

Anabolic - Catabolic Reactions

- **Catabolic Reactions**

- Organic compounds are **broken down** to their monomers by catabolic reactions, most of which result in energy release.

- EX: $C_6H_{12}O_6 + 6O_2 \longrightarrow 6CO_2 + 6H_2O + \text{Energy (38 ATP/686 Kcal/mol)}$

- **Anabolic Reactions**

- All reactions in a cell that **build** new molecules are known as anabolic reactions.

- EX:

- $6CO_2 + 6H_2O + \text{Light energy (686 Kcal/mol)} \longrightarrow C_6H_{12}O_6 + 6O_2$

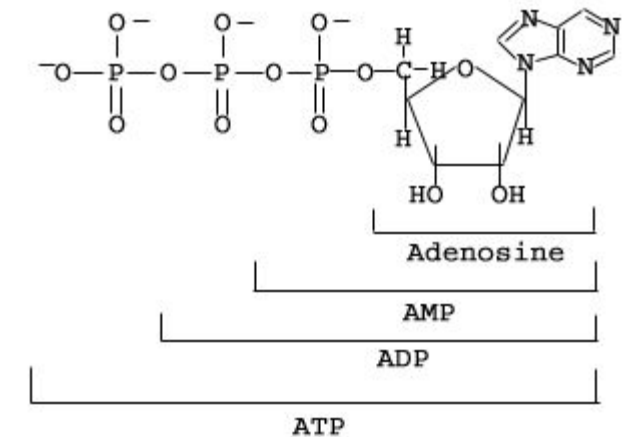
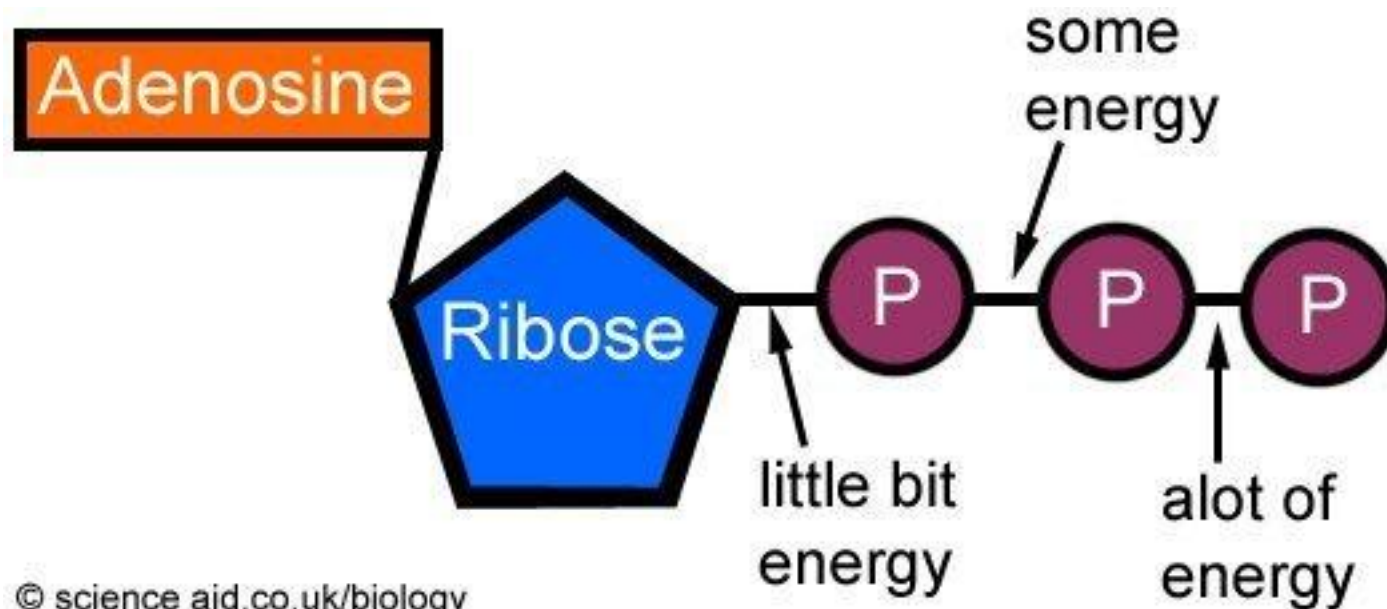
METABOLISM

