RAMSADAY COLLEGE, AMTA

AVIRUP CHAKROBORTY

GLYCOGENESIS

The process of synthesis of glycogen from glucose in the liver and muscle is called **'glycogenesis'**. It is an enderogonic process-it requires energy. Glycogenesis occurs by the sequential addition of glucose units.

Process

1. Glucose is first converted to the Glucose-6-phospthate by the enzyme **hexokinase**. In this reaction ATP is the coenzyme and Mg^{++} is the activator. ATP is converted to ADP. **glucokinase** removes glucose from blood following meal.
2. The next step is conversion of glucose -6-phosphate to glucose -1-phosphate. **Phosphoglucomutase** catalyzes the reaction. It is a reversible step. G-1-P is an intermediate due to phosphorylation of the enzyme.
3. The cells synthesize uridine triphosphate. In glycogenesis ,Uridine diphosphate glucose (UDPG) is formed by a reaction between G-1-P and UTP. **UDPG pyrophosphorylase** catalyzes the reaction and Inorganic pyrophosphate is released. Inorganic pyrophosphate is rapidly destroyed. For this reason it is not available in the cell.
4. A glycosidic bond is formed between C_1 of the activated glucose and C_4 of the terminal glucose of glycogen liberating UDP. This reaction is catalyzed by the **glycogen synthetase.** The glycogen primer is formed by the protein**, glycogenin**. Glycogenin transferns eight glyocosyl residues to tyrosine-OH on itself.
5. Glycogen synthetase catalyzes the synthesis of α-1,4 linkages. A second enzyme, the **branching enzyme** is recruited when a number of glycosyl residues are joined. Branching enzymes transfers a part of the terminal glycosyl units from the end of α- 1, 4 chain to the C (6) - OH of a glucose unit on the same or another chain. Branching increases the solubility of the glycogen.

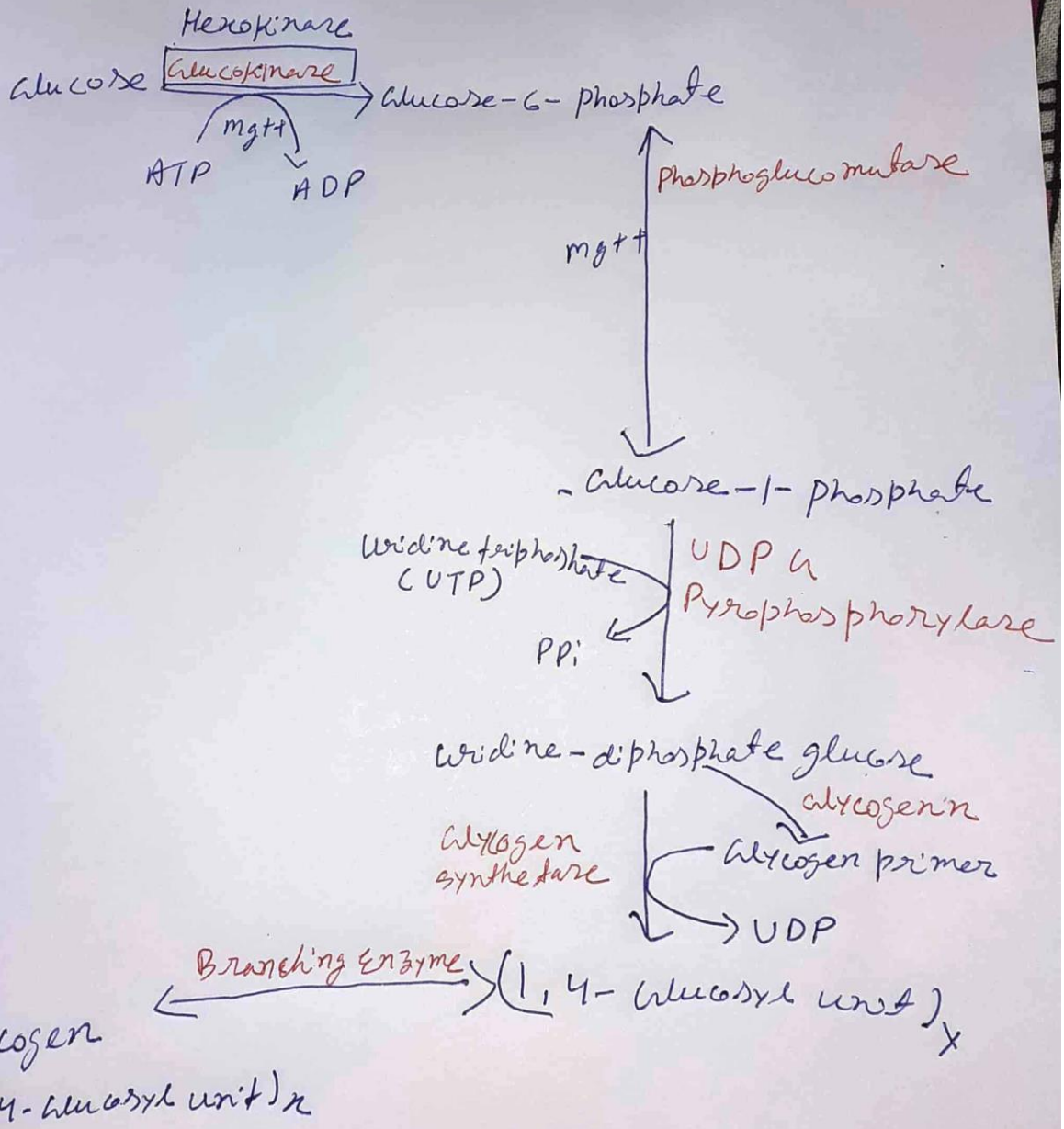

Fig- Pathway of the glycogenesis in the liver and muscle.