

Name: _____

Date: _____

Cellular Respiration Review

MULTIPLE CHOICE: Circle ALL that are TRUE. There may be MORE THAN one correct answer.

_____ is the first step in cellular respiration that begins releasing energy stored in glucose.

- A. Alcoholic fermentation
- B. Lactic acid fermentation
- C. Glycolysis
- D. Electron transport chain

The carrier for energy and high-energy electrons during GLYCOLYSIS is

- A. ATP.
- B. NADH.
- C. FADH₂.
- D. NADPH.

If oxygen is NOT present, glycolysis is followed by

- A. the Krebs cycle.
- B. the electron transport chain.
- C. fermentation.

The 3 carbon molecule produced when glucose is broken in half during glycolysis is

- A. pyruvic acid.
- B. lactic acid.
- C. Acetyl-CoA.
- D. citric acid.

Since fermentation does not require oxygen it is said to be

- A. aerobic.
- B. anaerobic.

Which high-energy electron carrier is regenerated during fermentation that allows cells to continue to make ATP using glycolysis?

- A. NAD⁺
- B. NADPH
- C. ATP
- D. ADP

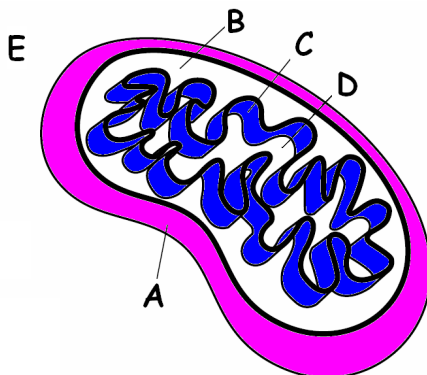
How many ATP molecules are added to get glycolysis started?

2

Since glycolysis produces 4 ATP molecules, this results in a NET GAIN of 2 ATP.

MATCH THE LETTER IN THE DIAGRAM WITH THE LABEL:

(You can use them MORE THAN ONCE)



- D MATRIX
- B INTERMEMBRANE SPACE
- E CYTOPLASM
- A OUTER MEMBRANE
- C INNER MEMBRANE (CRISTAE)
- E Place where GLYCOLYSIS happens

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Cellular Respiration Review

Write the complete overall chemical equation for cellular respiration using chemical symbols instead of words:



Write in words the equations for the two kinds of fermentation:

Alcoholic fermentation



Lactic acid fermentation



Tell the kind of fermentation used in each example:

Yeast use this to make bread dough rise **Ethanol Fermentation**

Your muscle cells use this during rapid exercise when oxygen is low **Lactic Acid Fermentation**

Bacteria and yeast use this to make beer and wine **Ethanol Fermentation**

Bacteria use this to make cheese, yogurt, and sour cream **Lactic Acid Fermentation**

If alcoholic fermentation is used to make bread dough rise, how come you don't become intoxicated when you eat the bread?

The alcohol is burned away.

The Krebs Cycle and Electron Transport Chain

MULTIPLE CHOICE:

Circle the answer or answers that best complete the statement or answer the question.
(THERE MAY BE MORE THAN ONE RIGHT ANSWER.)

Which of the following shows the correct sequence during cellular respiration?

- A. Electron transport chain → glycolysis → Krebs cycle
- B. Glycolysis → Electron transport chain → Krebs cycle
- C. Krebs cycle → Electron transport chain → glycolysis
- D. Glycolysis → Krebs cycle → Electron transport chain**

Where do the carbon atoms in pyruvic acid end up following the Krebs cycle?

- A. They enter the electron transport chain and make ATP
- B. They become part of a carbon dioxide molecule and end up in the atmosphere**
- C. They join with citric acid to make Acetyl-CoA
- D. They build up in the intermembrane space

Because cellular respiration requires oxygen it is said to be _____

- A. aerobic**
- B. anaerobic

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How many total ATP molecules are produced by 1 molecule of glucose completing cellular respiration?

2 6 24 **36**

Which of the following are produced during the Krebs cycle?

- A. ATP**
- B. NADH**
- C. FADH₂**
- D. CO₂**

What molecule is the final electron acceptor at the end of the electron transport chain?

- A. oxygen**
- B. carbon dioxide
- C. glucose
- D. NADH

The movement of which ion across the membrane from the intermembrane space to the matrix causes ATP synthase to spin and make ATP

- A. Na⁺ ions
- B. oxygen
- C. H⁺ ions**
- D. water

Which stage of cellular respiration produces the most ATP?

- A. glycolysis
- B. Krebs cycle
- C. Electron transport**
- D. Acetyl-CoA charging

Which of the following happens as electrons pass down the electron transport chain?

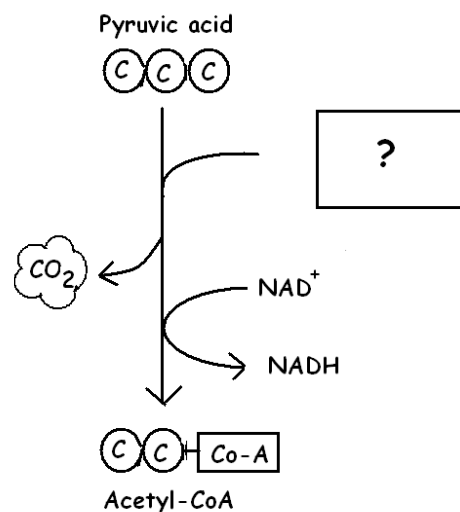
- A. Energy from the moving electrons transports H⁺ ions into the intermembrane space.**
- B. Carbon dioxide is released.
- C. Energy from H⁺ ions crossing back into the matrix causes ATP synthase to make ATP.**
- D. Water is produced.**

Name the [?] molecule that joins in this reaction to make Acetyl-CoA.

