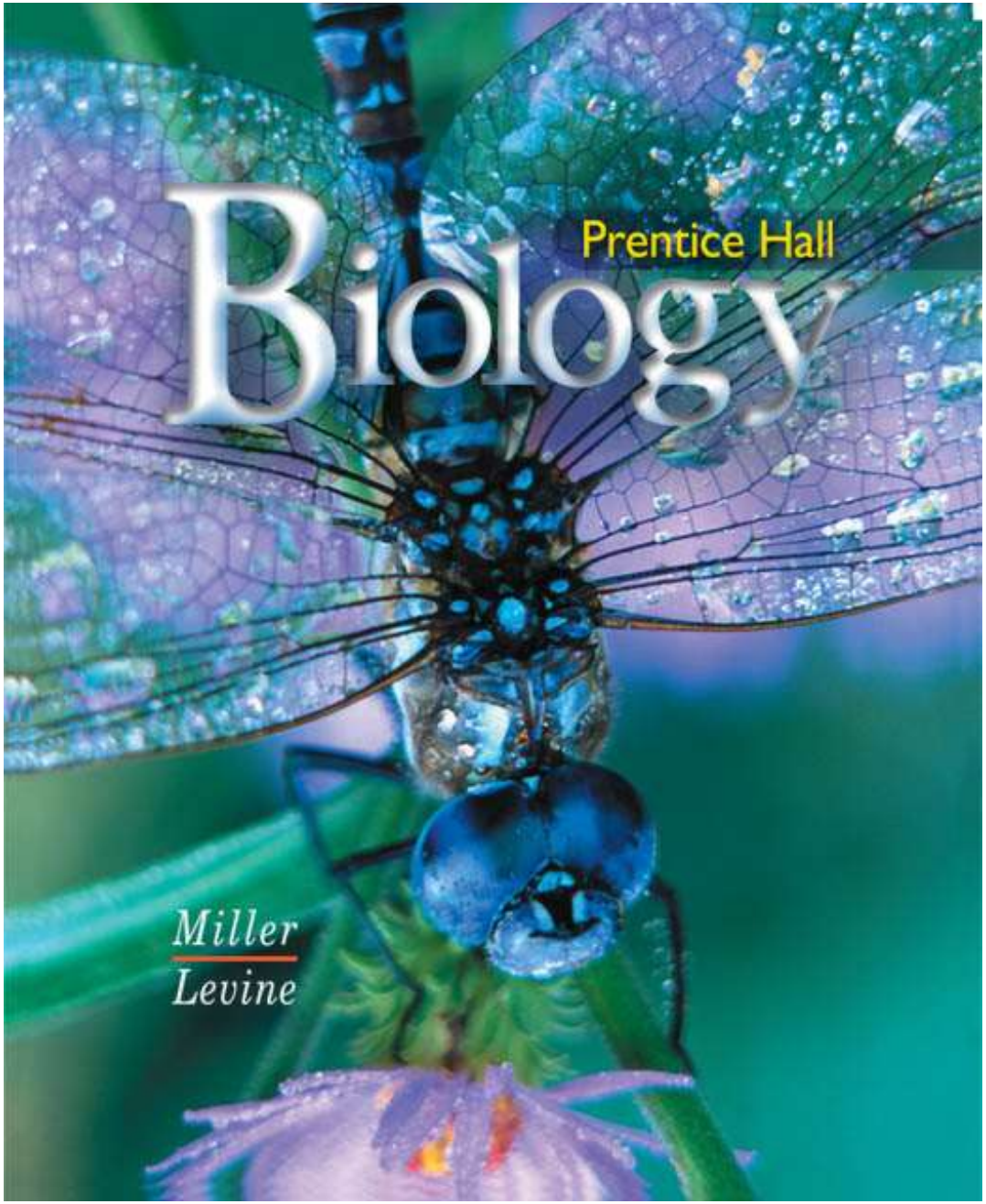
