

5.3 Chemical reactions either store or release energy

- Cells carry out thousands of chemical reactions
 - The sum of these reactions constitutes cellular metabolism

- There are two types of chemical reactions:
 - **Endergonic** reactions absorb energy and yield products rich in potential energy

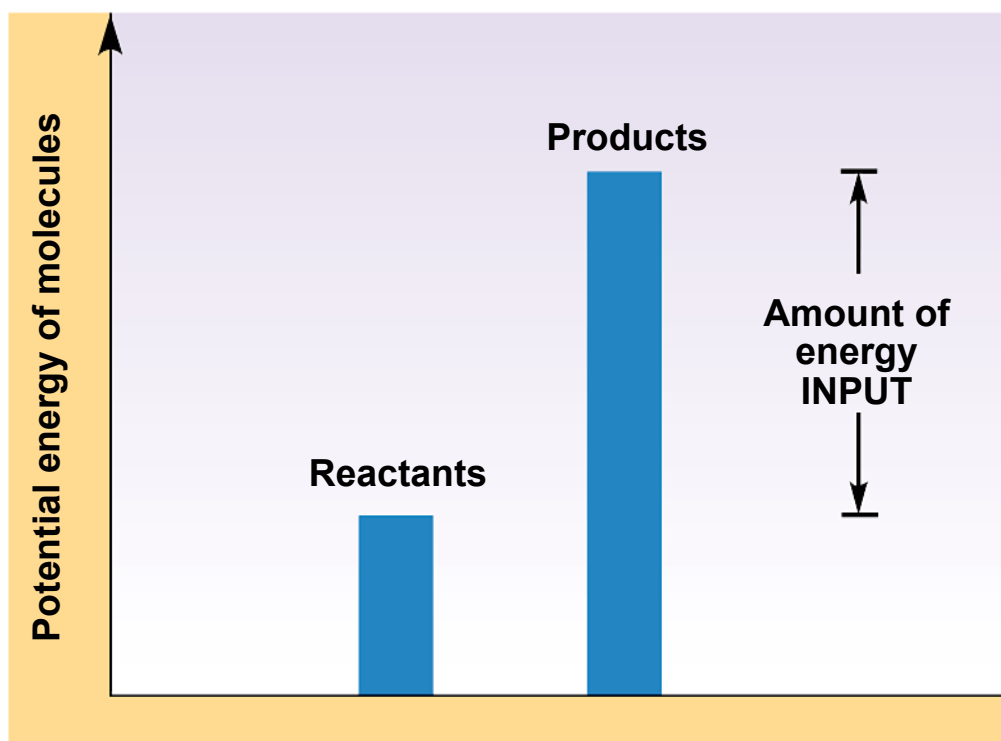


Figure 5.3A

- **Exergonic** reactions release energy and yield products that contain less potential energy than their reactants

