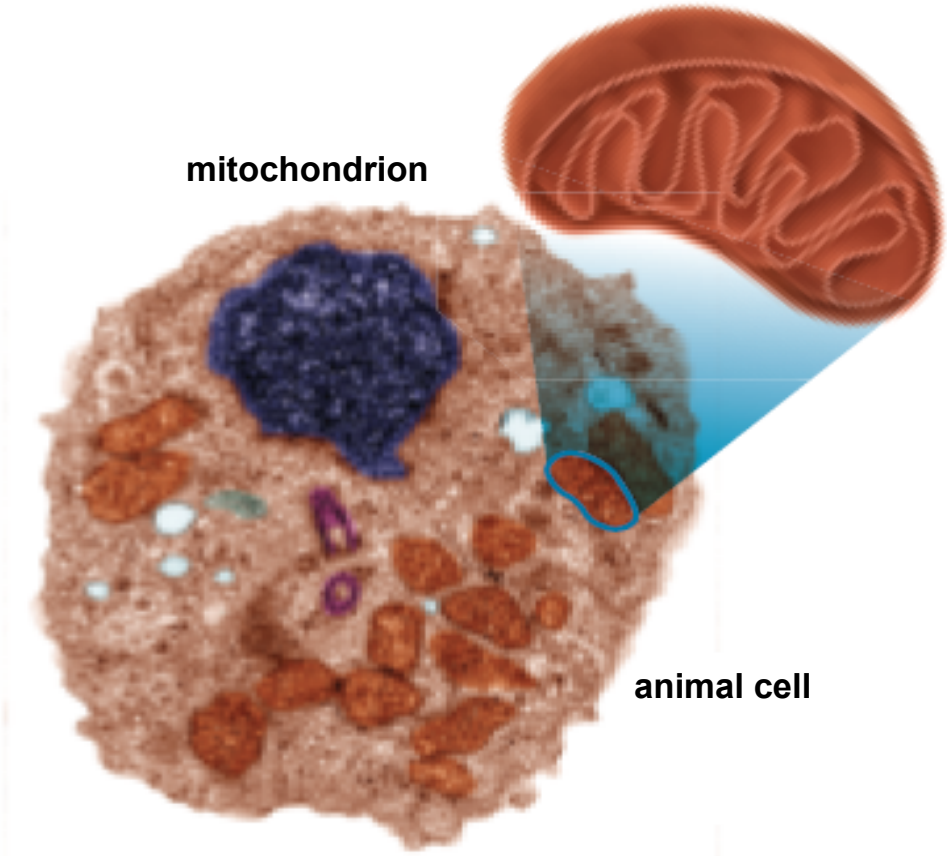
4.4 Overview of Cellular Respiration

KEY CONCEPT

The overall process of cellular respiration converts sugar into ATP using oxygen.

4.4 Overview of Cellular Respiration

- **Cellular respiration makes ATP by breaking down sugars.**
  - Cellular respiration is aerobic, or requires oxygen.
  - Aerobic stages take place in mitochondria.



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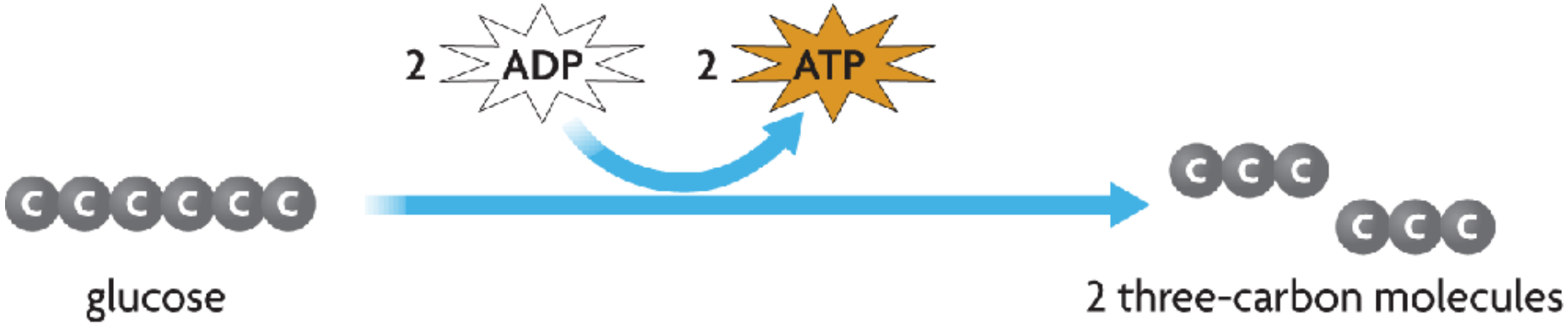
- Glycolysis must take place first.
  - anaerobic process (does not require oxygen)
  - takes place in cytoplasm
  - splits glucose into two three-carbon molecules
  - produces two ATP molecules



