

Practice Questions Relevant to Lectures 27 and 28 for Exam 3
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Lectures 27 and 28 - Glycogen Metabolism and Regulation

1. To be fully active protein phosphatase-1 must be:
 - A. phosphorylated by protein kinase A.
 - B. directly attached to glycogen phosphorylase.
 - C. attached to phosphorylated R_{G1}.
 - D. dephosphorylated by insulin-sensitive protein phosphatase.
2. True or False In type V glycogen storage disease (McArdle's), a defect of muscle glycogen phosphorylase will lead to hyperglycemia.
3. True or False The activity of glycogen phosphorylase is decreased following its dephosphorylation by protein phosphatase-1.
4. True or False In type I glycogen storage disease (von Gierke's), a defect of glucose-6-phosphatase will lead to hyperglycemia.
5. True or False Phosphorylase kinase is activated following phosphorylation by protein kinase A.
6. _____ when allosterically bound to glycogen synthase-**d** form causes the enzyme to become active.
7. _____ is the substrate for glycogen synthase that provides glucose units for addition to the glycogen molecule.
8. _____ is a hormone whose presence leads to increased activity of glycogen synthase.
9. _____ is the enzyme that is responsible for removing glucose units from glycogen and forms glucose-1-phosphate as a product.
10. _____ is a hormone whose presence leads to decreased activity of glycogen synthase.
11. Identify **ONE** kinase that phosphorylates glycogen synthase and state the mechanism for inactivating that kinase.
12. {AMP OR fructose-2,6-bisphosphate} - which is an allosteric activator of glycogen phosphorylase?

ANSWER KEY

Lectures 27 and 28 - Glycogen Metabolism and Regulation

1. C

2. FALSE

3. TRUE

4. FALSE

5. TRUE

6. Glucose-6-Phosphate (G6P)

7. UDP-Glucose

8. Insulin

9. Glycogen Phosphorylase

10. Epinephrine or Glucagon

11. **PROTEIN KINASE A** --- inactivated by phosphodiesterase removing cAMP

PHOSPHORYLASE KINASE ---inactivated by protein phosphatase removing phosphate OR
glucose-6-P allosteric inhibition

GLYCOGEN SYNTHASE KINASE --- inactivated through phosphorylation by Protein Kinase B

12. AMP