Krebs Cycle Quiz Questions and Answers PDF

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What role does the Krebs Cycle play in the metabolism of fats and proteins?

The Krebs Cycle plays a key role in the metabolism of fats and proteins by converting fatty acids and amino acids into acetyl-CoA, which is then utilized to generate ATP and other metabolic compounds.

Describe how the Krebs Cycle is linked to the electron transport chain.

The Krebs Cycle is linked to the electron transport chain through the production of NADH and FADH2, which transfer electrons to the chain, ultimately leading to ATP synthesis.

Discuss the evolutionary importance of the Krebs Cycle in aerobic organisms.

The Krebs Cycle, also known as the citric acid cycle, is essential for aerobic organisms as it generates ATP through the oxidation of acetyl-CoA, providing the energy necessary for various biological processes.

Identify and explain the role of one key enzyme in the Krebs Cycle.

Citrate synthase

Which enzyme is responsible for the conversion of succinate to fumarate?

- ◯ **Succinate dehydrogenase ✓**
- ◯ Malate dehydrogenase
- ◯ Fumarase
- ◯ α-Ketoglutarate dehydrogenase

The enzyme responsible for the conversion of succinate to fumarate is succinate dehydrogenase. This enzyme plays a crucial role in the citric acid cycle and is involved in the oxidation of succinate.

Which of the following are products of one turn of the Krebs Cycle?

- ☐ **3 NADH ✓**
- ☐ **1 FADH2 ✓**
- ☐ 2 ATP
- ☐ **2 CO2 ✓**

> One turn of the Krebs Cycle produces three NADH, one FADH2, one GTP (or ATP), and two CO2 molecules. These products are crucial for cellular respiration and energy production.

Which of the following molecules is regenerated at the end of the Krebs Cycle?

- ◯ Citrate
- ◯ Acetyl-CoA
- ◯ **Oxaloacetate ✓**
- ◯ Fumarate

> At the end of the Krebs Cycle, oxaloacetate is regenerated, allowing the cycle to continue by combining with acetyl-CoA to form citrate. This regeneration is crucial for the cycle's function in cellular respiration.

Which enzyme catalyzes the conversion of citrate to isocitrate?

- ◯ Citrate synthase
- ◯ **Aconitase ✓**
- ◯ Isocitrate dehydrogenase
- ◯ Fumarase

> The enzyme that catalyzes the conversion of citrate to isocitrate is called aconitase. This reaction is a crucial step in the citric acid cycle (Krebs cycle), which is essential for cellular respiration.

Which of the following are regulatory enzymes of the Krebs Cycle?

- ☐ **Citrate synthase ✓**
- ☐ **Isocitrate dehydrogenase ✓**
- ☐ Pyruvate kinase
- ☐ **α-Ketoglutarate dehydrogenase ✓**

> The regulatory enzymes of the Krebs Cycle include citrate synthase, isocitrate dehydrogenase, and alpha-ketoglutarate dehydrogenase. These enzymes play crucial roles in controlling the rate of the cycle and responding to cellular energy needs.

Where does the Krebs Cycle occur within the cell?

- ◯ Cytoplasm
- ◯ Nucleus
- ◯ **mitochondria ✓**
- ◯ Endoplasmic Reticulum

> The Krebs Cycle, also known as the citric acid cycle, occurs in the mitochondria of eukaryotic cells. This cycle is a crucial part of cellular respiration, where it plays a key role in energy production.

Which molecule initiates the Krebs Cycle by combining with oxaloacetate?

- ◯ Pyruvate
- ◯ **Acetyl-CoA ✓**
- ◯ Citrate
- ◯ Glucose

> The Krebs Cycle, also known as the citric acid cycle, is initiated when acetyl-CoA combines with oxaloacetate to form citrate. This reaction is a crucial step in cellular respiration, linking glycolysis to the Krebs Cycle.

How many molecules of CO2 are released per turn of the Krebs Cycle?

- ◯ One
- ◯ **Two ✓**
- ◯ Three
- ◯ Four

> The Krebs Cycle, also known as the citric acid cycle, releases two molecules of CO2 for each turn of the cycle. This occurs as acetyl-CoA is oxidized during the metabolic process.

Explain the significance of the Krebs Cycle in cellular respiration.

> **The Krebs Cycle is significant in cellular respiration because it produces electron carriers (NADH and FADH2) and ATP, which are vital for the subsequent stages of energy production in the cell.**

The Krebs Cycle is involved in which of the following processes?

- ☐ **Fatty acid synthesis ✓**
- ☐ **Gluconeogenesis ✓**

- [x] **Amino acid synthesis ✓**
- [ ] DNA replication

> The Krebs Cycle, also known as the Citric Acid Cycle, is a crucial metabolic pathway that plays a key role in cellular respiration, specifically in the production of energy through the oxidation of acetyl-CoA derived from carbohydrates, fats, and proteins.

Which of the following intermediates are part of the Krebs Cycle?

- [x] **Citrate ✓**
- [x] **Isocitrate ✓**
- [ ] Pyruvate
- [x] **Malate ✓**

> The Krebs Cycle, also known as the Citric Acid Cycle, includes several key intermediates such as citrate, isocitrate, alpha-ketoglutarate, succinate, fumarate, and oxaloacetate. These compounds play crucial roles in cellular respiration and energy production.

How is the Krebs Cycle regulated, and why is this regulation important?

> **The Krebs Cycle is regulated by the levels of ATP, ADP, NADH, and Ca2+, which influence key enzymes like citrate synthase and isocitrate dehydrogenase, ensuring that the cycle operates efficiently according to the cell's energy needs.**

Which of the following is a direct product of the Krebs Cycle?

- ○ Glucose
- ○ **NADH ✓**
- ○ Pyruvate
- ○ Oxygen

> The Krebs Cycle, also known as the citric acid cycle, directly produces ATP, NADH, and FADH2, which are essential for cellular energy production. Among these, NADH and FADH2 are particularly important as they carry electrons to the electron transport chain for further ATP generation.

Which molecules are electron carriers produced in the Krebs Cycle?

- [ ] **NADH ✓**
- [ ] **FADH2 ✓**
- [ ] ATP
- [ ] GTP

> In the Krebs Cycle, the primary electron carriers produced are NADH and FADH2. These molecules play a crucial role in transporting electrons to the electron transport chain for ATP production.

What are the main control mechanisms of the Krebs Cycle?

- [ ] **Allosteric inhibition ✓**
- [ ] **Feedback inhibition ✓**
- [ ] Competitive inhibition
- [ ] **Substrate availability ✓**

> The main control mechanisms of the Krebs Cycle include allosteric regulation, substrate availability, and feedback inhibition, which help to regulate the cycle's activity based on the cell's energy needs.

What is the primary purpose of the Krebs Cycle?

- ◯ To synthesize glucose
- ◯ **To generate ATP and electron carriers ✓**
- ◯ To produce oxygen
- ◯ To break down proteins

> The Krebs Cycle, also known as the citric acid cycle, primarily serves to generate energy through the oxidation of acetyl-CoA, producing ATP, NADH, and FADH2, which are essential for cellular respiration.