

Chapter 14 Questions  
Glucose Catabolism

Book study questions: 1 - 4. I really like 3 and 4 Book problems 2, 4, 7, 11

Be able to recognize each of the metabolic intermediates and KNOW the enzymes and their order in glycolysis

1) Substrate level phosphorylation is catalyzed by:

- a) hexokinase
- b) pyruvate kinase
- c) triose phosphate isomerase
- d) oxidation of any carbons on a glucose metabolite

2) Which of the following statements about glucokinase is true

- a) it is found in muscle and adipose tissue
- b) it has a higher  $K_m$  for glucose than hexokinase
- c) it is inhibited by citrate
- d) it catalyzes the phosphorylation of both glucose and fructose
- e) it catalyzes a reversible reaction under physiological conditions
- f) Huh,  $K_m$ ?

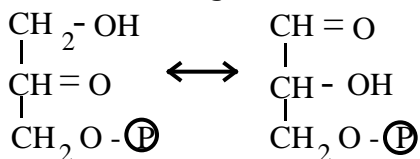
3) When lactate is converted to pyruvate:

- a)  $NAD^+$  is converted to  $NADH$
- b)  $ADP$  is converted to  $ATP$
- c)  $NADH$  is converted to  $NAD^+$
- d)  $ATP$  is converted to  $ADP$
- e)  $FAD$  is converted to  $FADH$

4) An increase in the level of blood glucose would not result in which of the following

- a) increased cAMP levels
- b) increases in the kinase activity of the PFK2 enzyme
- c) increases in the concentration of pyruvate
- d) increases in the rate of glycolysis
- e) increases in the concentration of fructose 2,6 bis-phosphate

5) The following reaction is:



- a) a mutase reaction catalyzed by phosphoglycerate mutase
- b) an isomerase reaction catalyzed by enolase
- c) an oxidation reaction catalyzed by Glyceraldehyde-3-phosphate dehydrogenase
- d) an isomerase reaction catalyzed by phosphoglucose isomerase
- e) none of the above

6) Which of the following enzymes in glycolysis is irreversible

- a) aldolase
- b) phosphoglycerate kinase
- c) Triose Phosphoisomerase
- d) pyruvate kinase
- e) glyceraldehyde-3-phosphate dehydrogenase

7) Which statement best describes glucose transport in muscle?

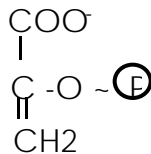
- a) Glucose is co-transported with sodium by GLUT1 and 3
- b) The membrane is freely permeable to glucose
- c) Glucose enters the cell by large non specific pores in the membrane
- d) Insulin stimulates the transport of glucose via the GLUT4

8) The reaction catalyzed by lactate dehydrogenase involves

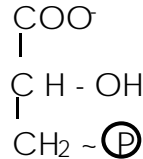
- a) transfer of electrons from lactate to pyruvate
- b) oxidation of pyruvate to lactate
- c) pyruvate and ATP as substrates
- d) reduction of lactate to lactose
- e) regeneration of NAD<sup>+</sup> required for the continuation of glycolysis

9) Name each the following glycolytic intermediates

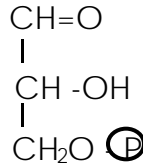
A)



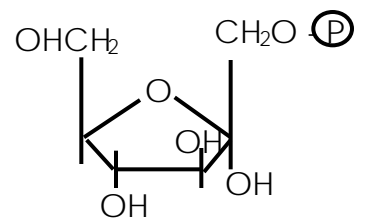
B)



C)



D)



11) What are the main reasons the pyruvate kinase reaction is considered irreversible?

12) If an animal were fed a diet where the #3 carbon of glucose was radioactive (<sup>14</sup>C), where would you expect to find the radioactive carbon in pyruvate? Would all of the pyruvate be radioactive? Why?

13) In a general form (without the molecules) draw out the oxidative metabolism of lactate. Include the key enzymes, reactants and products.

14) At which step does substrate level phosphorylation occur? What are the products and reactants.

15) I will also ask questions about the specific regulation and actions of many of the glycolytic enzymes. I also plan to ask several regulation questions and questions on the fate of pyruvate. Do pay attention to the last half of this chapter.