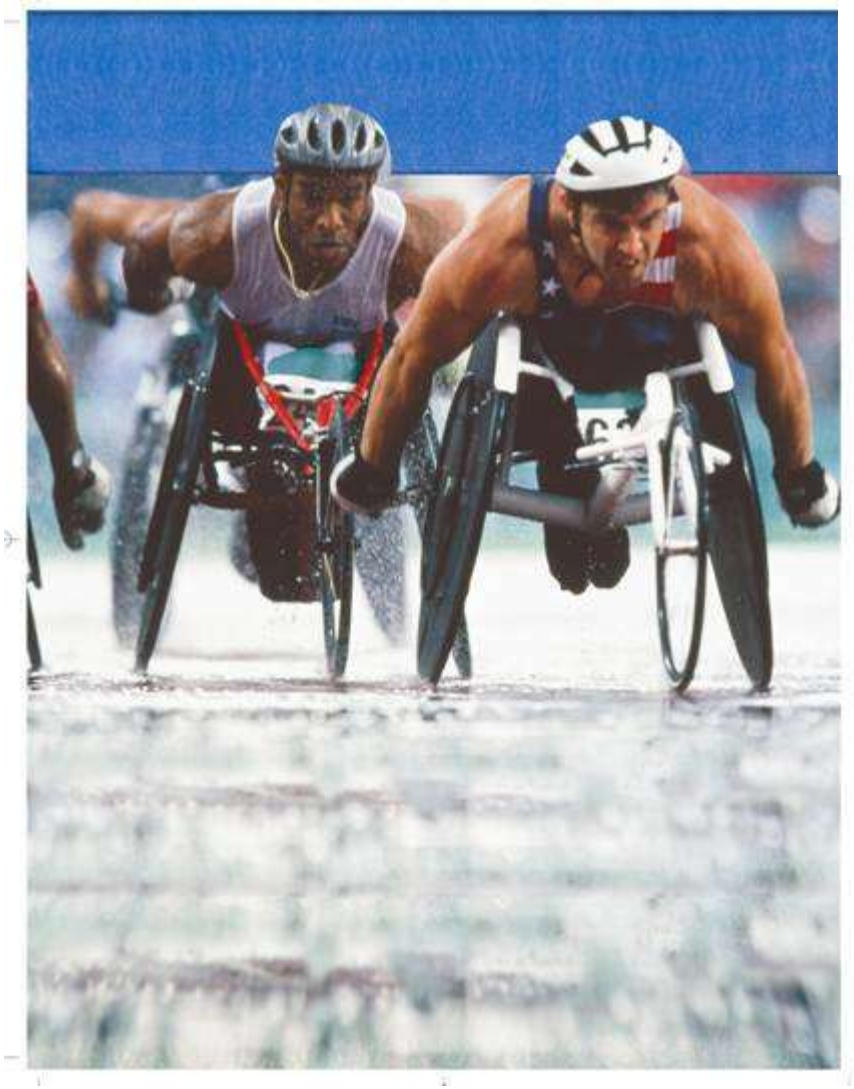


