

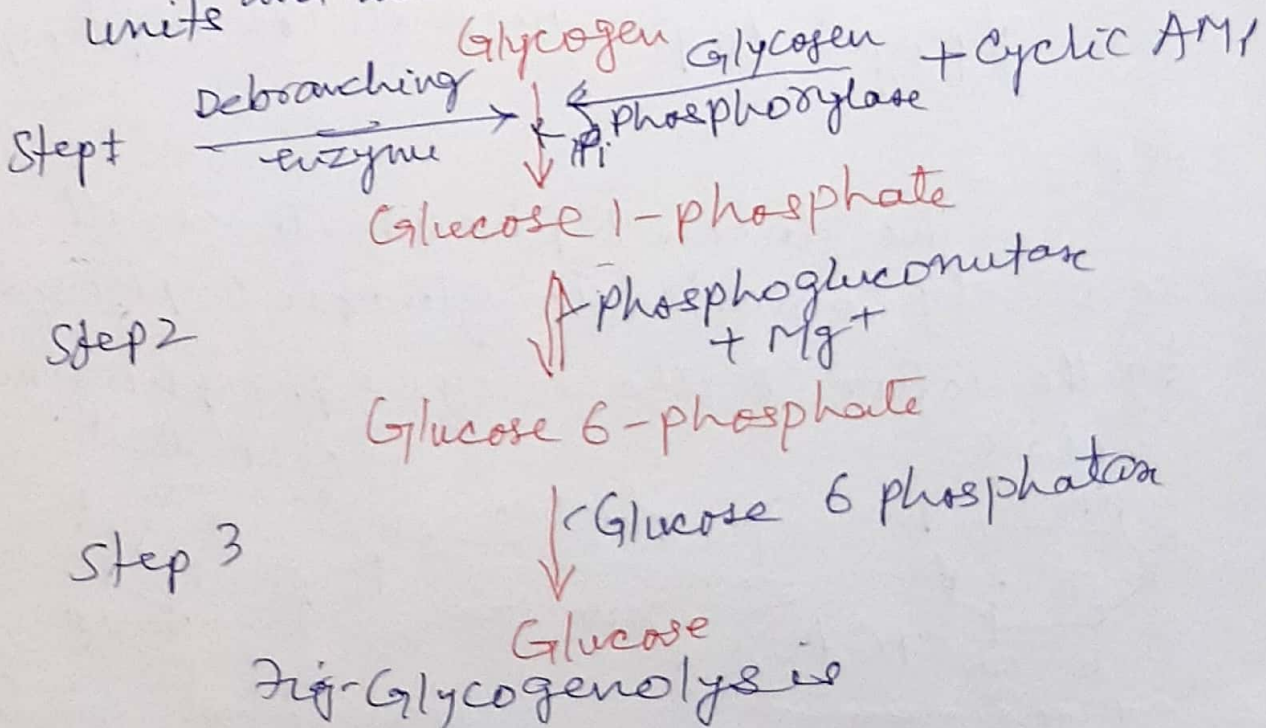
# GLYCOGENOLYSIS

The Process of breakdown of glycogen is called glycogenolysis.

When the blood sugar level falls, glycogen stored in liver, muscles, kidneys may be broken down. Glycogen may be broken down to glucose in liver and kidney or may be glucose 6 phosphate in muscles.

Following steps involved in the process of glycogenolysis.

**Step I** → Two enzymes act independently to break down of glycogen in first step. Glycogen phosphorylase enzyme with inorganic phosphate catalyze the cleavage of terminal  $\alpha$  1-4 bond of glycogen to produce glycogen with one glucose molecule less and a molecule of glucose 1-phosphate. The removal of glucose molecule as glucose 1-phosphate continues until 4 glucose residues remain on either side of the  $\alpha$  1-6 branch. If glycogen is acted upon by the phosphorylase alone it result in the formation of glycogen molecule with each branch having only 4 glucose units and this is called the "limit dextrin".