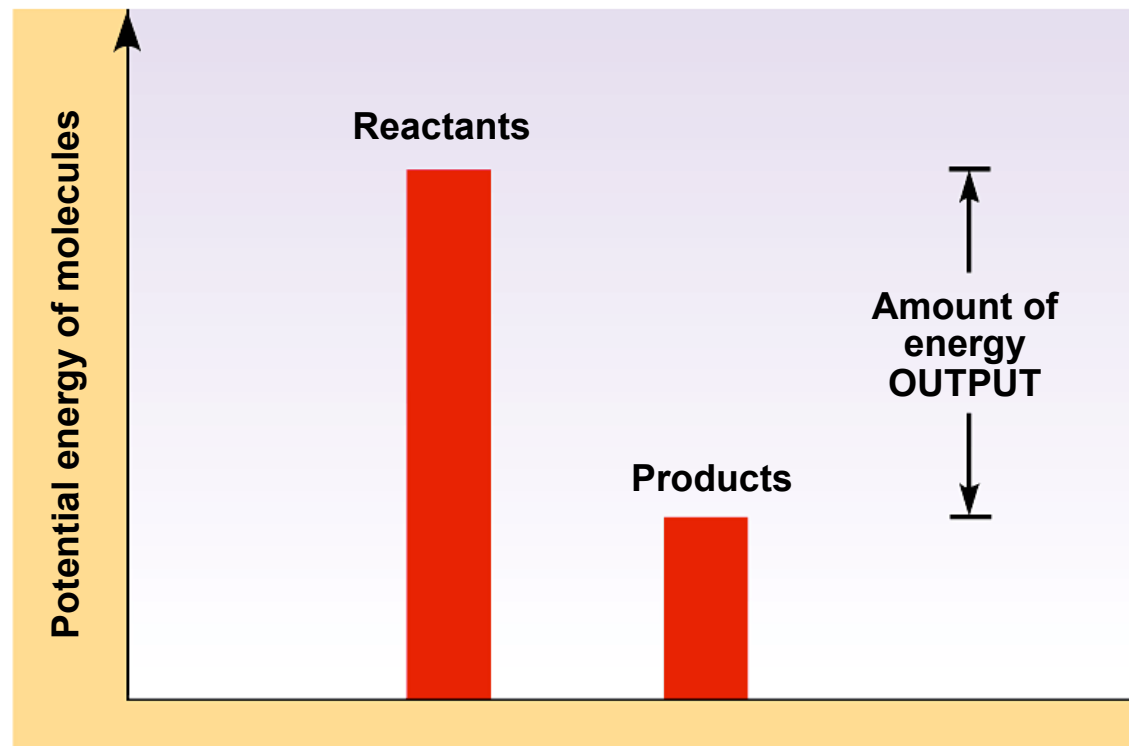


Figure 5.3B

Which has more potential energy in the graph, the reactants or products?

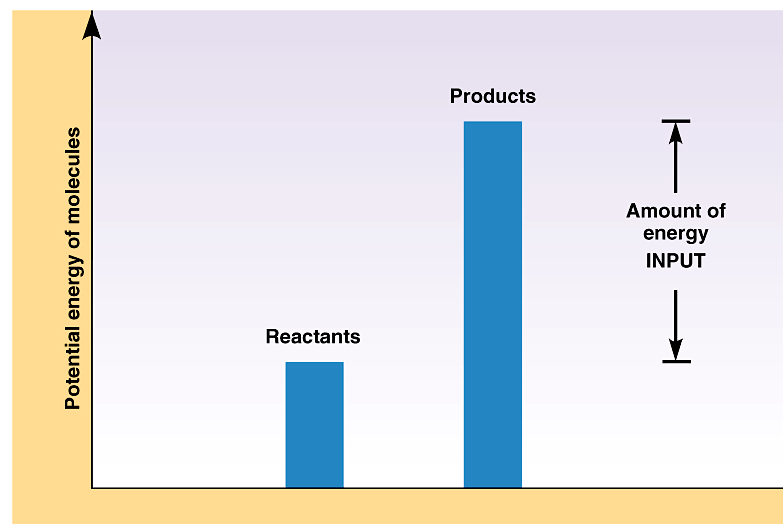
The products

What type of reaction has more energy in the products?

Endergonic

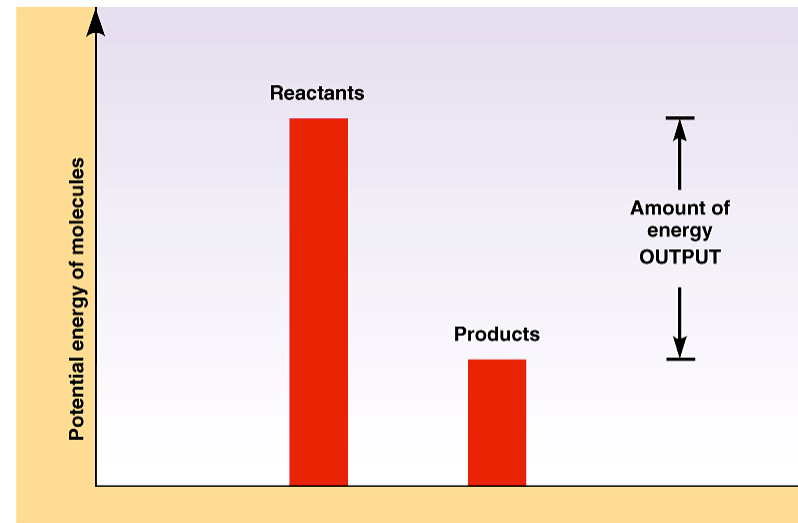
Give an example of an endergonic reaction