- A. ATP
- B. NADP⁺
- C. Coenzyme A**
- D. citric acid

If oxygen is present, what will happen to the NADH produced in this reaction?

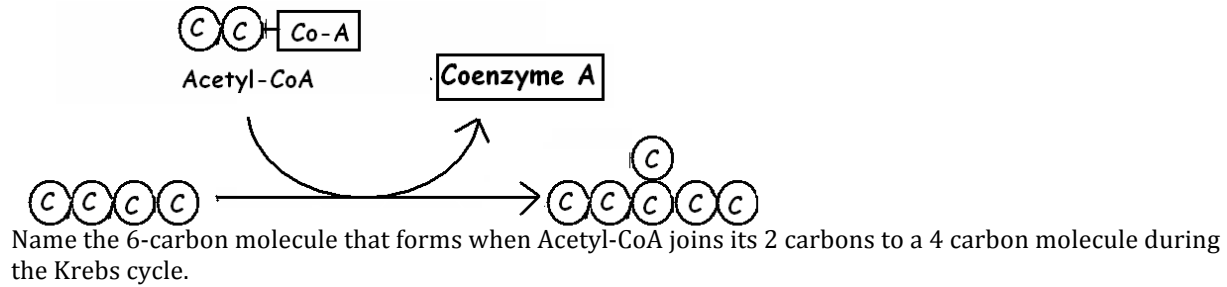
- A. Its electrons will enter the Electron transport chain**
- B. It will donate its H⁺ ions to make glucose
- C. It will join with ATP to make citric acid
- D. It will join with oxygen to make CO₂



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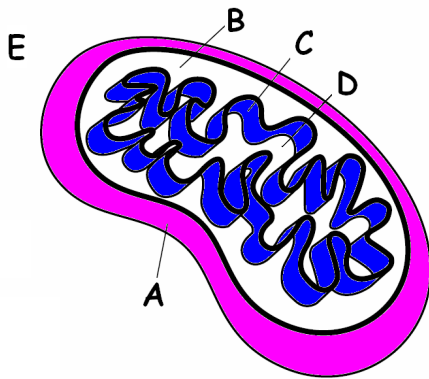
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- A. ATP
- B. pyruvic acid
- C. glucose
- D. citric acid**

MATCH THE LETTER IN THE DIAGRAM WITH THE LABEL:

(You can use them MORE THAN ONCE or NOT AT ALL)



- E** Place where glycolysis happens.
- C** Place where enzymes for the Electron Transport Chain are located.
- B** Place that fills with H^+ ions as electrons move down the Electron transport chain.
- C/D** Place where ADP and P join to make ATP.
- D** Place where oxygen acts as the final electron acceptor to make water.

CELLULAR RESPIRATION VOCABULARY REVIEW

1. **Pyruvic acid** is a 6 carbon molecule that is produced first when acetyl-CoA joins with a 4 carbon molecule to enter the Krebs cycle.
2. **Glycolysis** is the process of splitting a glucose molecule into 2 pyruvic acid (aka pyruvate) molecules.
3. The molecule used by cells to store and transfer energy is **ATP**.
4. Glycolysis happens outside the mitochondria in the **cytoplasm** of the cell.
5. **Aerobic respiration** happens when oxygen is present and includes glycolysis, Krebs cycle, and Electron transport.
6. This describes a process that requires oxygen = **aerobic**
7. This atmospheric gas is required for aerobic respiration = **oxygen**.
8. This describes a process that does NOT require oxygen; it means "without air" = **anaerobic**
9. Type of fermentation used by human muscles in low oxygen conditions and microorganisms to make yogurt, cheese, pickles, sauerkraut. = **lactic acid**
10. As electrons pass down the electron transport chain, H^+ ions build up in the

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intermembrane space.

11. The **Krebs** cycle breaks down pyruvic acid into carbon dioxide and produces NADH, FADH₂, and ATP.
12. The NADH and FADH₂ produced during the Krebs cycle pass their electrons down the **electron transport** chain to produce ATP.
13. The passage of H⁺ ions through **ATP synthase** causes it to spin and produce ATP.
14. This 3 carbon molecule is produced during glycolysis when glucose splits in half
= **pyruvate**
15. Cell organelle which acts as the cell's power plant to burn glucose and store energy as ATP
= **mitochondria**
16. If oxygen is NOT present, glycolysis is followed by **fermentation**.
17. Type of fermentation used to make bread dough rise and produce beer and wine.
= **ethanol**
18. This molecule has the formula C₆H₁₂O₆ and is split in half during glycolysis = **glucose**
19. The carbon atoms in pyruvic acid end up as **CO₂** in the atmosphere following the Krebs cycle.
20. The folded inner membranes inside a mitochondrion are called **cristae**.
21. This molecule reacts with pyruvic acid to release CO₂, produce NADH, and acetyl-CoA.
= **Coenzyme A**
22. **Acetyl CoA** forms when Coenzyme A attaches to two carbons from pyruvic acid.
23. **Glycogen** is the storage form of glucose used by animal cells which can be broken down for energy when glucose is used up.
24. The area inside the cristae where the Krebs cycle happens is the **matrix**.