The enzyme phosphorylase cannot cleave  $\alpha$ -1-6 linkage. This is carried out by another enzyme called the  $\alpha$ -1-6 glucosidase which hydrolyses these bonds, This makes more  $\alpha$ -1-4 linkage accessible to the action of glycogen phosphorylase and the debranching enzyme, glycogen is converted to glucose 1-phosphate.

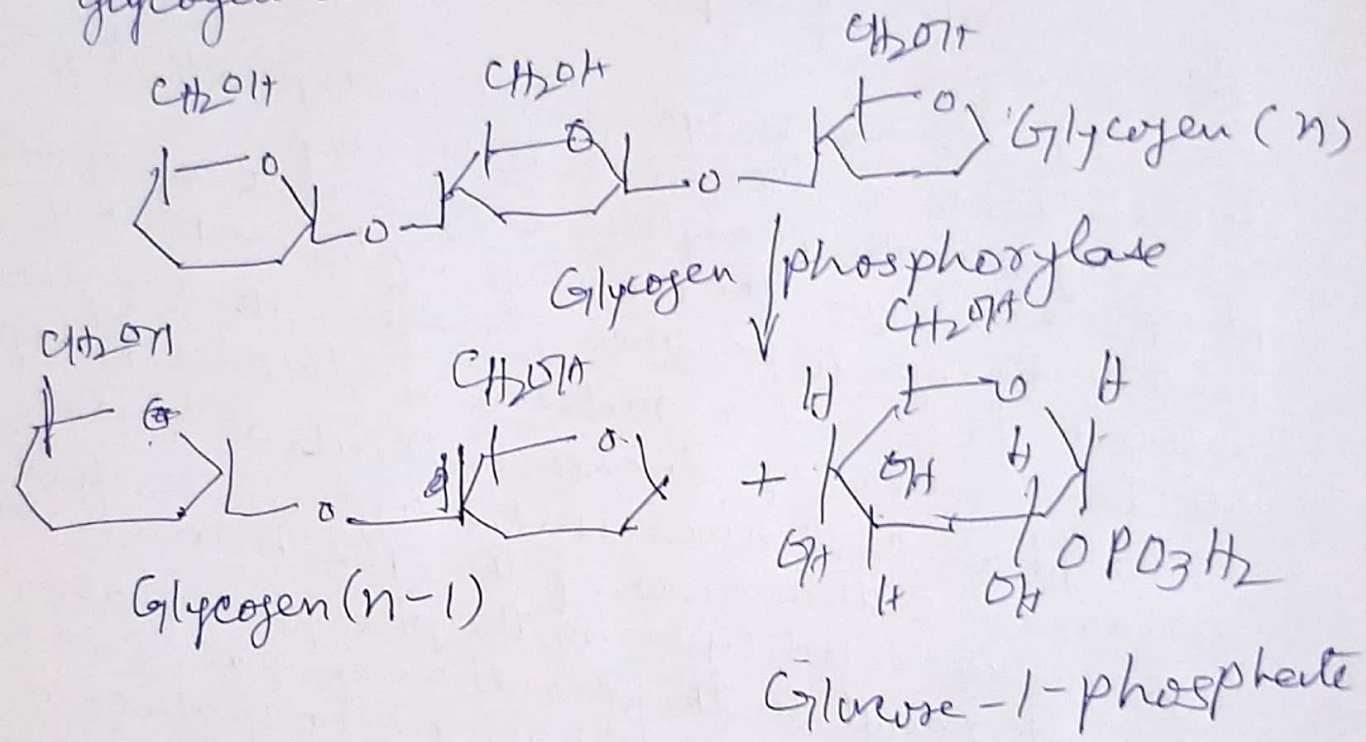
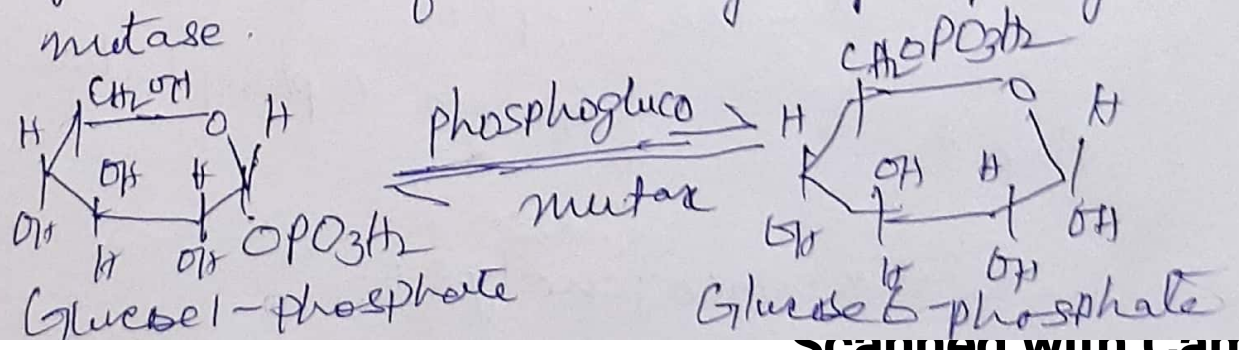