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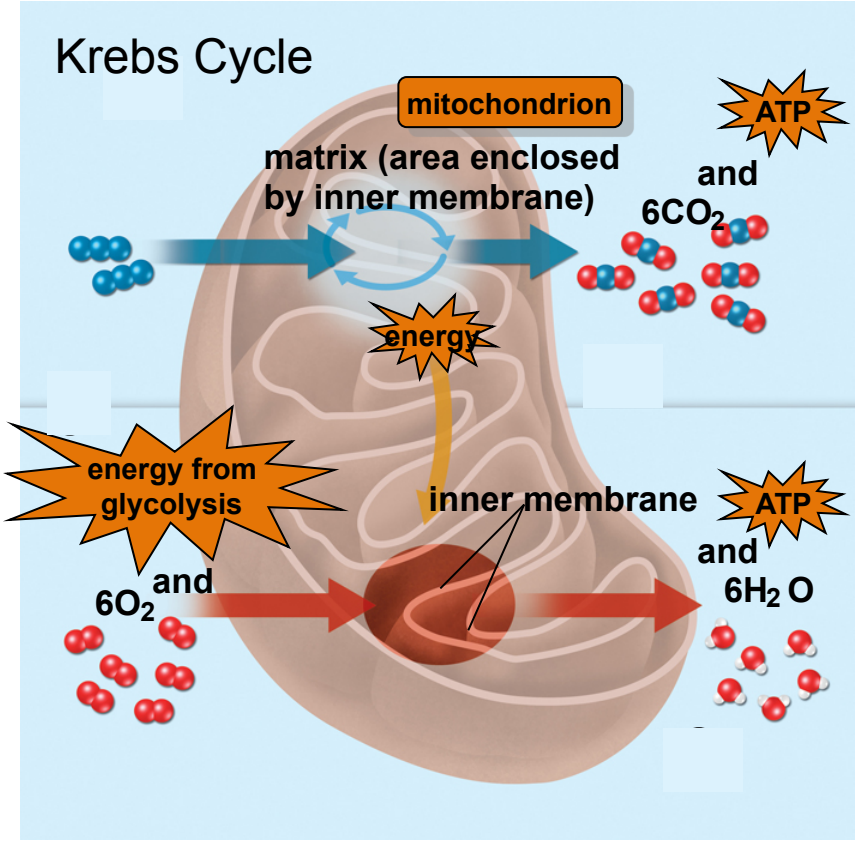
- **Cellular respiration is like a mirror image of photosynthesis.**
  - The Krebs cycle transfers energy to an electron transport chain.
    - takes place in mitochondrial matrix
    - breaks down three-carbon molecules from glycolysis
    - makes a small amount of ATP
    - releases carbon dioxide
    - transfers energy-carrying molecules



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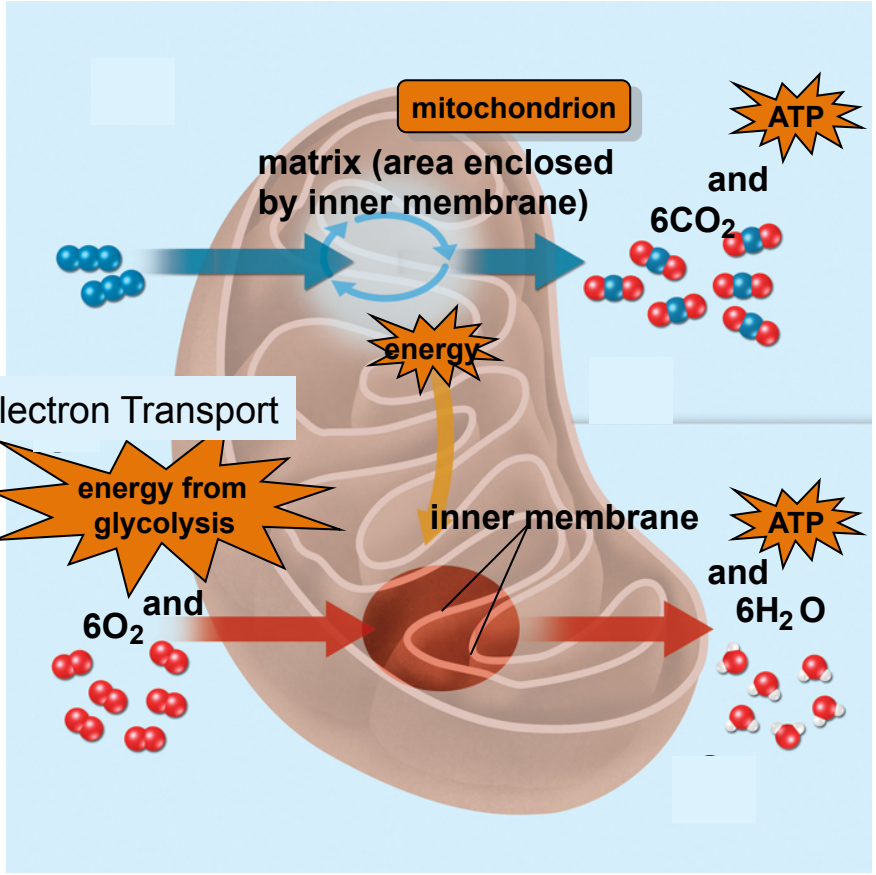
- The electron transport chain produces a large amount of ATP.
  - takes place in inner membrane
  - energy transferred to electron transport chain
  - oxygen enters process
  - ATP produced
  - water released as a waste product



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- The equation for the overall process is:

  $C_6H_{12}O_6 + 6O_2 \rightarrow\rightarrow\rightarrow\rightarrow\rightarrow\rightarrow 6CO_2 + 6H_2O$

- The reactants in photosynthesis are the same as the products of cellular respiration.