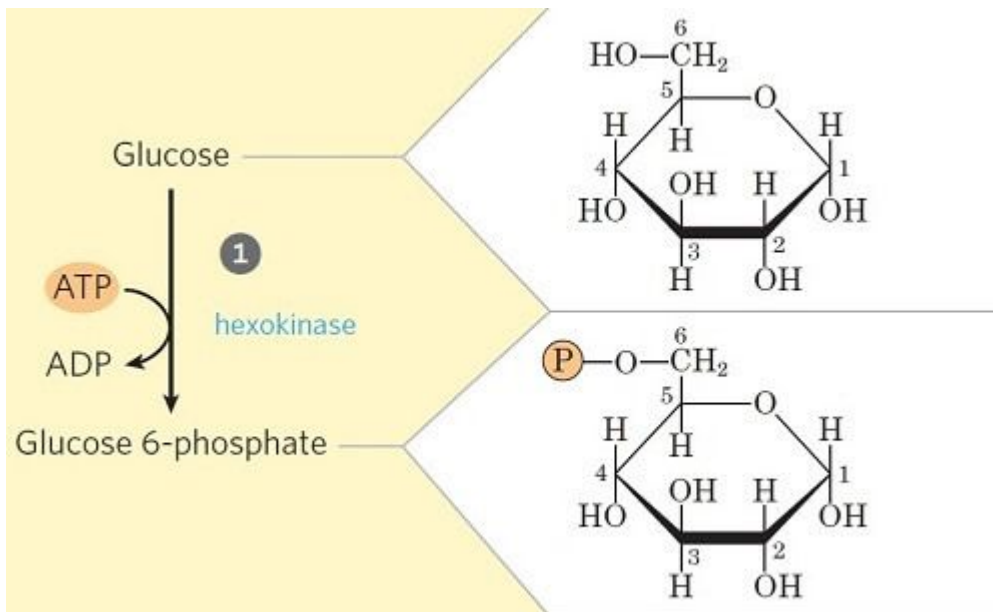


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### STEPS IN GLYCOLYSIS PART-1

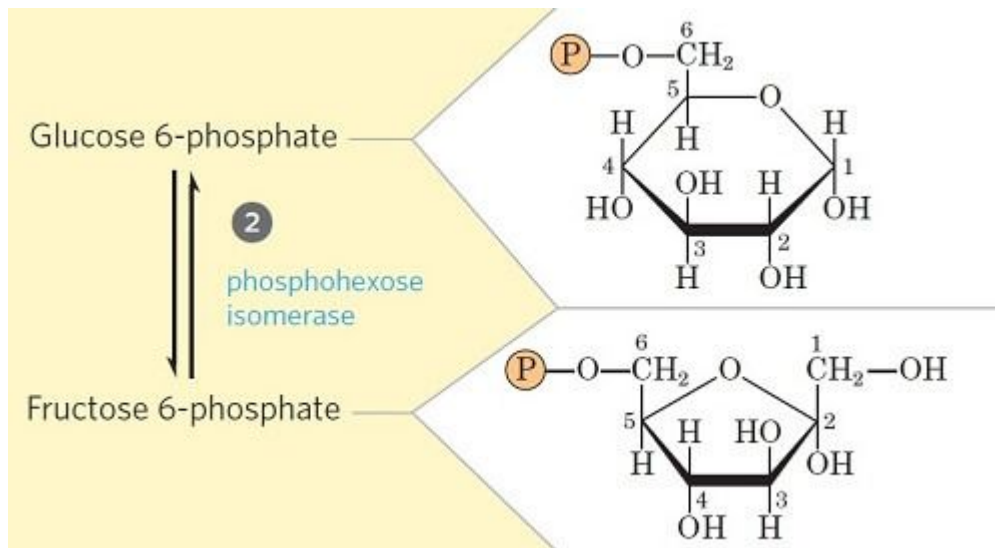
The ten steps of glycolysis occur in the following sequence:

#### Step 1- Phosphorylation of glucose



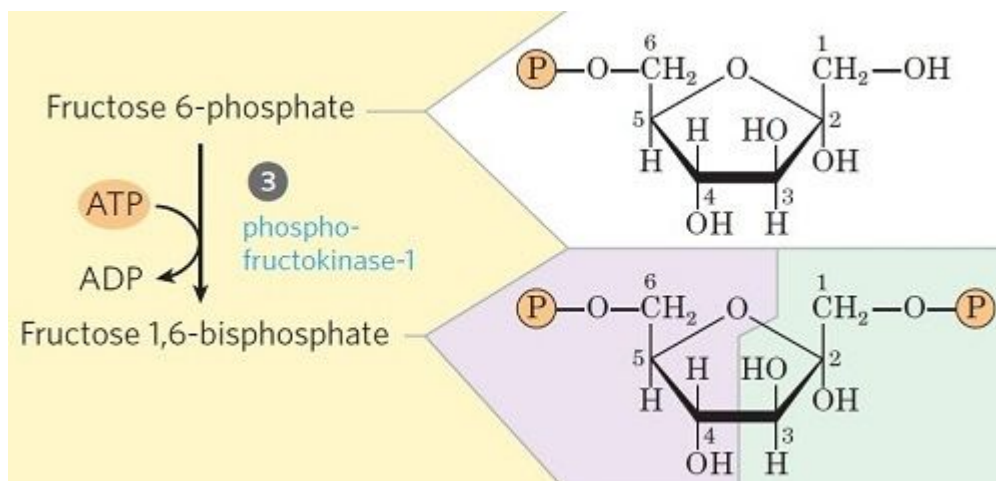
- In the first step of glycolysis, the glucose is initiated or primed for the subsequent steps by phosphorylation at the C<sub>6</sub> carbon.
- The process involves the transfer of phosphate from the ATP to glucose forming Glucose-6-phosphate in the presence of the enzyme hexokinase and glucokinase (in animals and microbes).
- This step is also accompanied by considerable loss of energy as heat.

