BIOSCI 1820
Quiz #1
Jan 2002

KEY

1. Give the full name of the enzyme that catalyzes *the most* exergonic reaction of the energy generation phase of glycolysis (Hint: it drives several unfavorable, preceding reactions).

Pyruvate kinase

2. Per glucose, how many net molecules of ATP and NADH would be produced (or consumed) by glycolysis if triose phosphate isomerase were inactivated?

Energy requiring phase

-1 ATP Hexokinase
-1 ATP Phosphofructokinase

Energy generation phase

Generate: dihydroxyacetone phosphate
(TPI) + glyceraldahyde-3-phosphate → 2 ATP + 1 NADH
(can't be converted!) **(not 4)** **(not 2)**

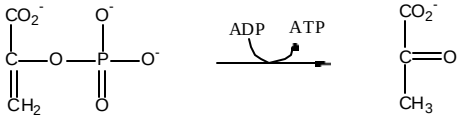
NET: 0 ATP
1 NADH

3. Which molecule of the pair depicted below represents the oxidized species (circle one):

CH_3CHO **CH_3CH_2OH**

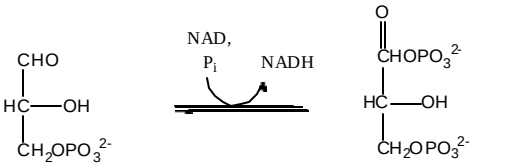
4. Give the NAMES and DRAW the structures of the products of the following reactions:

A.



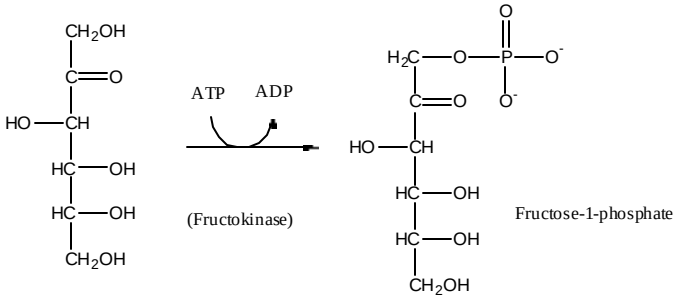
Pyruvate

B.



1,3-bis-phosphoglycerate

C.



(Fructokinase) Fructose-1-phosphate

5. **Regulation**

A. What is the name of the enzyme in glycolysis that exhibits product inhibition?

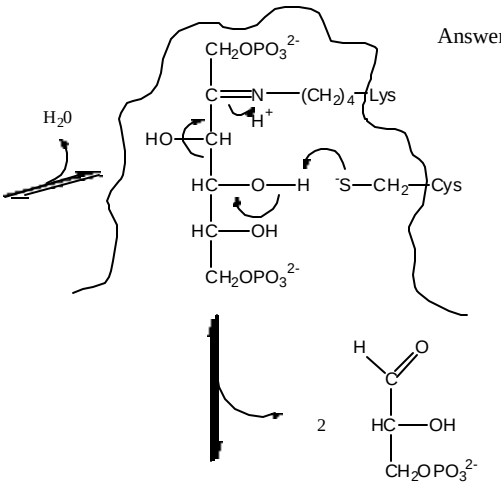
Hexokinase (inhibited by glucose-6-p)

B. Would the activity of phosphofructokinase-I (A) INCREASE or (B) DECREASE if there were an increase in the concentration of:

____A____ ADP

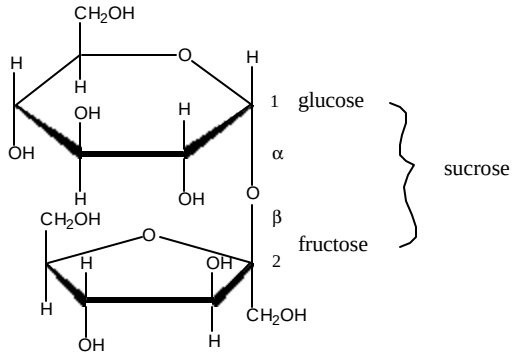
____A____ fructose-2,6-bis-phosphate

6. The following is a Schiff base intermediate in the reaction pathway catalyzed by which enzyme?



Answer: Aldolase

7. What is the name of the enzyme that cleaves the following disaccharide into two monosaccharides?



Answer: Sucrase
(or α-amylase)

8. Describe in brief how insulin activates glucose transport into fat and muscle cells.

Insulin, acting through the insulin receptor, triggers the movement of glucose transporters sequestered in intracellular vesicles to the plasma membrane. This increases the number (Vmax) of glucose transporters at the plasma membrane.