

**High energy bond**) is a covalent bond whose breakdown releases energy that cell can use directly. Generally, these bonds bind phosphate group to an organic molecule. The product with such a bond is called a **high-energy compound**. Most high energy compounds are derived from nucleotides.

**Phosphorylation**) the process of attaching a phosphate group to another molecule.

(Example...phosphate + phosphate=diphosphate or a phosphate + ADP= ATP

The requirements of high-energy bonds are:

- 1) A phosphate group
- 2) Enzymes capable of catalyzing the reactions involved, and
- 3) Suitable organic substrates to which the phosphate can be added

The most important such substrate is the nucleotide *adenosine (AMP)*, which already contains 1 phosphate group.

**Adenosine triphosphate**) a 3 phosphates high-energy bond.

The conversion of ADP to ATP is the most important method of storing energy in our cells. The breakdown of ATP to ADP is the most important method of releasing energy.

ATP is our most abundant high-energy compound

Example  $ADP + \text{phosphate group} + \text{energy} \leftarrow ATP + H_2O$

**Adenosine triphosphatase (ATPase)** an enzyme required to perform hydrolytic breakdown of ATP to ADP.

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## **Chemicals and their interactions form functional units called cells**

**Metabolic turnover**) the ongoing process of continually removing and replacing of temporary organic molecules other than DNA