

8.2 Cell Respiration

Question Paper

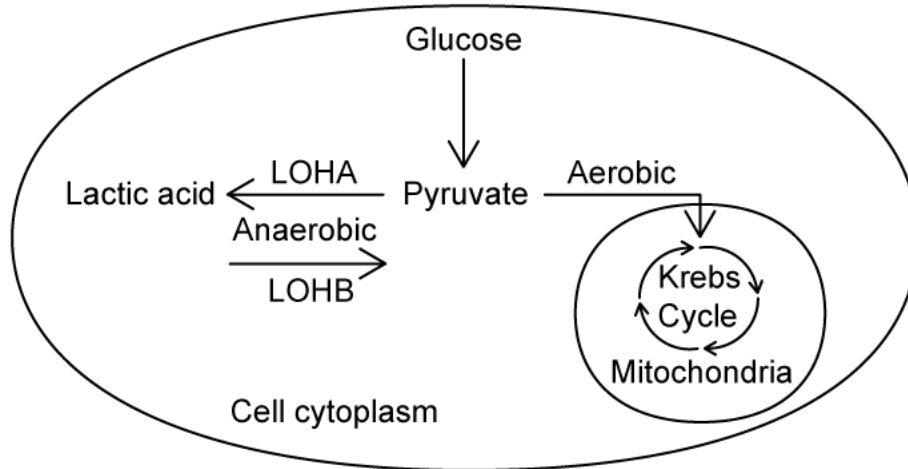
Course	DP IB Biology
Section	8. Metabolism, Cell Respiration & Photosynthesis (HL Only)
Topic	8.2 Cell Respiration
Difficulty	Hard

Time allowed: 10
Score: /5
Percentage: /100

Question 1

In an investigation into the impact of enzyme inhibition on respiration, scientists used a molecule to inhibit transcription of the gene that codes for the enzyme LDHA.

Using the diagram, identify the likely effect this would have on the process of respiration.



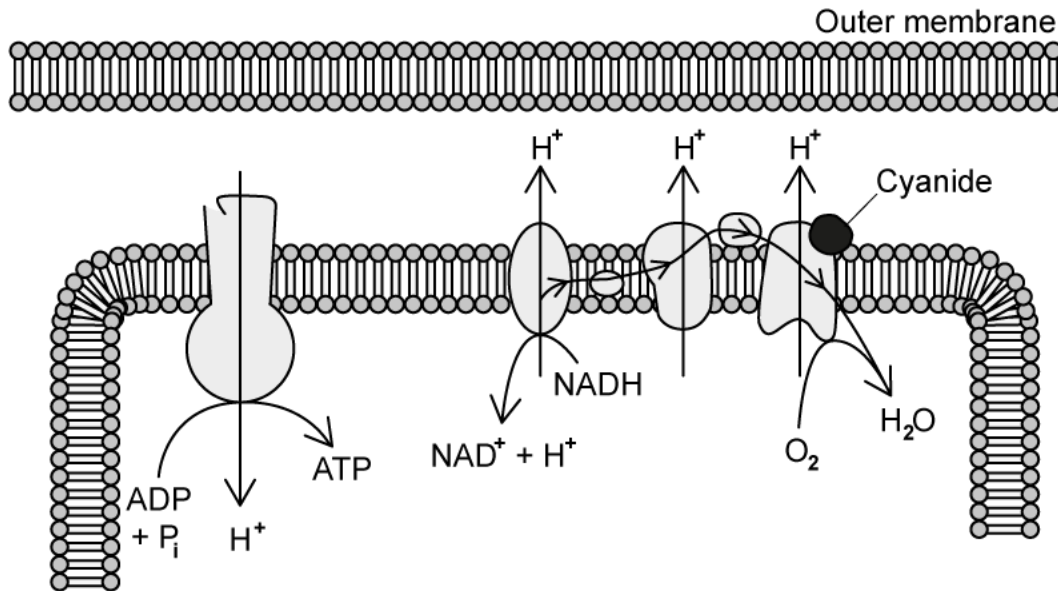
- I. Increased production of lactic acid
- II. A build up of pyruvate in anaerobic conditions
- III. Increased activity of the Krebs cycle in aerobic conditions

- A. I, II and III
- B. I only
- C. II and III
- D. II only

[1 mark]

Question 2

The diagram shows the electron transport chain in the membrane of the mitochondria.



Cyanide is a poison which causes cell death through inhibition of the final electron transport protein when it binds as shown in the diagram.

Which statements correctly describe the impact of cyanide binding to the final transport protein.

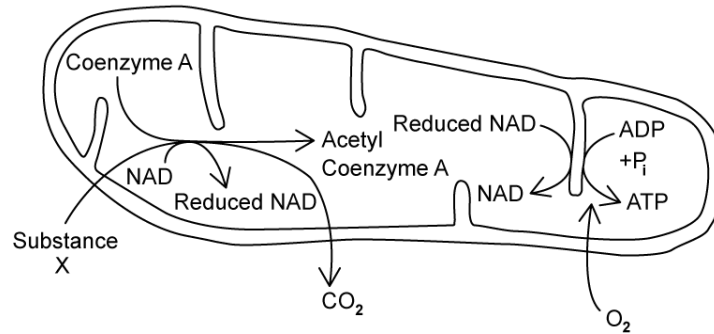
- I. A decrease in pH of the intermembrane space
- II. A decrease in production of H_2O
- III. An increase in electrochemical gradient
- IV. Inhibition of ATP synthesis

- A. I, II and IV only
- B. II and IV only
- C. I and II only
- D. II, III and IV

[1 mark]

Question 3

From each molecule of substance X (in the diagram), how many molecules of ATP can be produced?



- A. 17
- B. 34
- C. 36
- D. 18

[1 mark]

Question 4

Which of the following statements about the Krebs cycle are correct?

- I. NAD is oxidised and returned to the link reaction
- II. Citrate is decarboxylated to form a 6 carbon molecule
- III. FADH₂ is produced and sent to the electron transport chain
- IV. Oxidation of acetyl groups is coupled to reduction of hydrogen carriers.

- A. II, III and IV
- B. I, II and III
- C. II and III only
- D. III and IV only

[1 mark]

Question 5

The following steps describe processes involved in oxidative phosphorylation.

1. Redox reactions drive the movement of protons across the cristae to the intermembrane space
2. Oxygen molecules combine with protons and electrons to form water
3. NADH and FADH donate electrons to the first transport protein in the chain
4. Hydrogen ions (protons) are also released as the coenzymes are oxidised
5. A high concentration of protons in the intermembrane space creates an electrochemical gradient
6. Electrons move down the proteins in a series of redox reactions
7. Protons move down the electrochemical gradient through enzyme ATP synthase

Which of the following shows the correct sequence for these steps?

- A. 1 → 4 → 6 → 2 → 5 → 7 → 3
- B. 3 → 4 → 6 → 1 → 5 → 7 → 2
- C. 3 → 6 → 1 → 5 → 7 → 2 → 4
- D. 6 → 3 → 5 → 7 → 2 → 4 → 1

[1 mark]