Which of the following enzymes would not be used in the pentose phosphate pathway if the cell requires ribose but not NADPH?

|  |  |  |
| --- | --- | --- |
| http://owl.cengage.com/owlimages/check.GIF |  | glucose-6-phosphate dehydrogenase |
|  |  | transaldolase |
|  |  | ribulose-5-phosphate epimerase |
|  |  | aldolase |
|  |  | transketolase |

The conversion of glucose to lactate, a central pathway of catabolism, is reversed to convert lactate to glucose, a central pathway of anabolism. This statement is:

|  |  |  |
| --- | --- | --- |
| http://owl.cengage.com/owlimages/check.GIF |  | false because glycolysis is exergonic so its reversal would be endergonic |
|  |  | true because this allows for the flux from glucose to lactate, or lactate to glucose, to be controlled simply by the laws of mass action |
|  |  | false because phosphoglycerate kinase in glycolysis is reversed by phosphoglycerate phosphatase in gluconeogenesis. |
|  |  | true because using the same enzymes confers economy on the genome |

Which enzyme catalyzes an oxidative decarboxylation?

|  |  |  |
| --- | --- | --- |
|  |  | transketolase |
| http://owl.cengage.com/owlimages/check.GIF |  | 6-phosphogluconate dehydrogenase |
|  |  | glucose-6-phosphate dehydrogenase |
|  |  | transaldolase |

Fructose-1,6-bisphosphatase is allosterically inhibited by:

|  |  |  |
| --- | --- | --- |
|  |  | citrate |
| http://owl.cengage.com/owlimages/check.GIF |  | AMP |
|  |  | cAMP |
|  |  | acetyl-CoA |

Select the true statements regarding the activity of glycogen phosphorylase.  
a. Glycogen phosphorylase is the principal enzyme of glycogen catabolism.  
b. The ∆G for the phosphorylase reaction *in* *vivo* is +3.1 kJ/mol.  
c. The ∆G for the phosphorylase reaction *in* *vivo* is -6 kJ/mol.  
d. The glycogen phosphorylase reaction degrades glycogen to glucose monomers.  
e. The glycogen phosphorylase reaction involves phosphorolysis at a reducing end of a glycogen polymer.

|  |  |  |
| --- | --- | --- |
|  |  | a, c, d, & e |
|  |  | a, c, & d |
|  |  | a, b, d & e |
| http://owl.cengage.com/owlimages/check.GIF |  | a & c |

The enzyme UDP-glucose pyrophosphorylase catalyzes the attack of the:

|  |  |  |
| --- | --- | --- |
|  |  | phosphoryl O of glucose-6-phosphate on the γ-P of UTP |
|  |  | C6-OH of glucose on the β-P of UTP |
|  |  | C1-OH of glucose on the β-P of UTP |
| http://owl.cengage.com/owlimages/check.GIF |  | phosphoryl O of glucose-1-phosphate on the α-P of UTP |

Top of Form

Choose the option that places the intermediates of gluconeogenesis in the correct order.

|  |  |  |
| --- | --- | --- |
|  |  | Lactate → Pyruvate → Oxaloacetate → PEP → 2-Phosphoglycerate → 3-Phosphoglycerate → 1,3-Bisphosphoglycerate → Glyceraldehyde-3-P→Fructose-6-P → Fructose-1,6-bisP → Glucose-6-P → Glucose. |
|  |  | Lactate → Pyruvate → Oxaloacetate → PEP →3-Phosphoglycerate → 2-Phosphoglycerate → 1,3-Bisphosphoglycerate → Glyceraldehyde-3-P→ Fructose-1,6-bisP → Fructose-6-P → Glucose-6-P → Glucose. |
|  |  | Lactate → Pyruvate → PEP → Oxaloacetate → 2-Phosphoglycerate → 3-Phosphoglycerate → 1,3-Bisphosphoglycerate → Glyceraldehyde-3-P→ Fructose-1,6-bisP → Fructose-6-P → Glucose-6-P → Glucose. |
| http://owl.cengage.com/owlimages/check.GIF |  | Lactate → Pyruvate → Oxaloacetate → PEP → 2-Phosphoglycerate → 3-Phosphoglycerate → 1,3-Bisphosphoglycerate → Glyceraldehyde-3-P→ Fructose-1,6-bisP →Fructose-6-P → Glucose-6-P → Glucose. |

Bottom of Form

Following the 6th, 7th, and 8th reactions of the pentose phosphate pathway, if xylulose-5-phosphate were labeled at the C-2 position with 14C, where would the label end up after the transketolase, transaldolase, transketolase steps?

|  |  |  |
| --- | --- | --- |
|  |  | C-1 of sedoheptulose-7-phosphate |
|  |  | C-1 of glyceraldehyde-3-phosphate |
|  |  | C-1 of fructose-6-phosphate |
|  |  | C-2 of erythrose-4-phosphate |
| http://owl.cengage.com/owlimages/check.GIF |  | C-2 of fructose-6-phosphate |

The PFK-2 activity of the PFK-2/FBPase-2 bifunctional enzyme is:

|  |  |  |
| --- | --- | --- |
| http://owl.cengage.com/owlimages/check.GIF |  | inhibited by phosphorylation by the cAMP-dependent protein kinase (protein kinase A) |
|  |  | activated by AMP |
|  |  | inhibited by fructose-6-phosphate |
|  |  | activated by acetyl-CoA |

The glucose residues stored in glycogen are readily mobilized for energy metabolism when needed. What are the correct characteristics of the enzyme-catalyzed degradation of glycogen?  
  
a. Glucose residues are removed by a hydrolysis reaction.  
b. Glucose-1-phosphate residues are removed in a phosphorolytic reaction.  
c. Cleavage of glycogen occurs at non-reducing ends.  
d. The glucose-1-phosphate product released is converted to glucose-6-phosphate for entry into glycolysis.

|  |  |  |
| --- | --- | --- |
|  |  | a, c, d |
|  |  | a, c |
| http://owl.cengage.com/owlimages/check.GIF |  | b, c, d |
|  |  | b, d |