Medical Committee
The University of Jordan

SLIDE ○ SHEET

SLIDE : # 4- Gluconeogenesis

Biochemistry

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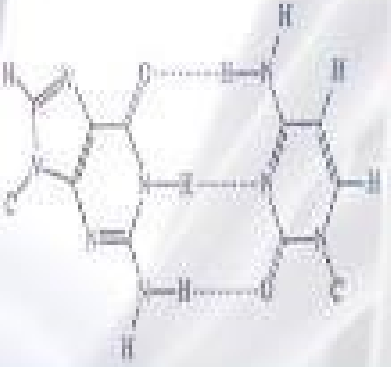


Majida Al-Foqaraa'

GLUCONEOGENESIS

- Glucose Synthesis Is Required for Survival

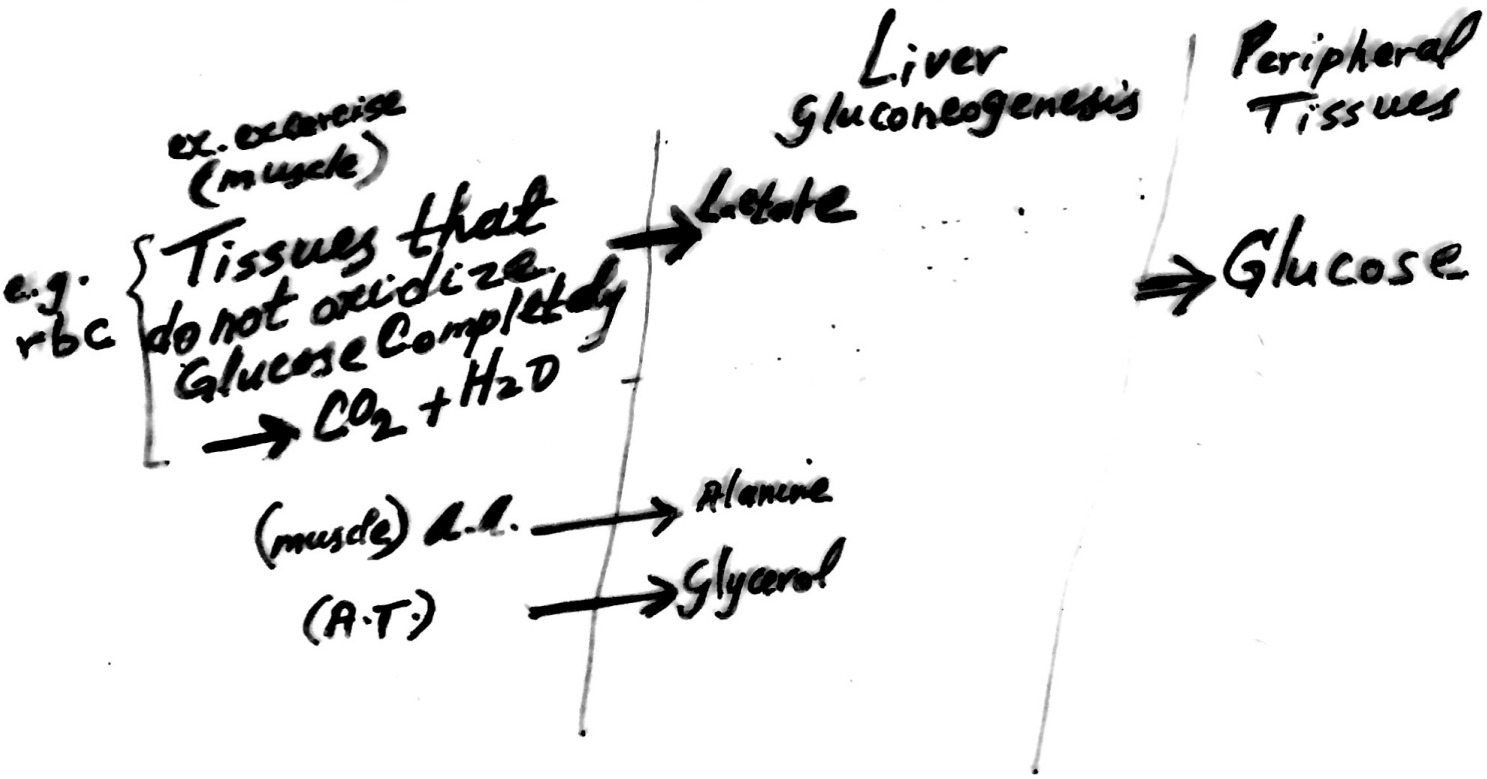
- Pathways of Gluconeogenesis

(2) Lactate → (2) Pyruvate ← Amino acids

Amino acids → (2) Oxaloacetate ← (2) Propionate

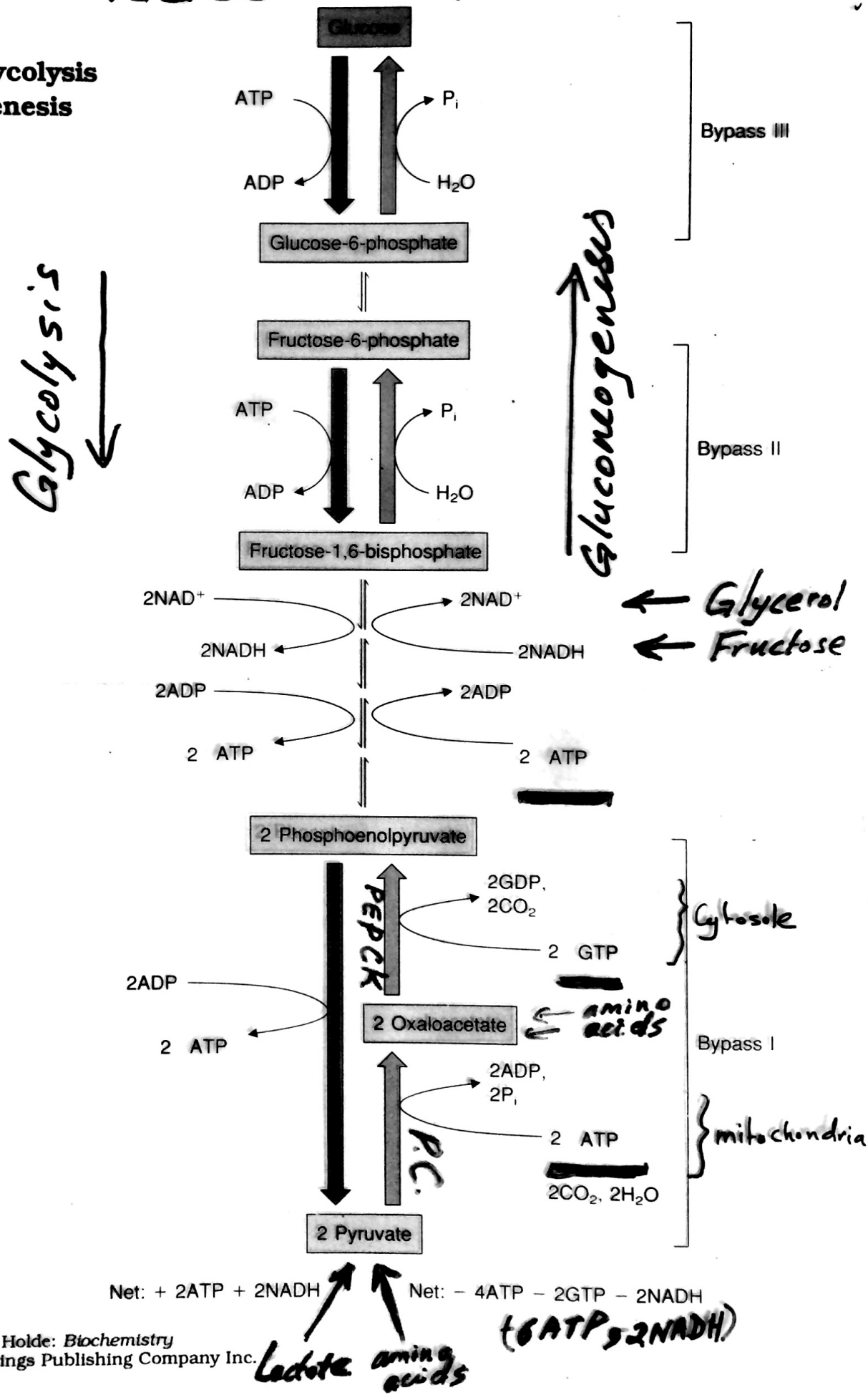
(2) Glycerol → (2) Triosephosphates ← Fructose