9-2 The Krebs Cycle and Electron Transport



Oxygen is required for the final steps of cellular respiration.

Because the pathways of cellular respiration require oxygen, they are **aerobic**.

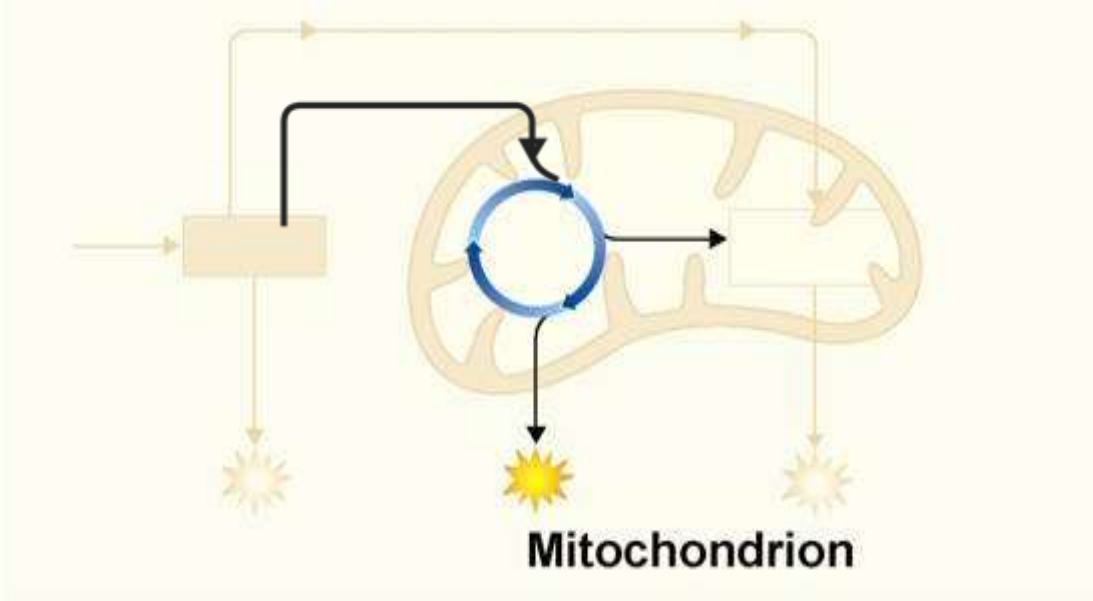
The Krebs Cycle

In the presence of oxygen, pyruvic acid produced in glycolysis passes to the second stage of cellular respiration, the **Krebs cycle**.

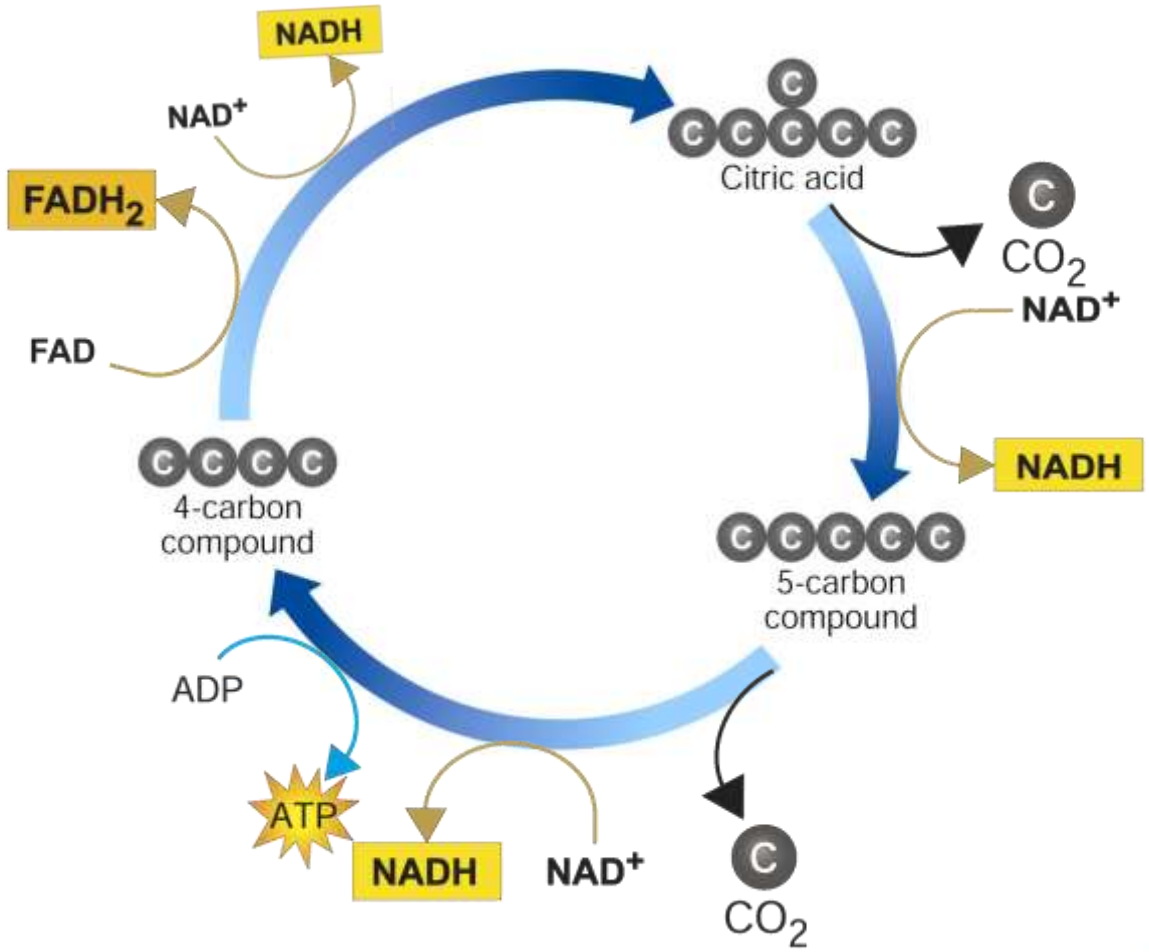
During the Krebs cycle, pyruvic acid is broken down into carbon dioxide in a series of energy-extracting reactions.

movie
click to start

The Krebs cycle begins when pyruvic acid produced by glycolysis enters the mitochondrion.