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

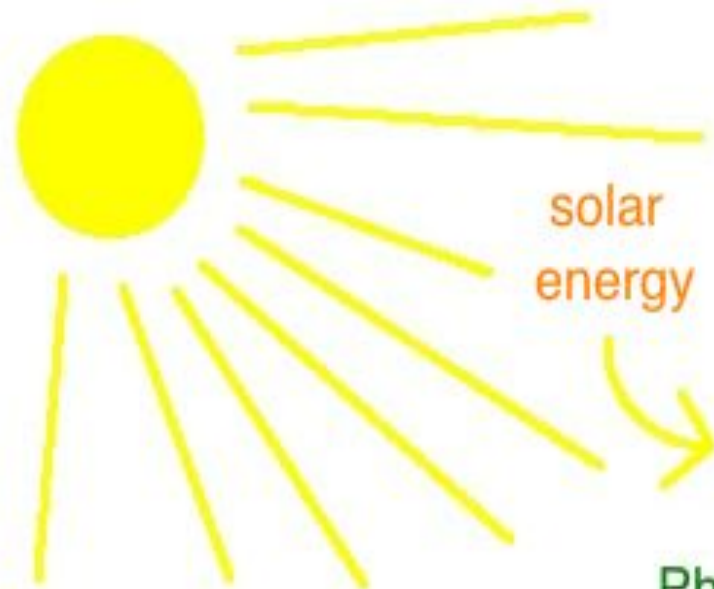
Metabolism = Anabolism + Catabolism

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

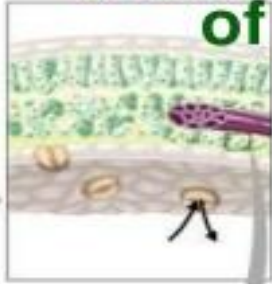


Chloroplasts

leaves



cross section of leaf



chloroplasts in plant cell