Galactose → Glucose



Reactions of glycolysis and gluconeogenesis

Figure 16.3



From Mathews and van Holde: *Biochemistry*
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Key Reactions of Gluconeogenesis

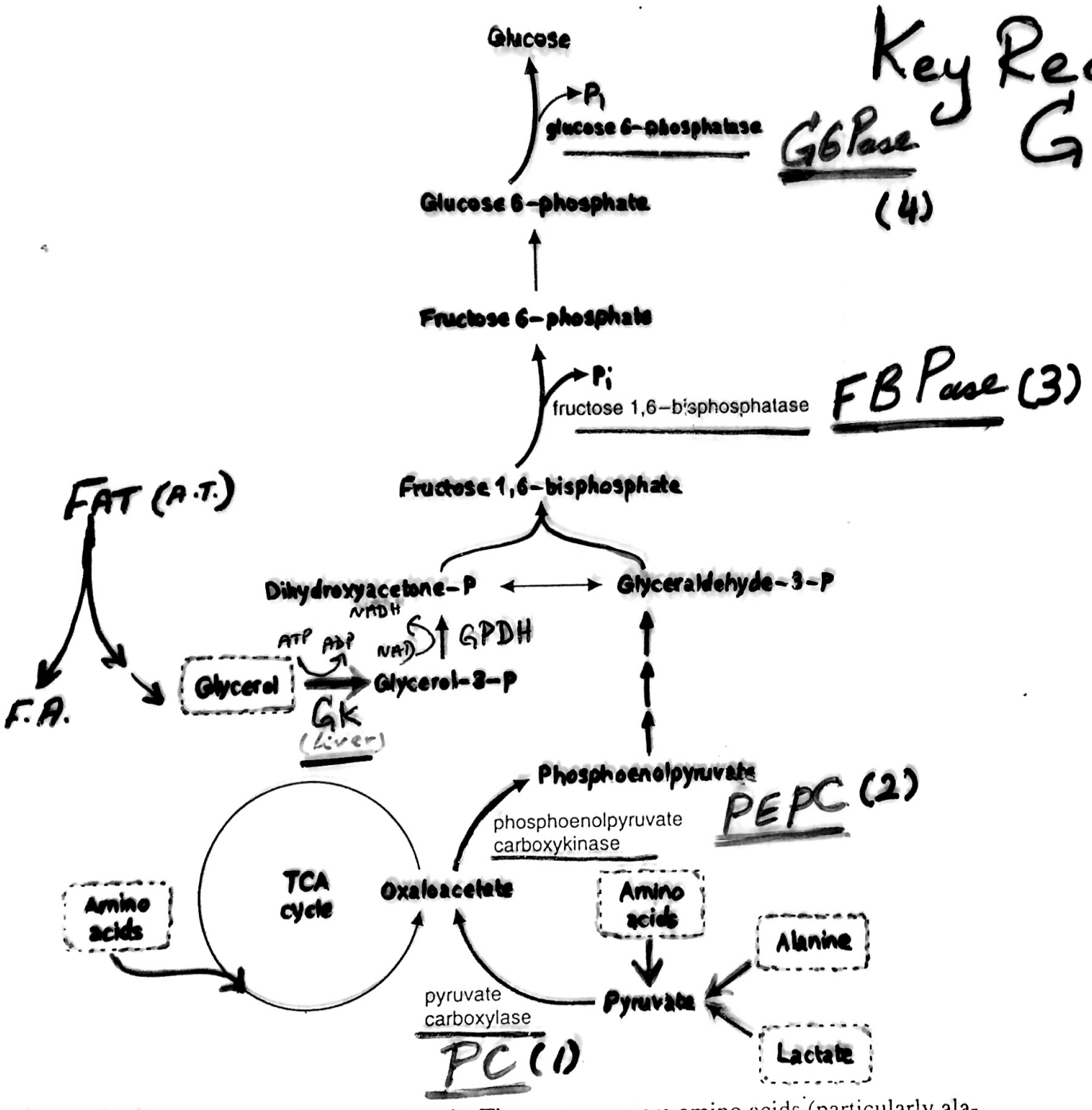


Fig. 27.6. Key reactions of gluconeogenesis. The precursors are amino acids (particularly alanine), lactate, and glycerol. Heavy arrows indicate steps that differ from those of glycolysis.

