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Faculty of Sciences

M’sila Medicine Annex

First year medicine

Homework No. 1 : carbohydrate metabolism

**Exercise 01:**

Write the overall reaction of glucose oxidation by glycolysis.

**Exercise 02:**

Let us be the successive stages of glycolysis from fructose-6-phophate

Frucose6-P

1. Name X1, X2, X3, X4, X5, X6
2. Name A, B, C, D, E, F and G.
3. What is the name of the enzymes, which are involved in the irreversible reactions of this metabolic pattern?
4. What is the name of the enzyme that regulates this metabolic pathway?
5. What is the name of an enzyme having X4 as a substrate?
6. What is the energy balance of glycolysis and the Krebs cycle from fructose-6phosphate?
7. What is the energy balance if fructose-6P is broken down to lactate?

**Exercise 03:**

One mole of glucose labeled with 14C at the C1 level is incubated in the presence of liver tissue and pyruvic acid is isolated.

1- Describe the important stages of glycolysis.

2- Which carbon atom of pyruvic acid will be labeled with 14C

3- What will be the percentage of marked pyruvic acid?

4- Give the biochemical and energy balance expressed in ATP.

**Exercise 04:**

Answer with true or false and justified you answer:

1. Gluconeogenesis allows the synthesis of glucose from CO 2 and H 2 O.
2. The substrates of gluconeogenesis are mainly pyruvate, lactate, and alanine.
3. Gluconeogenesis only takes place in gluco-dependent tissues.
4. Gluconeogenesis uses reversible reactions of glycolysis in the opposite direction.
5. The mobilization of glucose residues from glycogen requires 3 enzymatic activities.
6. Glycogen phosphorylase releases glucose residues from glycogen.
7. Glycogen phosphorylase in the presence of pyridoxal phosphate and inorganic phosphate (PH 3 O 4 ) degrades glycogen by attacking the non-reducing ends, thus releasing G-1-P.
8. Muscle glycogen helps produce glucose released into the bloodstream.