

BC351-Lecture 9

Metabolism: Glycolysis/GNG

Terms:

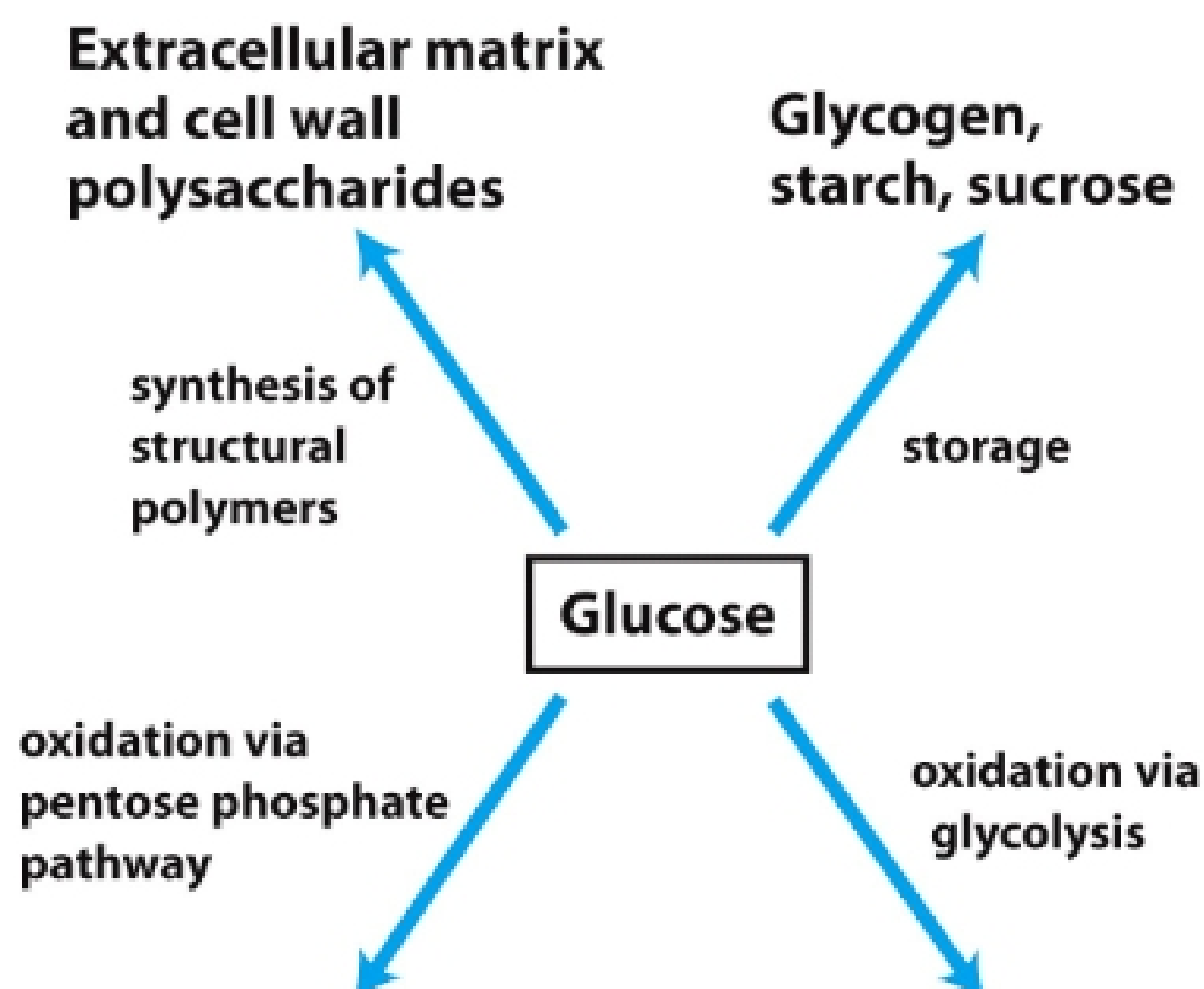
- Irreversible reaction
- Isozyme
- Kinase
- Phosphatase
- Near equilibrium reaction

Principles:

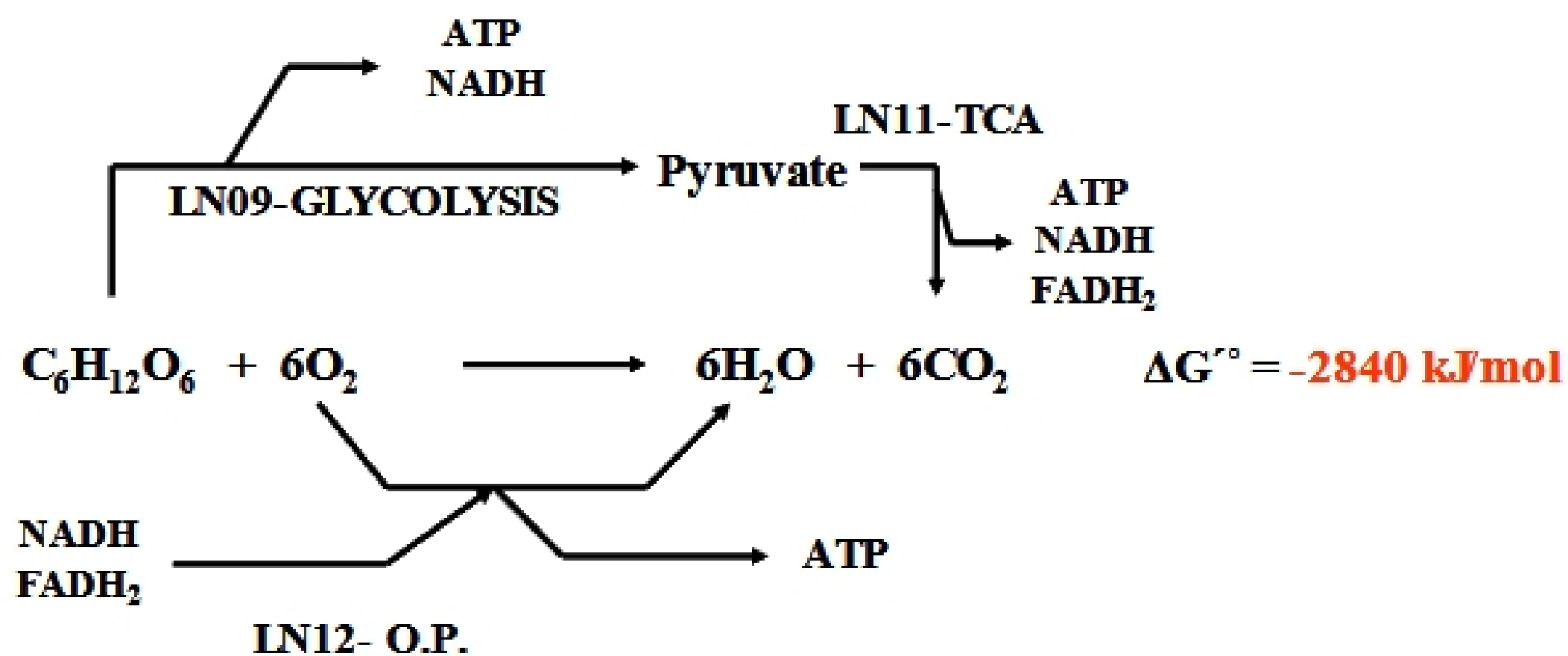
1. Glucose combustion is a redox reaction.
 - a. Metabolism is a long series of reactions that will result in the complete combustion of glucose.
2. Thermodynamics of the reactions:
 - a. At standard conditions
 - b. At actual conditions
 - c. And of course energy conservation
3. Glucose production.

I. Glycolysis introduction pgs. 527-531

- a. Glucose metabolism
 - i. Four fates of glucose.



b. Glucose combustion



i. Glycolysis as the beginning.

1. Overview.

a. 10 reactions/10 enzymes

i. All take place in the cytosol.

b. Two phases

i. Prep phase.

ii. Payoff phase.

c. Lactic acid Fermentation (the 11th reaction).