Energy Requirements of Gluconeogenesis

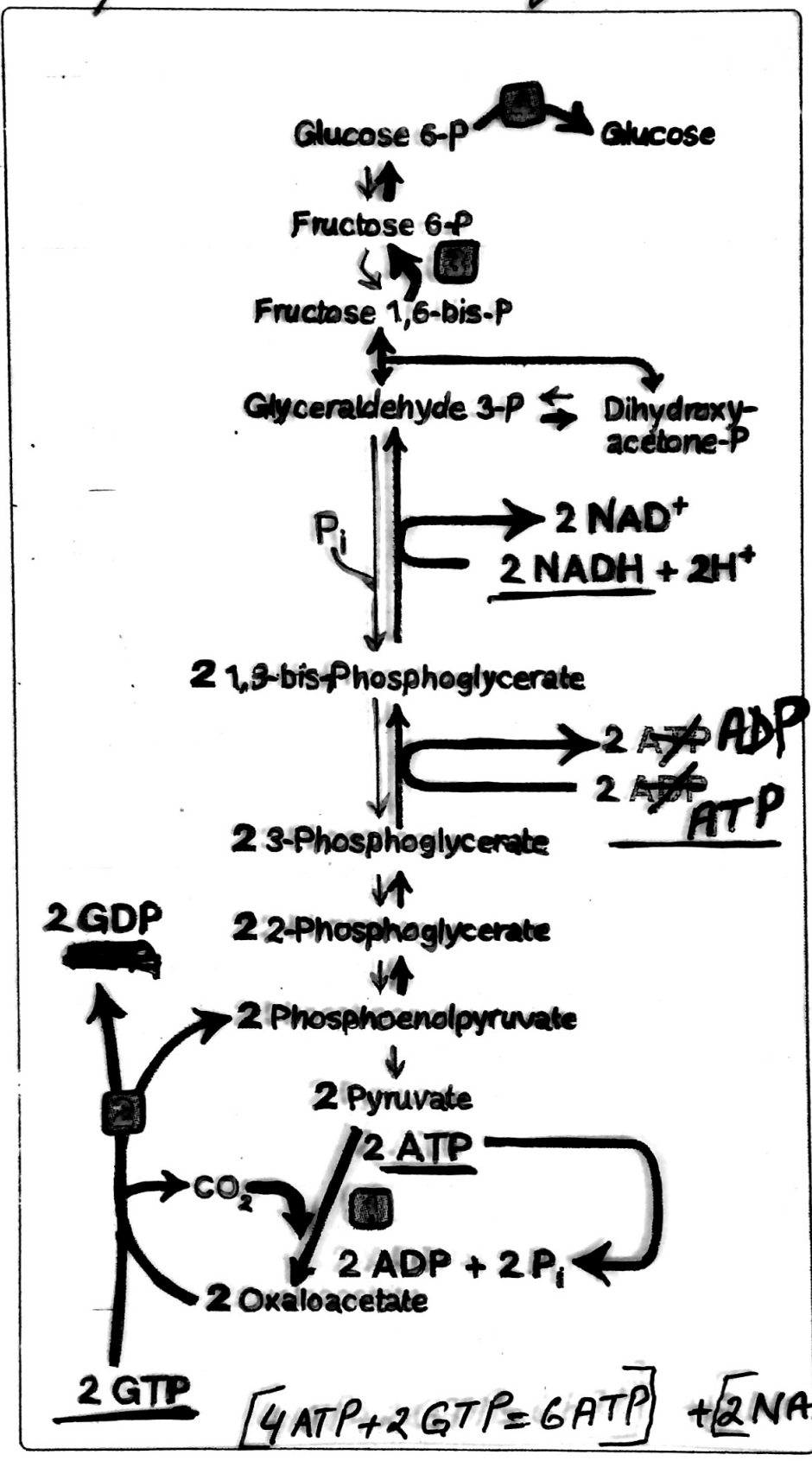
