Carbohydrate Metabolism MCQs

Which enzyme catalyzes the rate-limiting step of glycolysis?A) HexokinaseB) Phosphofructokinase-1 (PFK-1)C) Pyruvate kinaseD) Aldolase

What is the primary role of the citric acid cycle in carbohydrate metabolism?A) To synthesize glucoseB) To produce ATP directly via substrate-level phosphorylationC) To oxidize acetyl-CoA and generate NADH and $FADH_2$D) To store glycogen

Which of the following is NOT a substrate for gluconeogenesis?A) LactateB) GlycerolC) Acetyl-CoAD) Alanine

What is the role of glycogen phosphorylase in glycogen metabolism?A) Synthesizes glycogen from glucose-1-phosphateB) Breaks down glycogen into glucose-1-phosphateC) Converts glucose-6-phosphate to glucoseD) Activates glucose for glycolysis

Which molecule is an allosteric activator of phosphofructokinase-1 (PFK-1) in glycolysis?A) ATPB) CitrateC) Fructose-2,6-bisphosphateD) Glucose-6-phosphate

What is the net ATP yield from glycolysis per molecule of glucose?A) 2 ATPB) 4 ATPC) 6 ATPD) 8 ATP

Which enzyme converts pyruvate to acetyl-CoA, linking glycolysis to the citric acid cycle?A) Pyruvate kinaseB) Pyruvate dehydrogenaseC) Lactate dehydrogenaseD) Phosphoenolpyruvate carboxykinase

In gluconeogenesis, which enzyme bypasses the irreversible step catalyzed by phosphofructokinase-1 in glycolysis?A) Glucose-6-phosphataseB) Fructose-1,6-bisphosphataseC) Pyruvate carboxylaseD) Phosphoglycerate mutase

Which coenzyme is primarily produced in the citric acid cycle for use in the electron transport chain?A) $NADP^+$B) NADHC) Coenzyme AD) FAD

What is the primary regulatory mechanism for glycogen synthase?A) Allosteric activation by ATPB) Phosphorylation leading to inactivationC) Inhibition by fructose-2,6-bisphosphateD) Activation by citrate

Answers

B) Phosphofructokinase-1 (PFK-1)
C) To oxidize acetyl-CoA and generate NADH and $FADH_2$
C) Acetyl-CoA

B) Breaks down glycogen into glucose-1-phosphate
C) Fructose-2,6-bisphosphate
A) 2 ATP
B) Pyruvate dehydrogenase
B) Fructose-1,6-bisphosphatase
B) NADH
B) Phosphorylation leading to inactivation