Remember Steps Of Glycolysis Quiz Answer Key PDF

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What is the primary location of glycolysis within a cell?

A. mitochondria

B. Cytoplasm ✓

C. Nucleus

D. Endoplasmic reticulum

Which of the following are enzymes involved in the glycolysis pathway?

A. Hexokinase ✓

B. Pyruvate carboxylase

C. Phosphofructokinase-1 (PFK-1) ✓

D. Aldolase ✓

Explain the significance of the energy investment phase in glycolysis and how it contributes to the overall process.

The energy investment phase involves the consumption of ATP to phosphorylate glucose, which is necessary to destabilize the glucose molecule and prepare it for subsequent breakdown. This phase is crucial as it primes the glucose for energy extraction in the later stages of glycolysis.

Which enzyme is responsible for converting glucose to glucose-6-phosphate in glycolysis?

A. Hexokinase ✓

B. Glukokinase

C. Phosphoglucoisomerase

D. Pyruvate kinase

Which of the following statements about glycolysis are true?

A. It requires oxygen to proceed.
B. It produces a net gain of 2 ATP molecules per glucose molecule. ✓
C. It occurs in the cytoplasm. ✓
D. It directly produces carbon dioxide as a byproduct.

Discuss the role of NADH in glycolysis and its importance in cellular respiration.

NADH is produced during glycolysis when glyceraldehyde-3-phosphate is converted to 1,3-bisphosphoglycerate. It serves as an electron carrier, transferring electrons to the electron transport chain in aerobic respiration, which is crucial for ATP production.

Which phase of glycolysis involves the generation of ATP and NADH?

A. Energy Investment Phase
B. Energy Payoff Phase ✓
C. Preparatory Phase
D. Oxidative Phase

Identify the key intermediates formed during glycolysis.

A. Glucose-6-phosphate ✓
B. Fructose-1,6-bisphosphate ✓
C. Acetyl-CoA
D. Pyruvate ✓

Analyze how glycolysis is regulated and the factors that influence its rate.

Glycolysis is regulated by allosteric enzymes such as hexokinase, phosphofructokinase-1, and pyruvate kinase. Factors influencing its rate include ATP and AMP levels, substrate availability, and feedback inhibition by downstream products.

What is the net gain of ATP molecules per glucose molecule during glycolysis?

A. 1 ATP
B. 2 ATP ✓
C. 3 ATP

D. 4 ATP

Which of the following are outcomes of glycolysis?

A. Production of pyruvate ✓
B. Generation of ATP ✓
C. Formation of acetyl-CoA
D. Release of oxygen

Evaluate the importance of glycolysis in both aerobic and anaerobic conditions.

In aerobic conditions, glycolysis provides pyruvate for the citric acid cycle and NADH for the electron transport chain. In anaerobic conditions, it allows cells to produce ATP through fermentation, converting pyruvate to lactate or ethanol, ensuring energy production continues without oxygen.

Which enzyme catalyzes the conversion of phosphoenolpyruvate to pyruvate?

A. Hexokinase
B. Pyruvate kinase ✓
C. Aldolase
D. Enolase

Which enzymes are involved in the regulation of glycolysis?

A. Hexokinase ✓
B. Phosphofructokinase-1 (PFK-1) ✓
C. Pyruvate kinase ✓
D. Citrate synthase

Describe the differences between the energy investment phase and the energy payoff phase of glycolysis.

The energy investment phase consumes ATP to phosphorylate glucose, preparing it for breakdown. The energy payoff phase generates ATP and NADH by extracting energy from the phosphorylated intermediates, resulting in a net gain of ATP.

What is the final product of glycolysis?

A. Acetyl-CoA
B. Lactate
C. Pyruvate ✓
D. Ethanol

Which factors can influence the regulation of glycolysis?

A. ATP levels ✓
B. AMP levels ✓
C. Oxygen availability
D. Feedback inhibition ✓

Explain how glycolysis can proceed in the absence of oxygen and its implications for energy production.

In the absence of oxygen, glycolysis proceeds through fermentation, converting pyruvate to lactate or ethanol, allowing NAD+ regeneration and continued ATP production, albeit less efficiently than aerobic respiration.

Which of the following is not an intermediate of glycolysis?

A. Glucose-6-phosphate
B. Fructose-1,6-bisphosphate
C. Citrate ✓
D. Pyruvate

Which of the following are true about the energy payoff phase of glycolysis?

A. It consumes ATP.
B. It produces NADH. ✓
C. It generates ATP. ✓
D. It forms glucose-6-phosphate.

Discuss the role of glycolysis in the context of cellular metabolism and its integration with other metabolic pathways.

Glycolysis is a central metabolic pathway that provides pyruvate for the citric acid cycle, NADH for the electron transport chain, and intermediates for biosynthetic pathways, integrating with and supporting various cellular functions.

What is the primary purpose of glycolysis in cellular metabolism?

A. To produce carbon dioxide
B. To generate glucose
C. To produce ATP and pyruvate ✓
D. To synthesize proteins

Which molecules are produced during glycolysis that can be used in other metabolic pathways?

A. ATP ✓
B. NADH ✓
C. Acetyl-CoA
D. Pyruvate ✓

Analyze the impact of glycolysis on the overall energy balance of a cell and its role in energy homeostasis.

Glycolysis provides a rapid means of ATP production, crucial for energy homeostasis, especially under anaerobic conditions. It balances energy supply and demand, supporting cellular functions and metabolic flexibility.

Which enzyme is responsible for the cleavage of fructose-1,6-bisphosphate into two 3-carbon molecules?

A. Hexokinase
B. Aldolase ✓
C. Phosphoglycerate kinase
D. Pyruvate dehydrogenase

Which steps in glycolysis are considered irreversible and play a role in its regulation?

A. Glucose to glucose-6-phosphate ✓
B. Fructose-6-phosphate to fructose-1,6-bisphosphate ✓
C. 1,3-bisphosphoglycerate to 3-phosphoglycerate

D. Phosphoenolpyruvate to pyruvate ✓

Evaluate the significance of glycolysis in different types of cells and its adaptation to various energy demands.

Glycolysis is vital across cell types, providing energy under both aerobic and anaerobic conditions. Its adaptability allows cells to meet energy demands efficiently, supporting diverse physiological functions and survival in varying environments.