ATP

Why do we need energy?

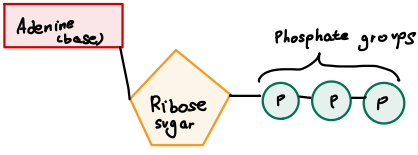
- Plants and animal cells need energy for biological processes to occur.
- For example:
  - Active transport
  - DNA replication
  - Cell division
  - Protein synthesis

During respiration:

- Plants and animal cells release energy from glucose — this is respiration.
- Since a cell can't get energy directly from glucose ↓ hence
- Energy released from glucose is used to make ATP.

ATP stands for Adenosine Triphosphate

- ATP is known as a nucleotide derivative since it is a modified form of a nucleotide.

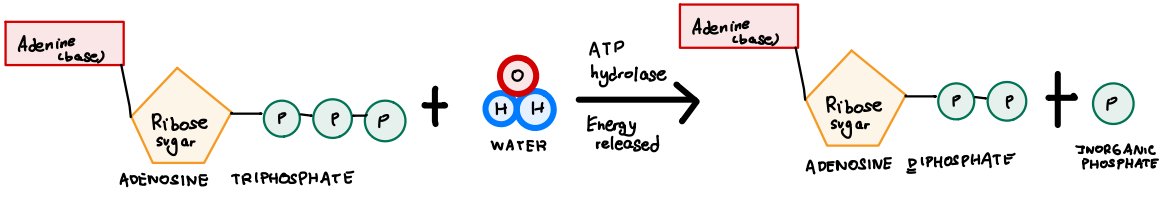


Where is the energy stored?

- The energy in ATP is stored in high energy bonds between the phosphate groups.
- Once ATP is made, it diffuses to the part of the cell that needs energy.

Making and using ATP

- When energy is needed by a cell, ATP is broken down into ADP (adenosine diphosphate) and P_i (inorganic [single] phosphate) in the presence of water.
- Under the catalysation of enzyme ATP hydrolase, a phosphate bond is broken and energy is released.
- This is a hydrolysis reaction.



- The released inorganic phosphate (P_i) can be added to a compound to make it more reactive, this is known as phosphorylation.

ATP Synthesis

- ATP can be resynthesised (remade) in a condensation reaction between ADP and P_i during respiration and photosynthesis.
- This process is catalysed by the enzyme ATP synthase.