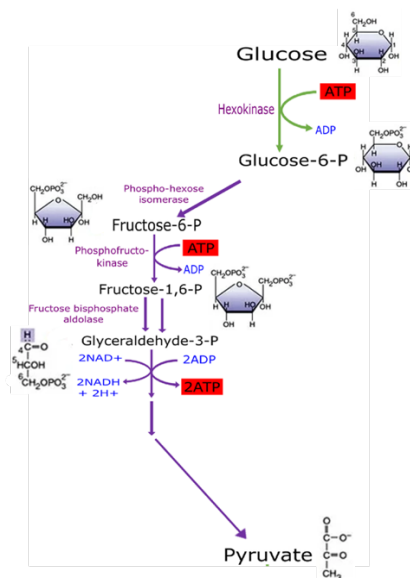


The EMB Pathway - Correction



The EMB pathway describes the different steps of glycolysis:

Step 1: Thanks to the action of an enzyme called hexokinase, glucose is turned into glucose-6-phosphate. This reaction is not spontaneous and requires energy, provided by ATP.

ATP, aka Adenosine Tri Phosphate, also provides the phosphate ion, by turning into Adenosine Di Phosphate, aka ADP.

Note: Enzymes can be recognized by their name, finishing in “-ase”.

Step 2: Under the action of phosphohexoseisomerase, glucose is isomerised into fructose-6-phosphate.

Note: 2 molecules are said to be isomers when they have the same molecular formula, but different structure.

The formula of both glucose and fructose are $C_6H_{12}O_6$, but glucose is an hexose (6-carbon cycle), while fructose is a pentose (5-carbon cycle, with a side chain based on 1 carbon atom).

Step 3: Phosphofructokinase acts on fructose-6-phosphate in adding a second phosphate ion, turning it into fructose-1,6-diphosphate. This reaction again is not spontaneous, and requires energy, provided by ATP.

Step 4: Fructose biphosphate aldolase then separates the symmetrical fructose-1,6-diphosphate ion into 2 identical glyceraldehyde-3-phosphate ions, each having a 3-carbon structure.

Step 5: Each of these glyceraldehyde-3-phosphate ions is then oxidized into a pyruvate ion, through the action of NAD⁺ ions (which are reduced into NADH). This process liberates energy, stored as ATP.

Glycolysis has therefore turned one glucose molecule into 2 pyruvate ions, this enzyme-driven process involving redox reactions.