Draw and Label Figure 9-6, page 227



What does the cell do with all those high-energy electrons in carriers like NADH?

In the presence of oxygen, those high-energy electrons can be used to generate huge amounts of ATP.

Electron Transport

The electron transport chain uses the high-energy electrons from the Krebs cycle to convert ADP into ATP.

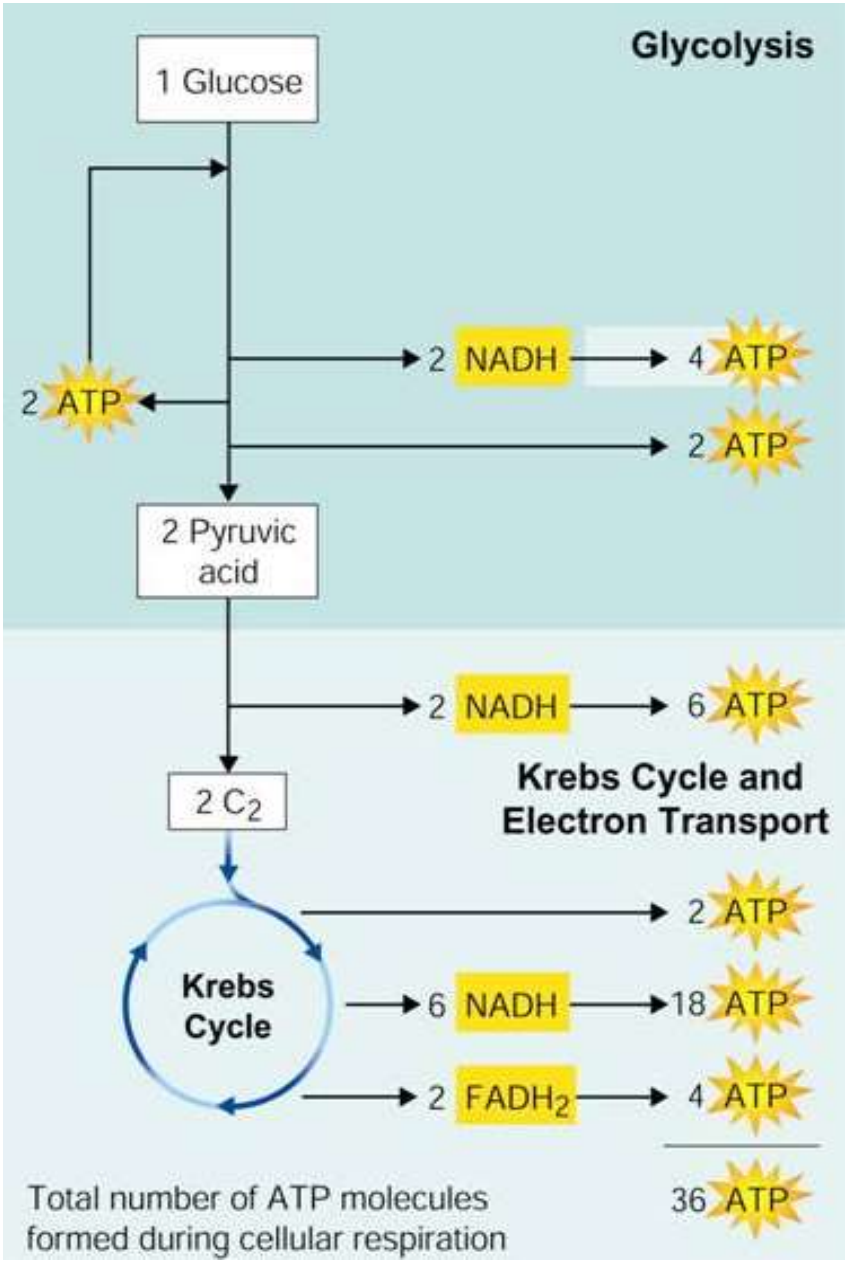
On average, each pair of high-energy electrons that moves down the electron transport chain provides enough energy to produce three molecules of ATP from ADP.

