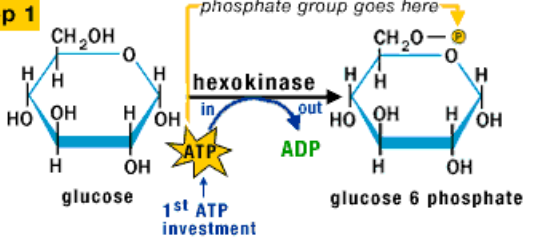
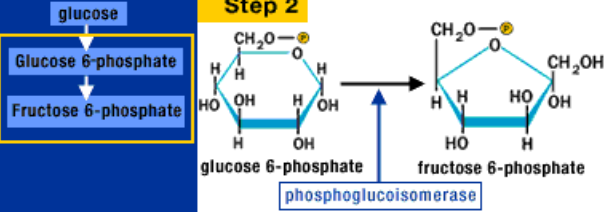
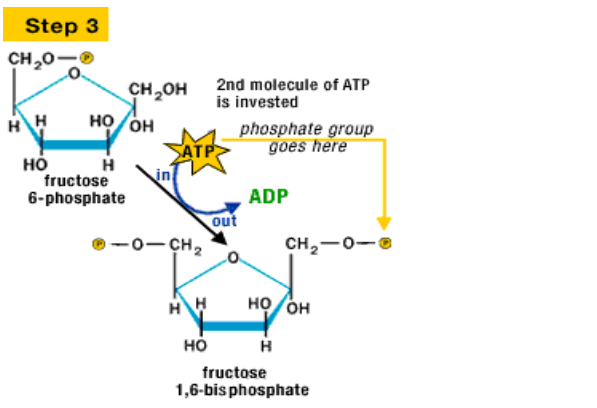


Biology Lecture Notes

Glycolysis: The Initial Steps: Energy Input

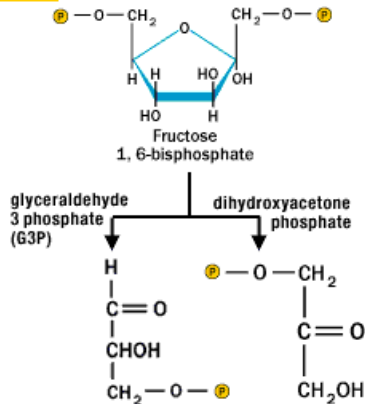
>> Key Concepts:

- ✎ In the process of **glycolysis**, **glucose**, a six-carbon molecule, is split into two **pyruvates** (three-carbon molecules).
- ✎ The first stage of glycolysis involves an energy investment of two **ATP**.
- ✎ When studying metabolic pathways, pay attention to the name of the enzyme and what the enzyme did.

<p>Step 1</p>  <p>glucose</p> <p>hexokinase</p> <p>glucose 6-phosphate</p> <p>1st ATP investment</p>	<p>Glycolysis: The Energy Investment</p> <p>Step 1: Glucose is phosphorylated by the enzyme hexokinase to form glucose 6-phosphate. Glucose gains energy by being phosphorylated at the expense of one ATP.</p>
 <p>glucose</p> <p>Glucose 6-phosphate</p> <p>Fructose 6-phosphate</p> <p>glucose 6-phosphate</p> <p>fructose 6-phosphate</p> <p>phosphoglucose isomerase</p>	<p>Step 2: Glucose 6-phosphate is converted into its isomer, fructose 6-phosphate, by an isomerase enzyme. By converting into its isomer, the molecule is further energized.</p>
<p>Step 3</p>  <p>fructose 6-phosphate</p> <p>fructose 1,6-bisphosphate</p> <p>2nd molecule of ATP is invested</p>	<p>Step 3: Fructose 6-phosphate is phosphorylated by the enzyme phosphofructokinase to form fructose 1,6-bisphosphate. This step adds even more energy to the molecule at the expense of one ATP.</p>

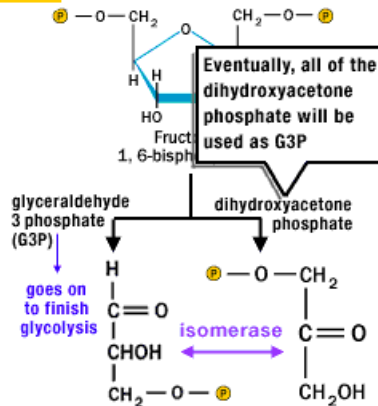
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Step 4



Step 4: Fructose 1,6-bisphosphate is split into two molecules, dihydroxyacetone phosphate and glyceraldehyde phosphate.

Step 5



Step 5: Dihydroxyacetone phosphate is converted into glyceraldehyde 3-phosphate. This reaction runs in both directions, but because the glyceraldehyde 3-phosphate is converted further in glycolysis, the equilibrium favors the formation of glyceraldehyde 3-phosphate.

Glyceraldehyde 3-phosphate goes on to the next phase of glycolysis, the energy payoff phase.