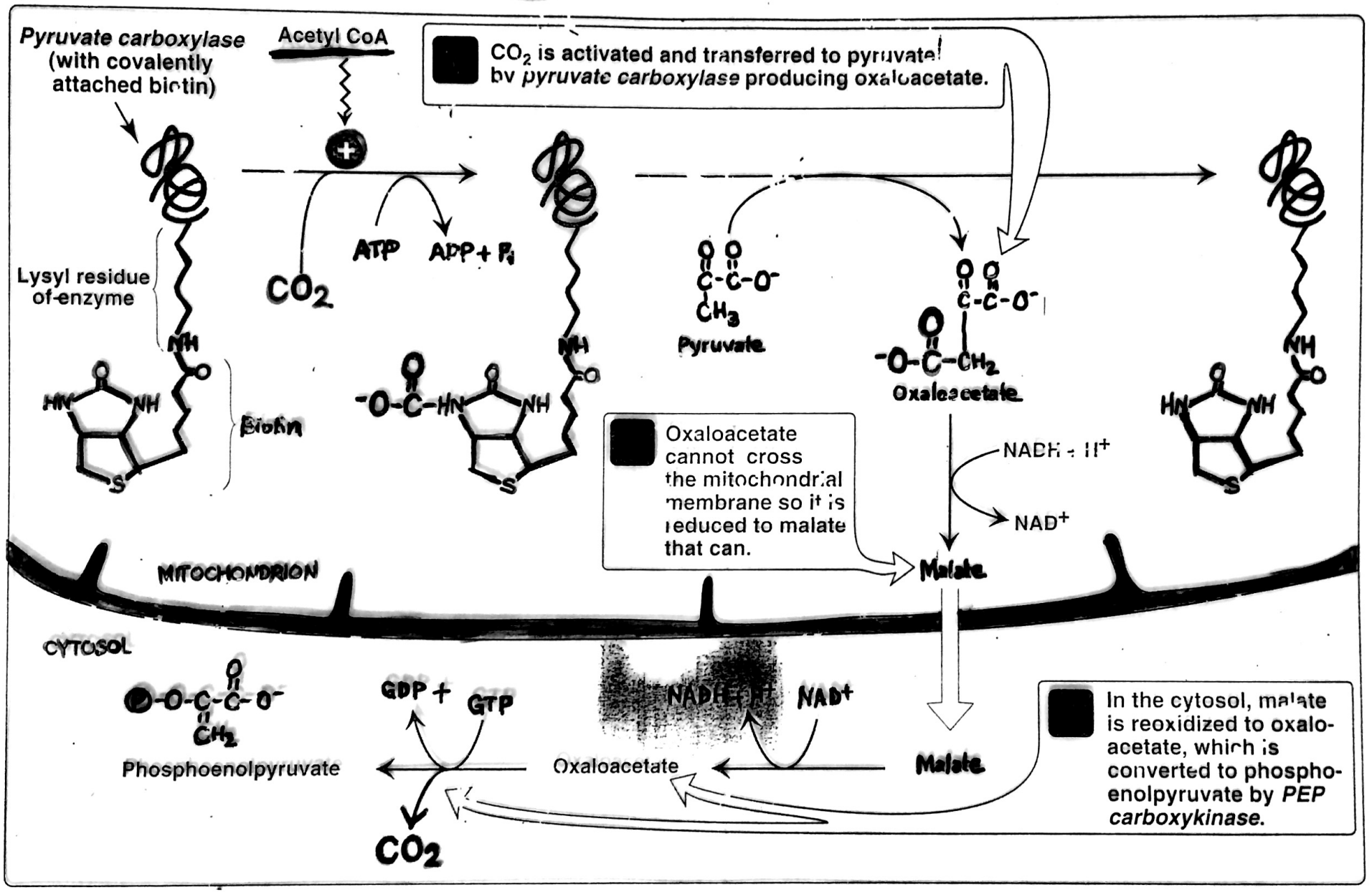