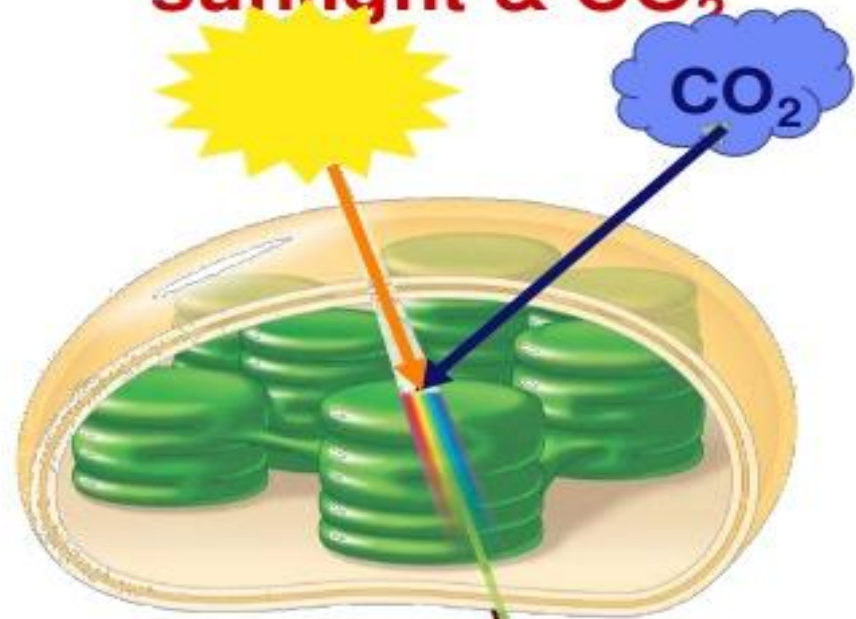


chloroplast



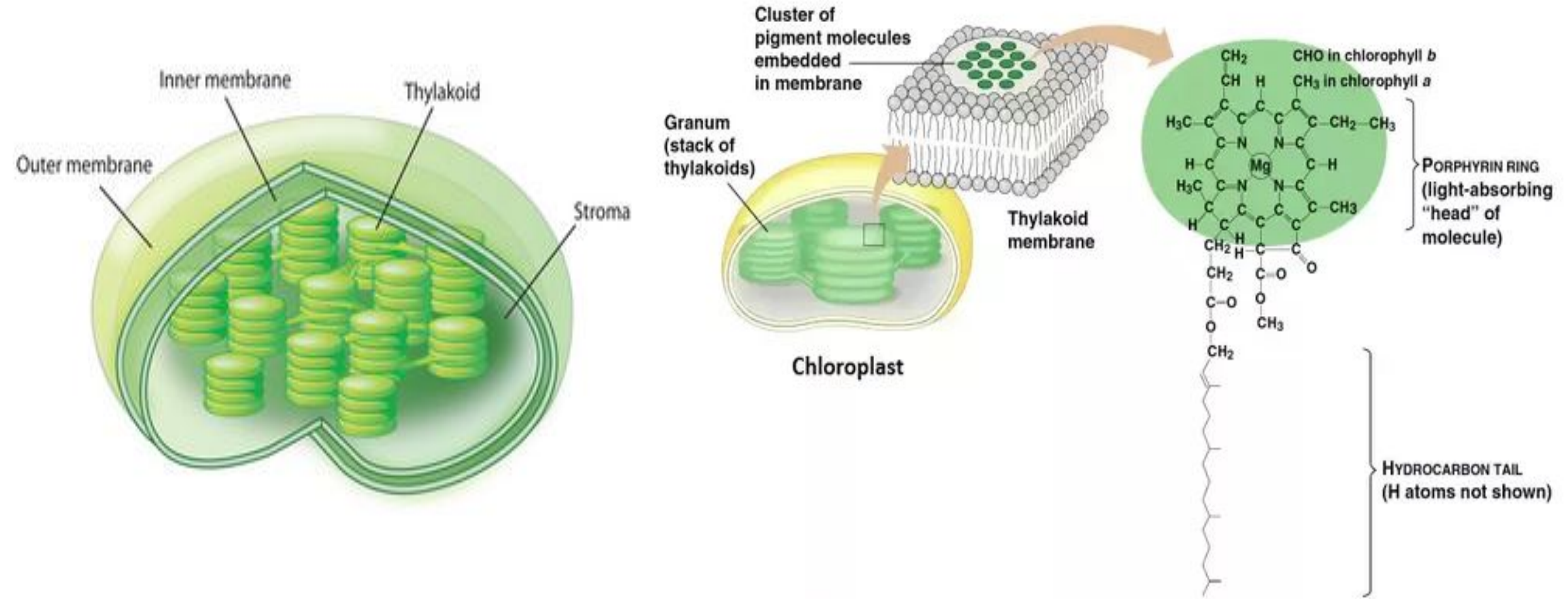
chloroplasts contain chlorophyll

absorb sunlight & CO₂



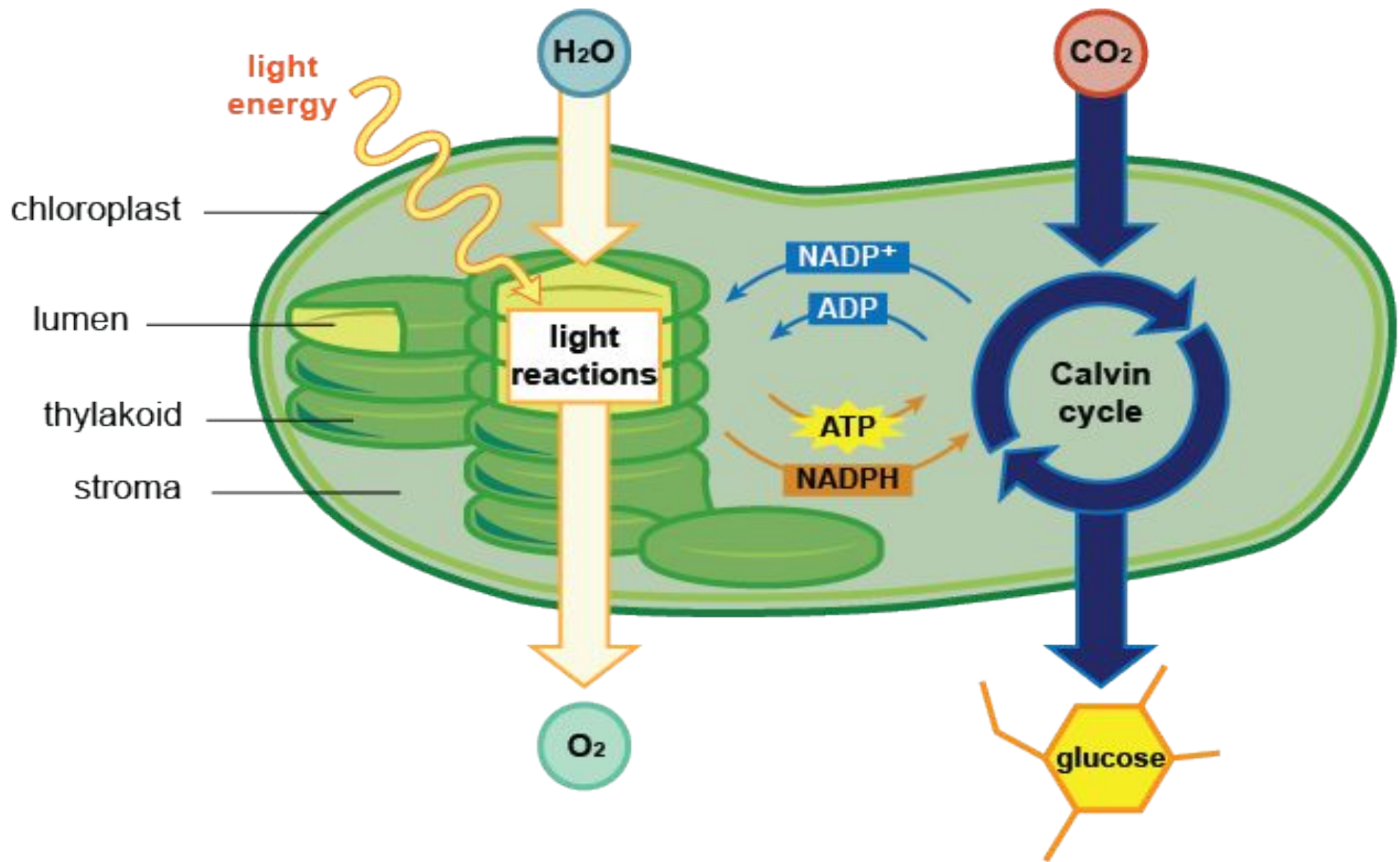
make energy & sugar

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{thylacoid}**)
- **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(H₂O)
- **Photolysis** is the process splitting of water to 2 electrons, 2 protons, and oxygen.
- As a result of light reactions ATP, NADPH and O₂ 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 CO₂ to C₆H₁₂O₆(sugar).
- The process of adding CO₂ to Calvin cycle is called ***carbon fixation***