Fig - Cleavage of terminal  $\alpha$ -1-4 bond of glycogen to produce glucose 1-phosphate

Step 2:

The glucose 1-phosphate is then reversely converted to glucose 6-phosphate by the action of the enzyme phosphogluco-mutase.



Step 3: The final reaction conversion of Glucose 6 phosphate into glucose takes place in the liver and kidney by the action of the enzyme glucose 6 phosphatase. This enzyme remove phosphate from the glucose 6 phosphate enabling the free glucose to diffuse from the cell into the extra cellular spaces including the blood. This reaction does not occur in the muscles because muscles lacks the enzyme glucose 6 phosphatase.

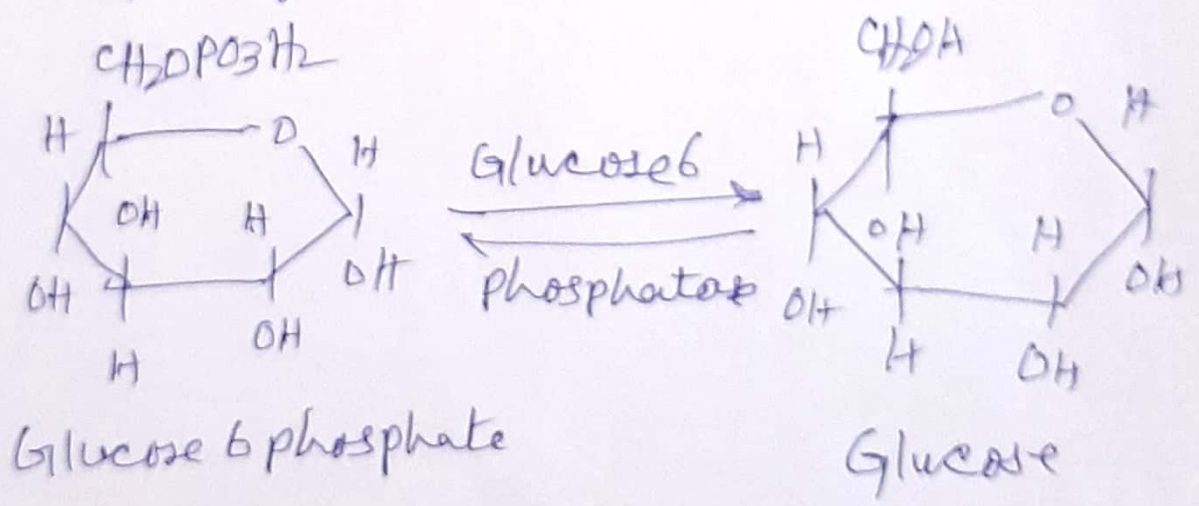


Fig - Conversion of glucose 6 phosphate into glucose.