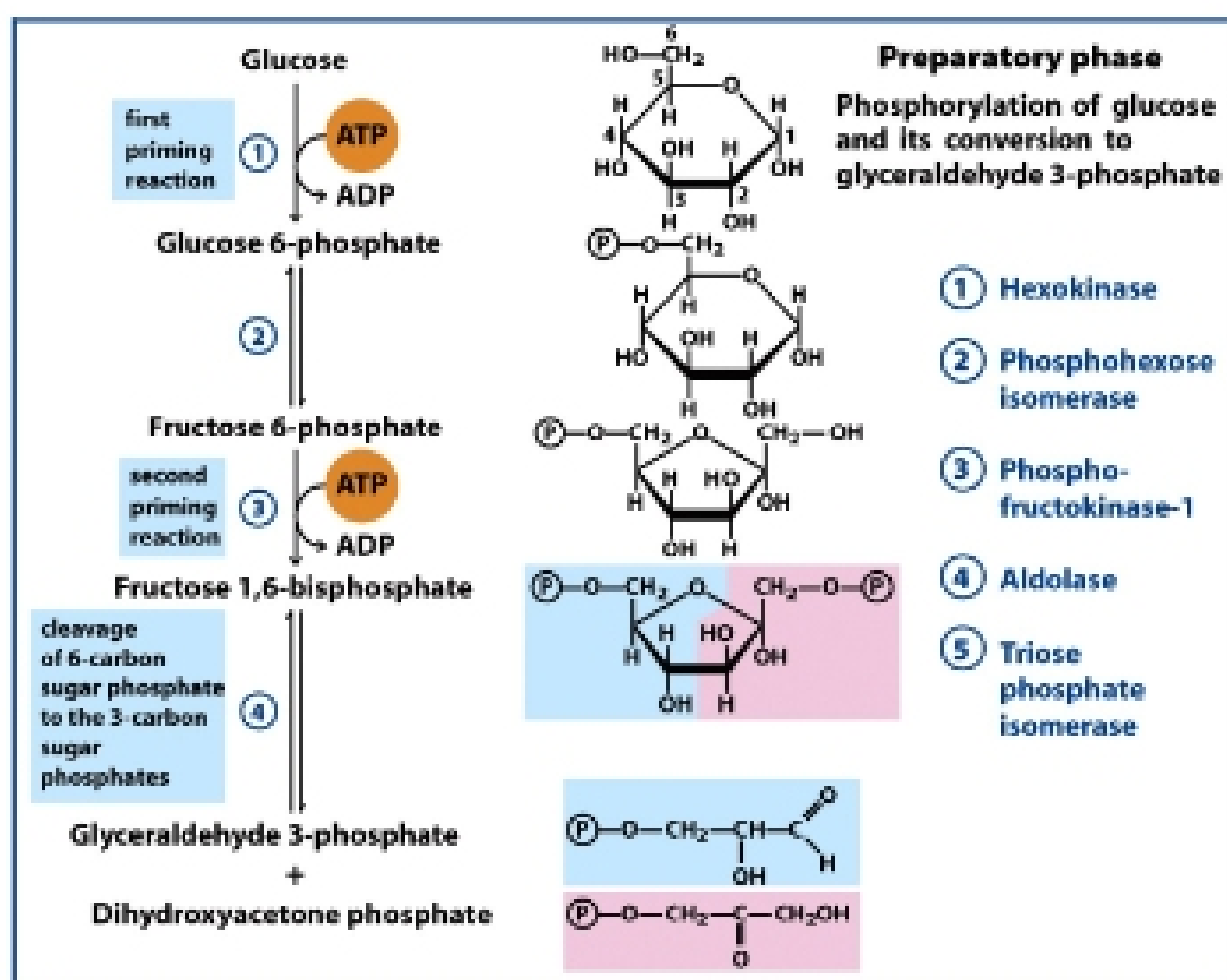


Figure 14-2a
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