Photosynthesis



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- Which has more energy in the graph, the reactants or products?
- The reactants
- What type of reaction has more energy in the reactants?
- Exergonic
- What does this mean?
- It releases energy



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5.4 ATP shuttles chemical energy within the cell

- In cellular respiration, some energy is stored in **ATP** molecules
- ATP powers nearly all forms of cellular work
- ATP molecules are the key to energy coupling

- When the bond joining a phosphate group to the rest of an ATP molecule is broken by hydrolysis, the reaction supplies energy for cellular work

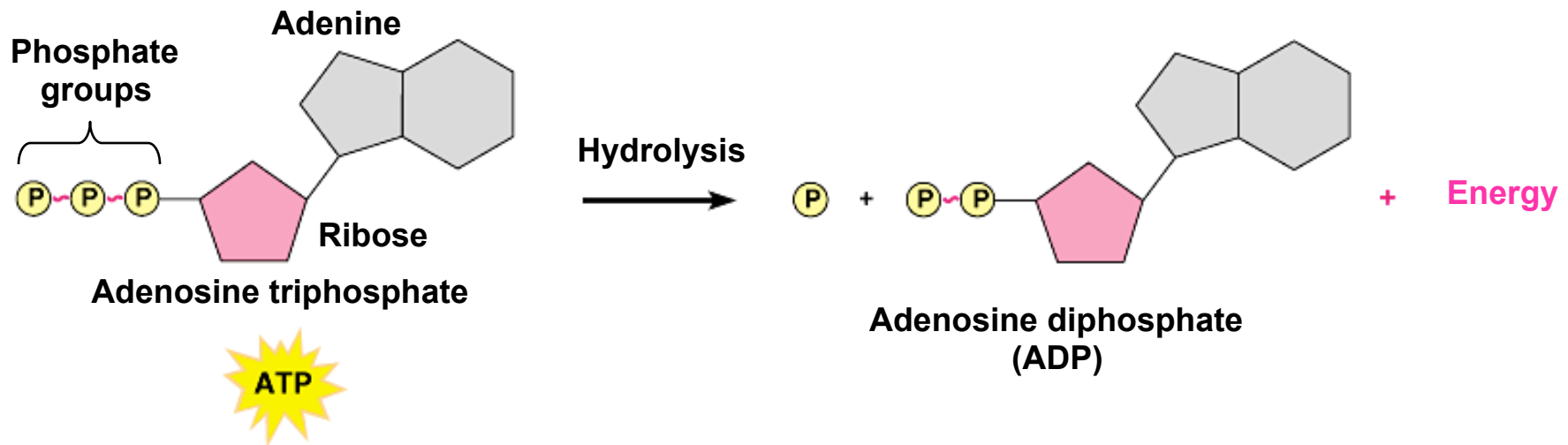


Figure 5.4A

- How ATP powers cellular work

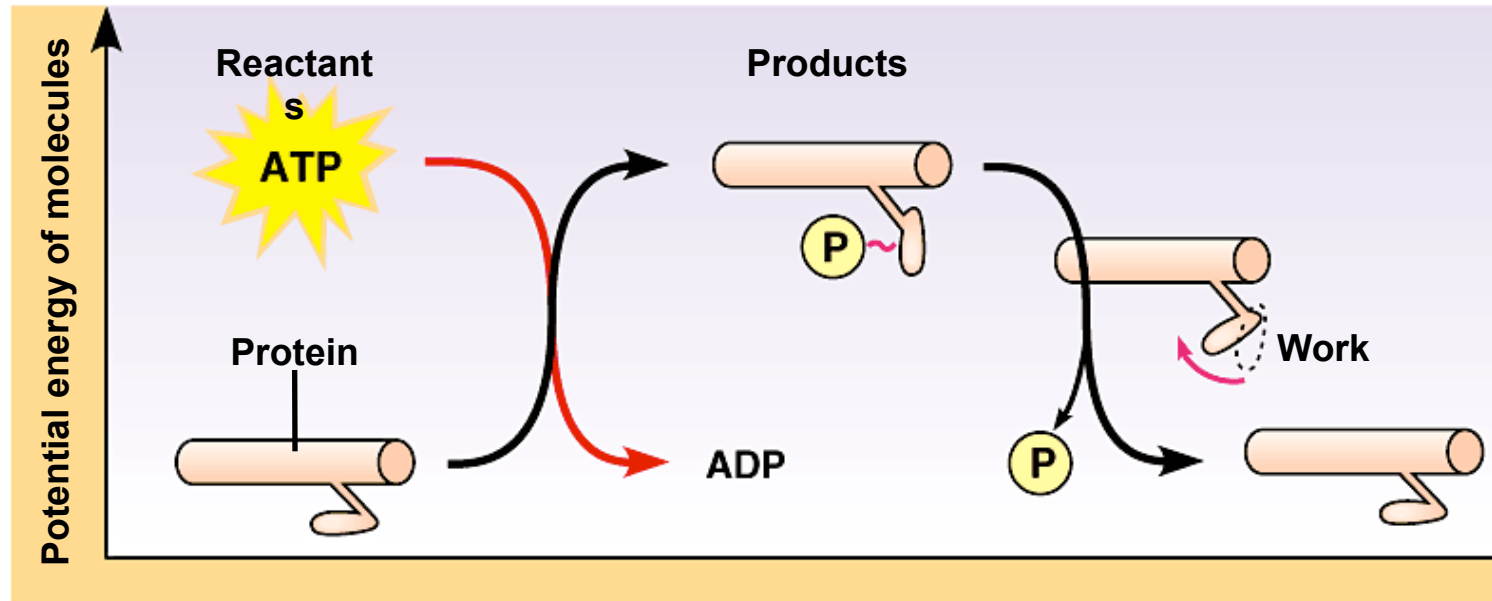


Figure 5.4B

- The ATP cycle

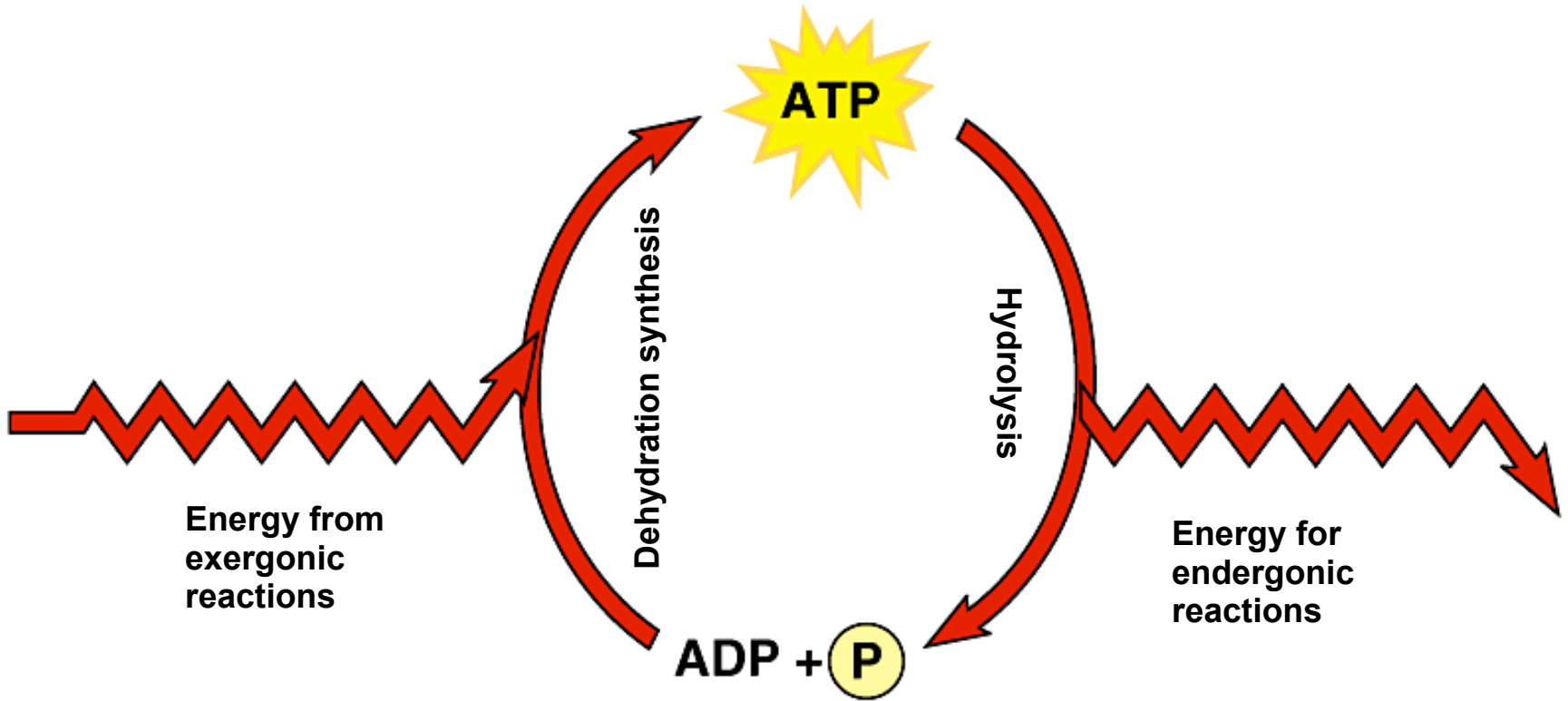
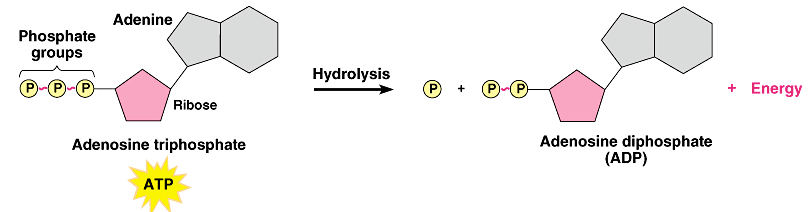


Figure 5.4C

- Why does ATP break apart so easily?
- Three negative P together is not very stable

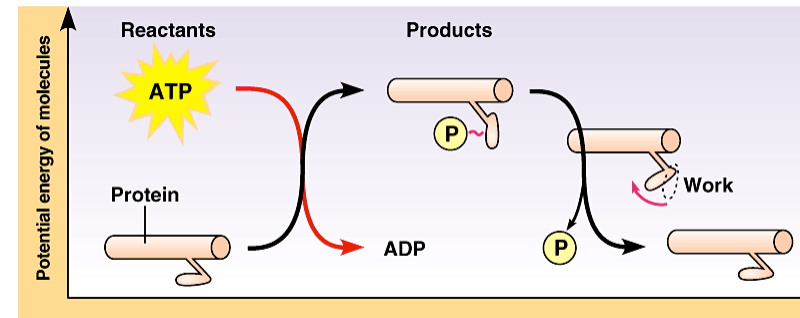
- What else happens when the phosphate comes off?

- Energy is released



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- What is energy coupling?
- It is when a really exergonic reaction is used along with an endergonic reaction to make the endergonic reaction happen
- Explain how ATP is coupled to the movement of a protein
- The phosphate comes off the ATP and temporarily stays on the protein, as the protein knocks it off it moves`



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- Exergonic reaction produce _____ while endergonic reactions use _____ and release _____ and _____
- ATP, ADP, P
- If we couple these reactions we can give energy from an exergonic reaction to an endergonic reaction and make it happen