Figure 10.7
Summary of the reactions of glycolysis and gluconeogenesis, showing the energy requirements of gluconeogenesis.

Pyruvate Carboxylase :-



Regulation of Gluconeogenesis and Glycolysis

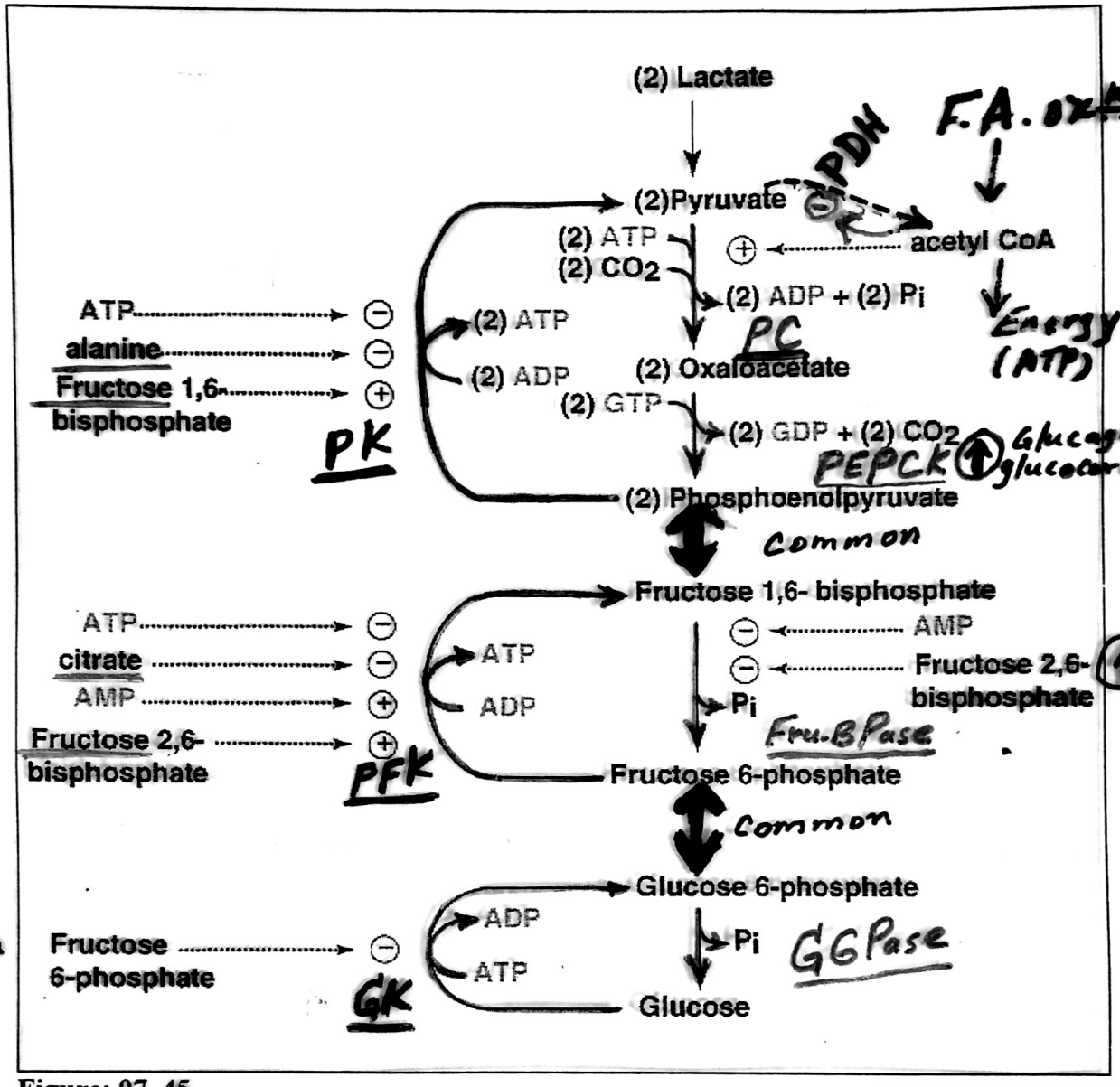
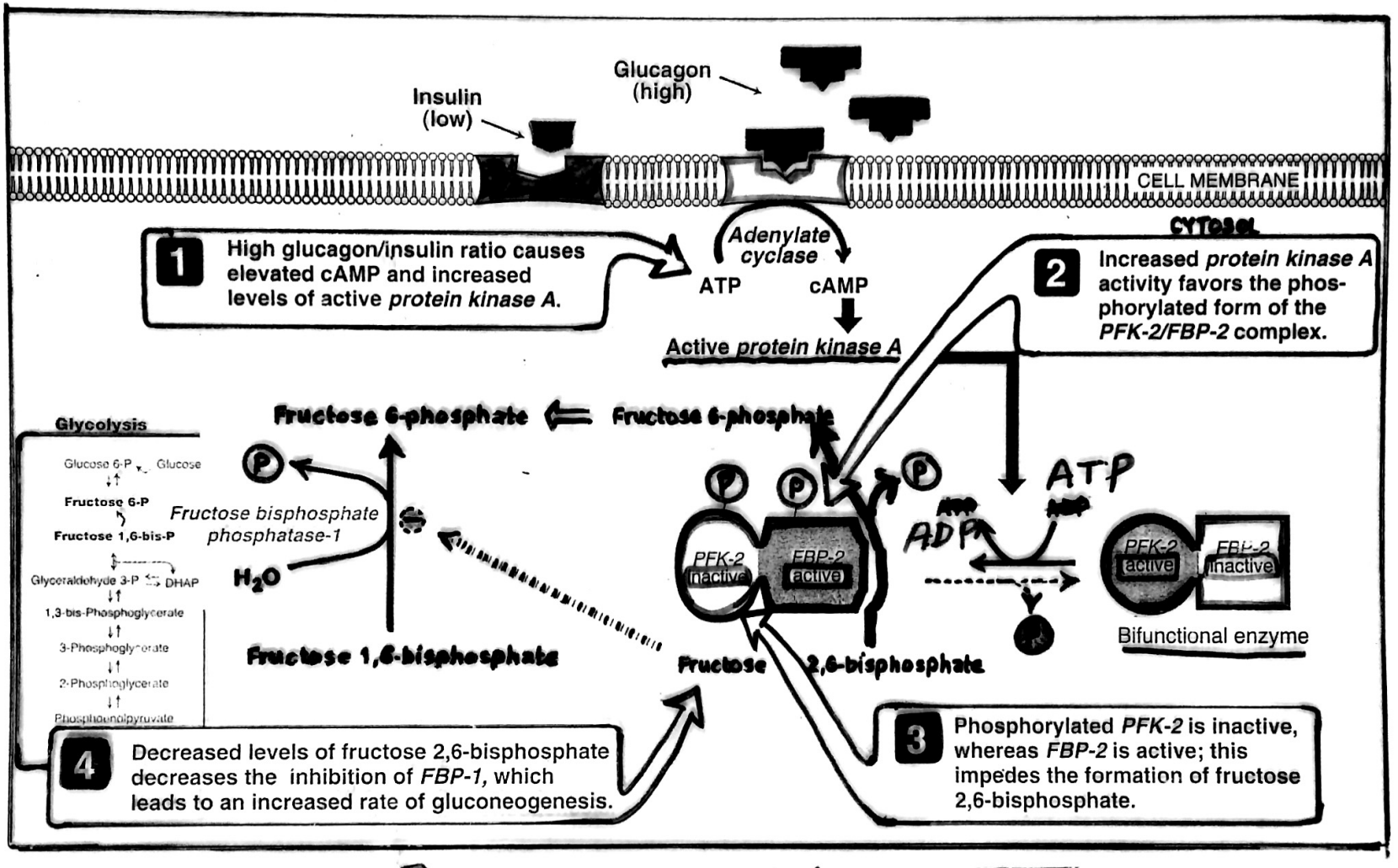