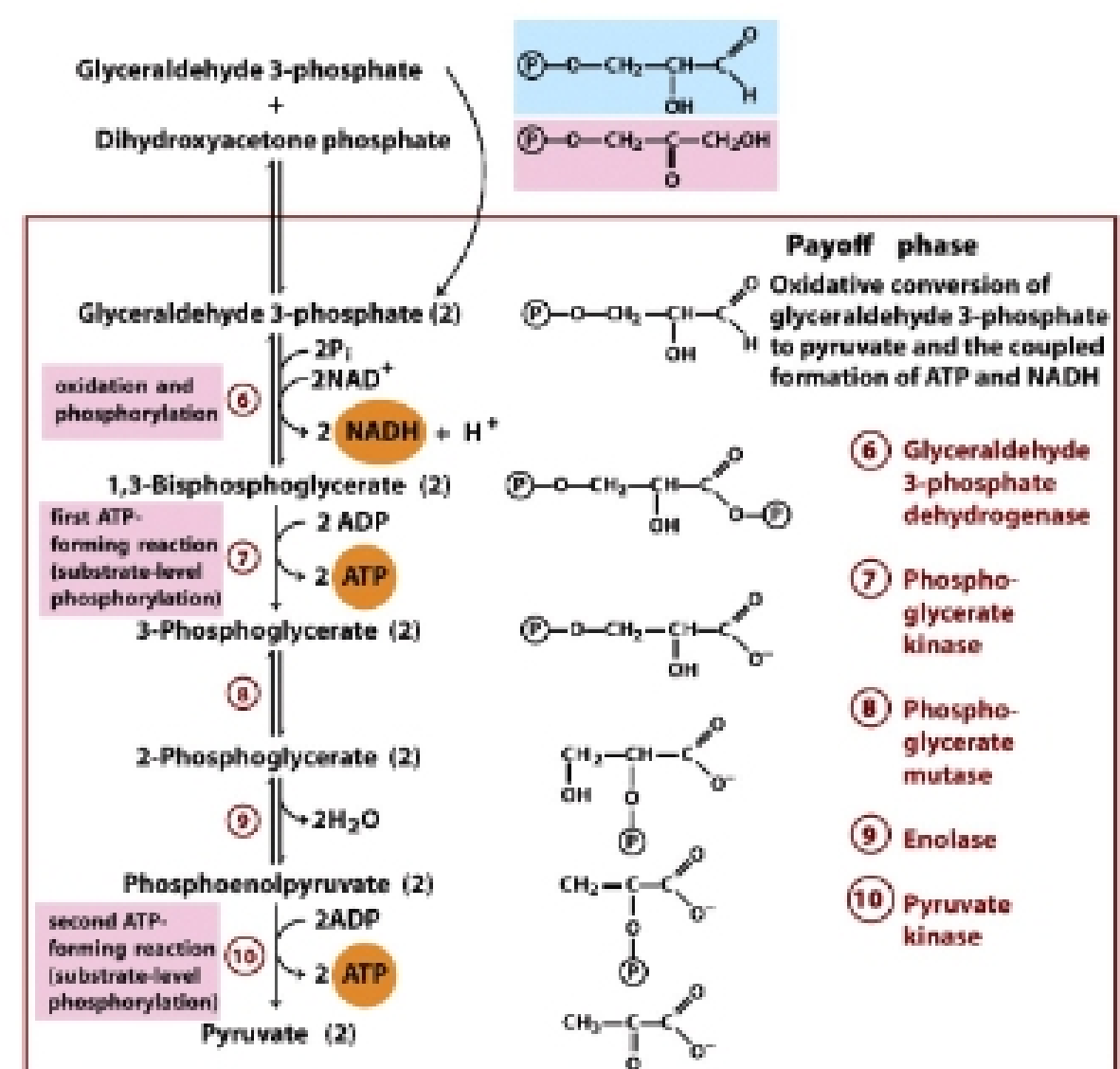
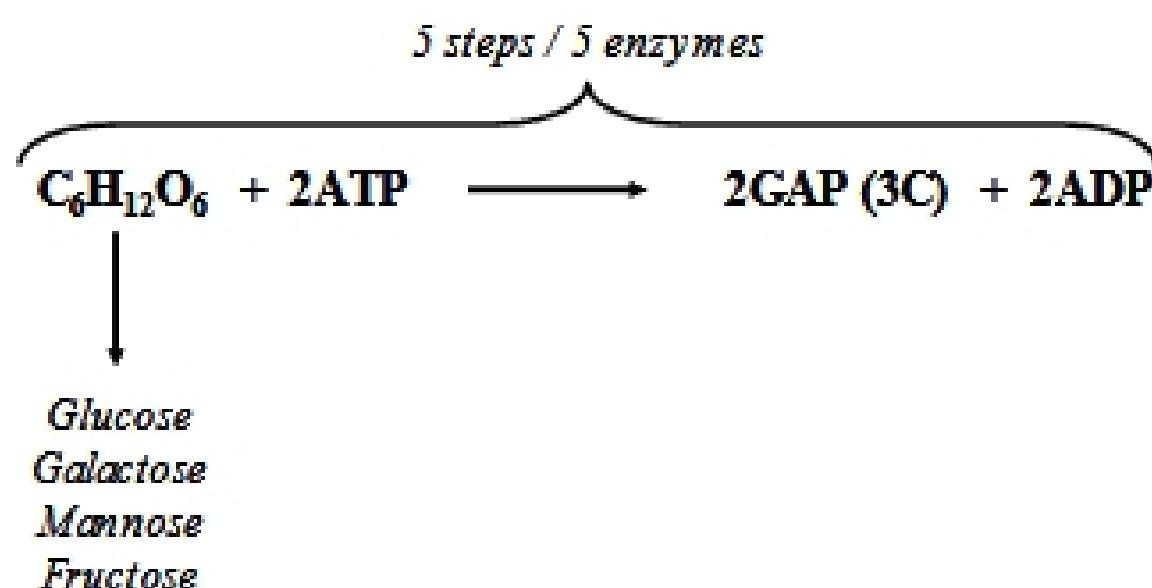