## Step 2- Isomerization of Glucose-6-phosphate



- Glucose 6-phosphate is reversibly isomerized to fructose 6-phosphate by the enzyme phosphohexoisomerase/phosphoglucoisomerase.
- This reaction involves a shift of the carbonyl oxygen from C1 to C2, thus converting an aldose into a ketose.

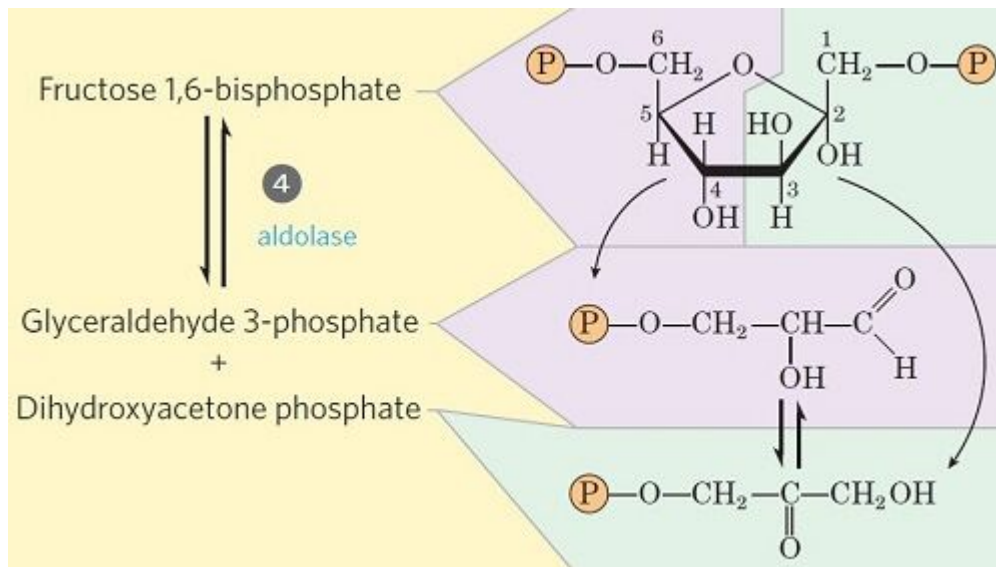
## Step 3- Phosphorylation of fructose-6-phosphate



- This step is the second priming step of glycolysis, where fructose-6-phosphate is converted into fructose-1,6-bisphosphate in the presence of the enzyme phosphofructokinase.

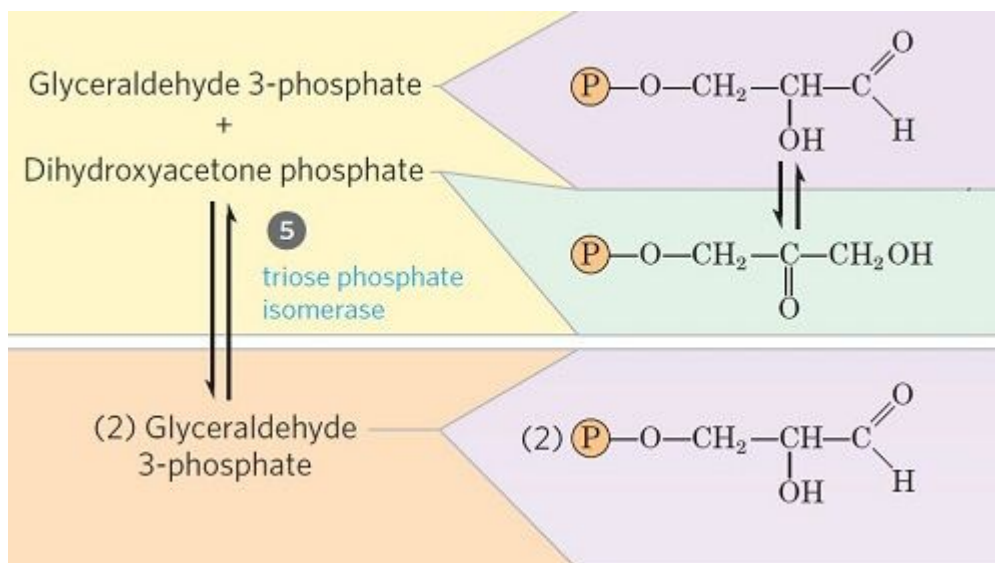
- Like in Step 1, the phosphate is transferred from ATP while some amount of energy is lost in the form of heat as well.

#### Step 4- Cleavage of fructose 1, 6-diphosphate



- This step involves the unique cleavage of the C-C bond in the fructose 1, 6-bisphosphate.
- The enzyme fructose diphosphate aldolase catalyzes the cleavage of fructose 1,6-bisphosphate between C<sub>3</sub> and C<sub>4</sub> resulting in two different triose phosphates: glyceraldehyde 3-phosphate (an aldose) and dihydroxyacetone phosphate (a ketose).
- The remaining steps in glycolysis involve three-carbon units, rather than six carbon units.

#### Step 5- Isomerization of dihydroxyacetone phosphate



- Glyceraldehyde 3-phosphate can be readily degraded in the subsequent steps of glycolysis, but dihydroxyacetone phosphate cannot be. Thus, it is isomerized into glyceraldehyde 3-phosphate instead.
- In this step, dihydroxyacetone phosphate is isomerized into glyceraldehyde 3-phosphate in the presence of the enzyme triose phosphate isomerase.
- This reaction completes the first phase of glycolysis.