The Totals

Glycolysis produces just 2 ATP molecules per molecule of glucose.

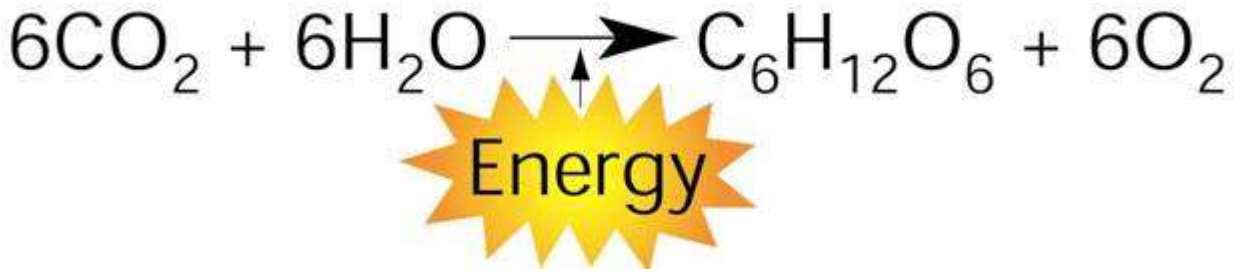
The complete breakdown of glucose through cellular respiration, including glycolysis, results in the production of 36 molecules of ATP.

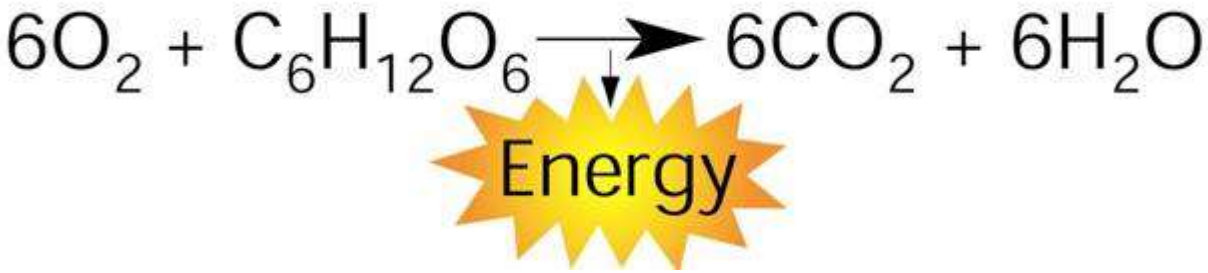
9-2 The Krebs Cycle and The Totals Electron Transport



Comparing Photosynthesis and Cellular Respiration

The energy flows in photosynthesis and cellular respiration take place in opposite directions.





On a global level, photosynthesis and cellular respiration are also opposites.

- Photosynthesis removes carbon dioxide from the atmosphere and cellular respiration puts it back.
- Photosynthesis releases oxygen into the atmosphere and cellular respiration uses that oxygen to release energy from food.

9-2 Section QUIZ

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9-2 Section QUIZ

1 The Krebs cycle breaks pyruvic acid down into

a. oxygen.

b. NADH.

A c. carbon dioxide.

d. alcohol.

2 What role does the Krebs cycle play in the cell?

a. It breaks down glucose and releases its stored energy.

A b. It releases energy from molecules formed during glycolysis.

c. It combines carbon dioxide and water into high-energy molecules.

d. It breaks down ATP and NADH, releasing stored energy.

3 In eukaryotes, the electron transport chain is located in the

a. cell membrane.

A b. inner mitochondrial membrane.

c. cytoplasm.

d. outer mitochondrial membrane.

4 To generate energy over long periods, the body must use

a. stored ATP.

b. lactic acid fermentation.

A c. cellular respiration.

d. glycolysis.

5 Which statement correctly describes photosynthesis and cellular respiration?

a. Photosynthesis releases energy, while cellular respiration stores energy.

b. Photosynthesis and cellular respiration use the same raw materials.

A c. Cellular respiration releases energy, while photosynthesis stores energy.

d. Cellular respiration and photosynthesis produce the same products.

END OF SECTION