Figure 14-2b
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II. Prep phase pgs. 531-535

a. Overview.

- i. 5 steps/5 enzymes.
- ii. Utilized:
 1. One 6-carbon molecule (glucose is what we will go over).
 - a. Other 6-carbon molecules can feed into this pathway such as:
 - i. Galactose, mannose and fructose.
 2. 2 ATP.
- iii. Produced:
 1. Two 3 carbon molecules (glyceraldehyde-3-phosphate).



b. Reaction one- Hexokinase.

i. Definition of a “kinase” (principle #1):

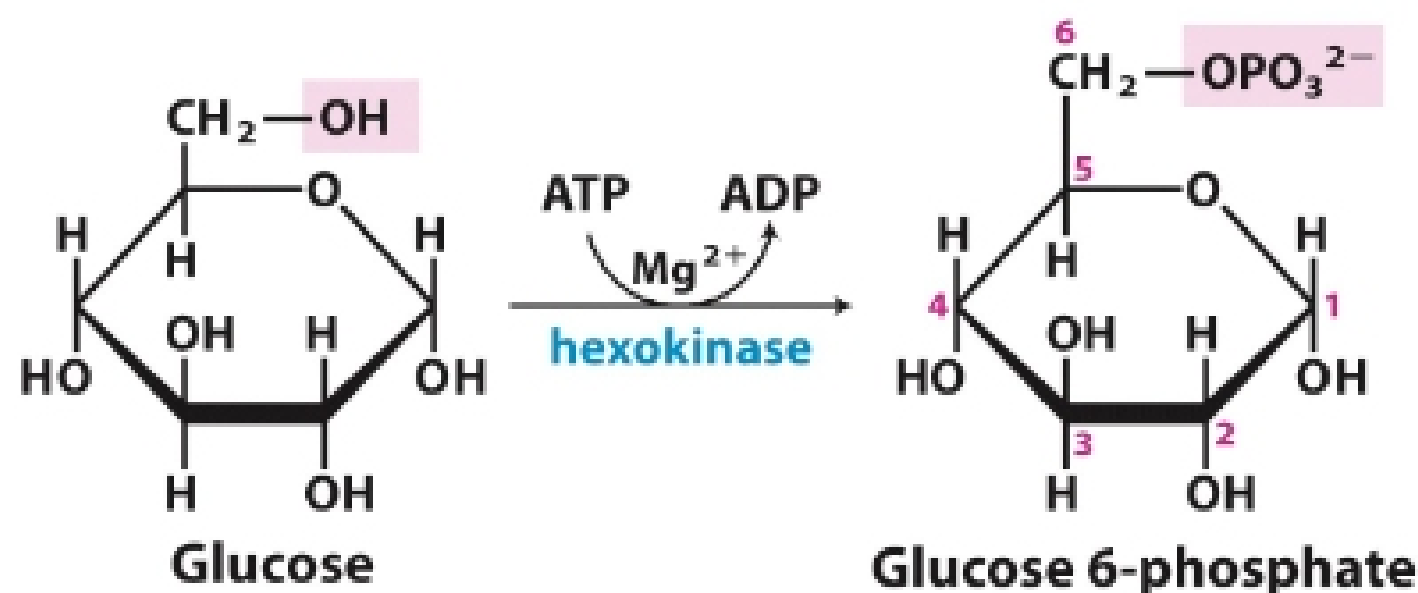
1.

ii. The reaction

1. An overview of reaction layout in your book.

Principles for Hexokinase:

1. Kinases
2. Conservation of free energy.
3. ΔG vs. $\Delta G'^{\circ}$
4. Irreversible reactions
5. Phosphorylated Intermediates.



$$\Delta G'^{\circ} = -16.7 \text{ kJ/mol}$$