is *formed by the addition* of another phosphate group to ADP



PHOTOSYNTHESIS

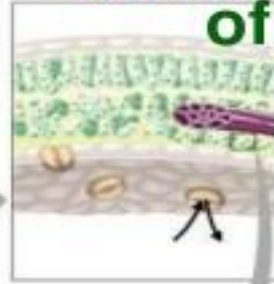


Chloroplasts

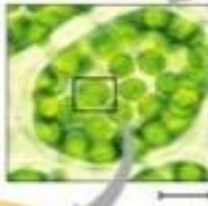
leaves



cross section
of leaf



chloroplasts
in plant cell

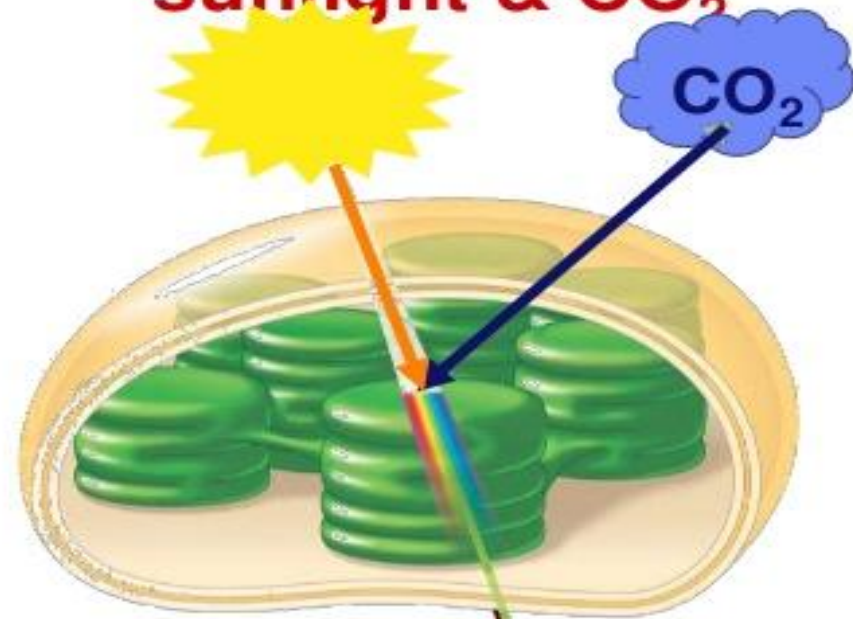


chloroplast



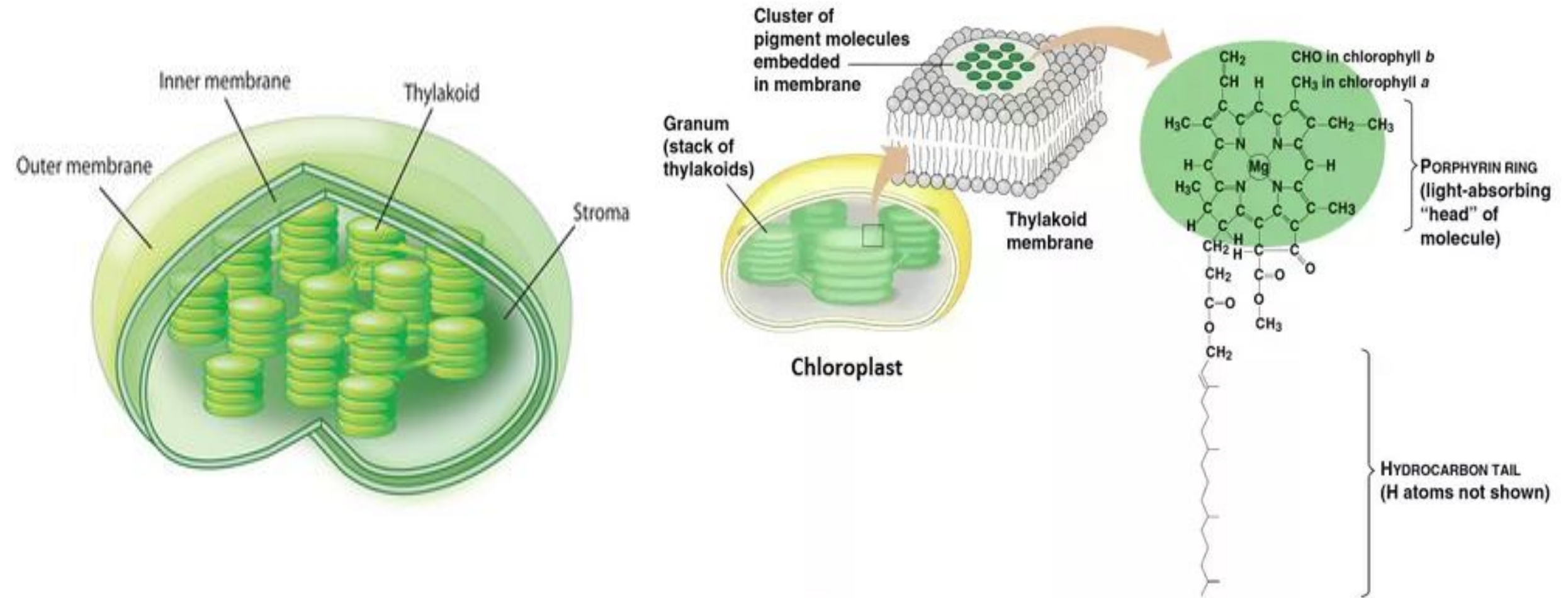
chloroplasts
contain
chlorophyll

absorb
sunlight & CO₂



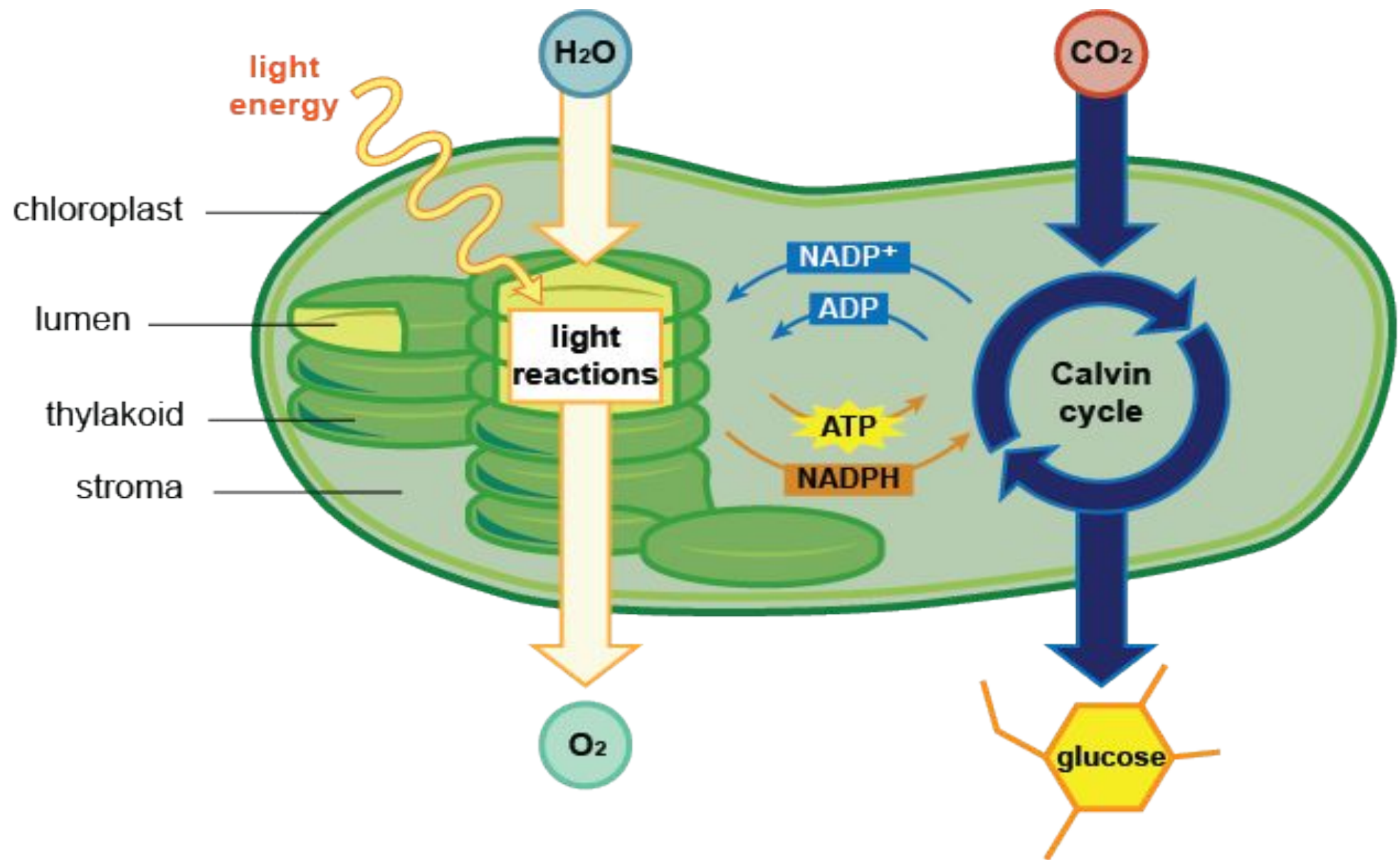
make
energy & sugar

Chlorophyll is molecule which found in chloroplast, which absorbs sunlight



Photosynthesis consist of 2 main stages:
light phase & dark phase

- **Light phase** light energy is converted into chemical energy(ATP). Run only in the present of light.(occurs in **grana{tylacoid}**)
- **Dark phase** products of light phase are used to combine carbon dioxide (CO₂) to produce sugar(C₆H₁₂O₆) molecules.(occurs in **stroma**)



Light reactions

- Light reactions is *running* of electrons from **chlorophyll** to another protein molecules.
- Electrons are replaced by electrons from water(H_2O)
- **Photolysis** is the process splitting of water to 2 electrons, 2 protons, and oxygen.
- As a result of light reactions ATP, NADPH and O_2 are formed

Dark phase

- Dark reactions occur wherever light present or not
- It is series of cycle reactions (**Calvin cycle**)
- During dark phase reactions products of *light reactions* are used to convert CO_2 to $\text{C}_6\text{H}_{12}\text{O}_6$ (sugar).
- The process of adding CO_2 to Calvin cycle is called ***carbon fixation***