Figure: 07_45
Important allosteric regulatory features of the gluconeogenic pathway.

Deinhibition of fru-1,6-bisphatase



Also:-

PK (Active) —Active Protein Kinase A (ATP → ADP)→ P–PK (Inactive)

Net results:

- Inhibition of glycolysis PFK↓ PK↓
- Removal of inhibition of (Deinhibition) gluconeogenesis F-2,6-BPase↑

CORI CYCLE

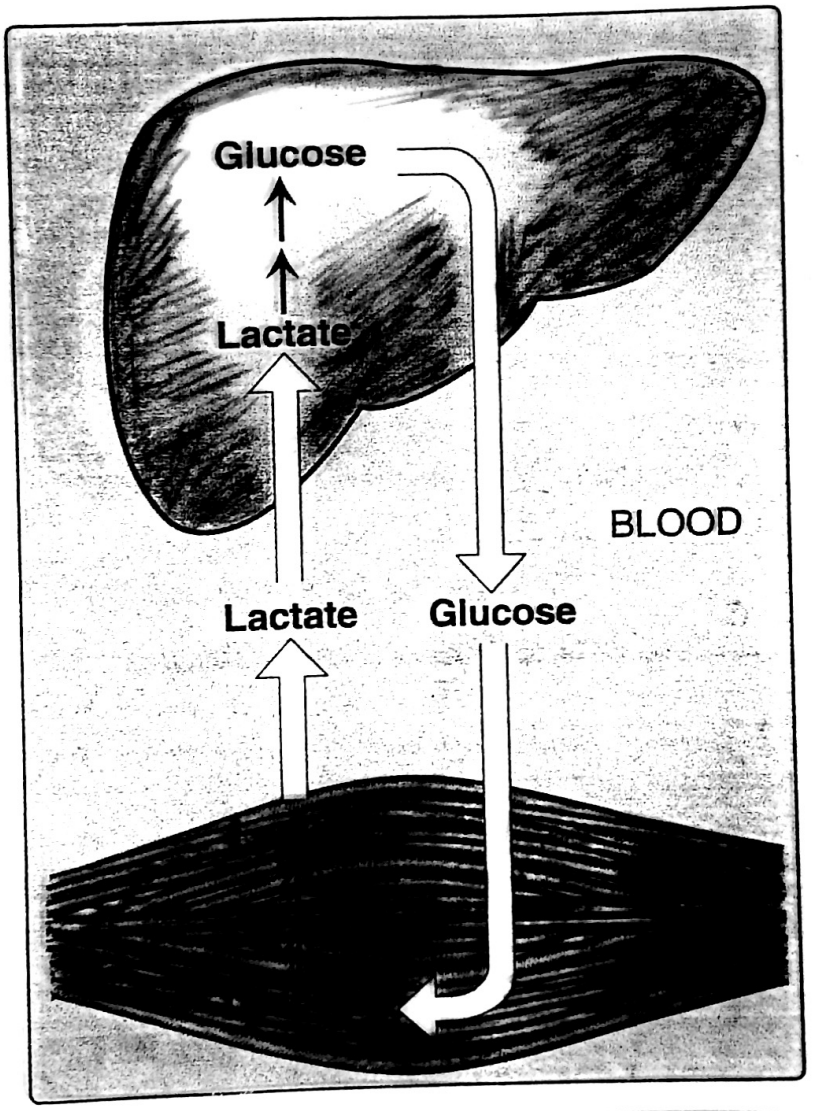
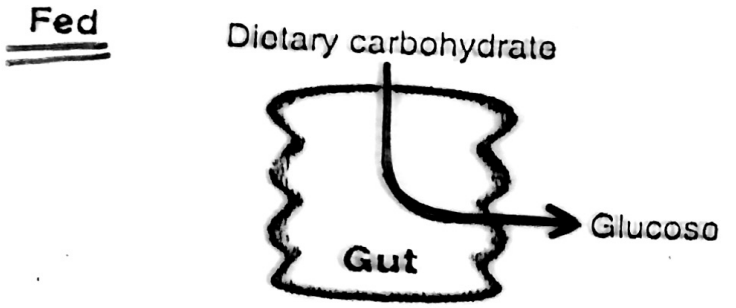


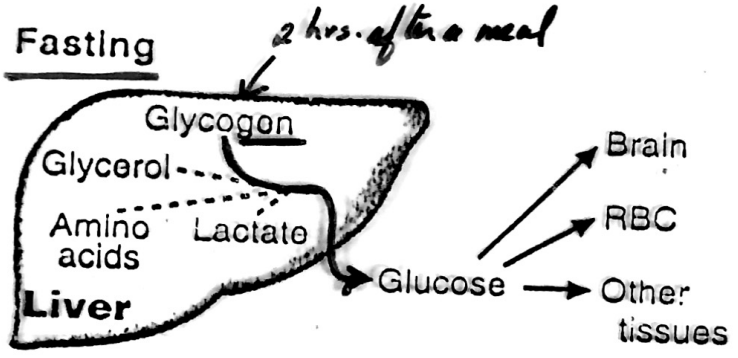
Figure 10.2
The Cori cycle.

Maintanance of Blood Glucose

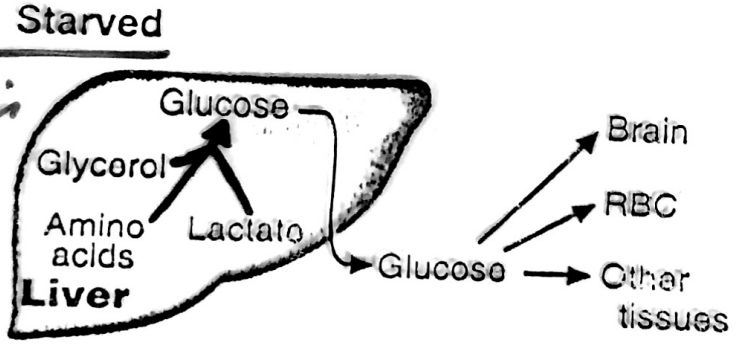
Sources of Blood Glucose:-



Glycogen Breakdown (mainly) + gluconeogenesis



Gluconeogenesis (mainly)



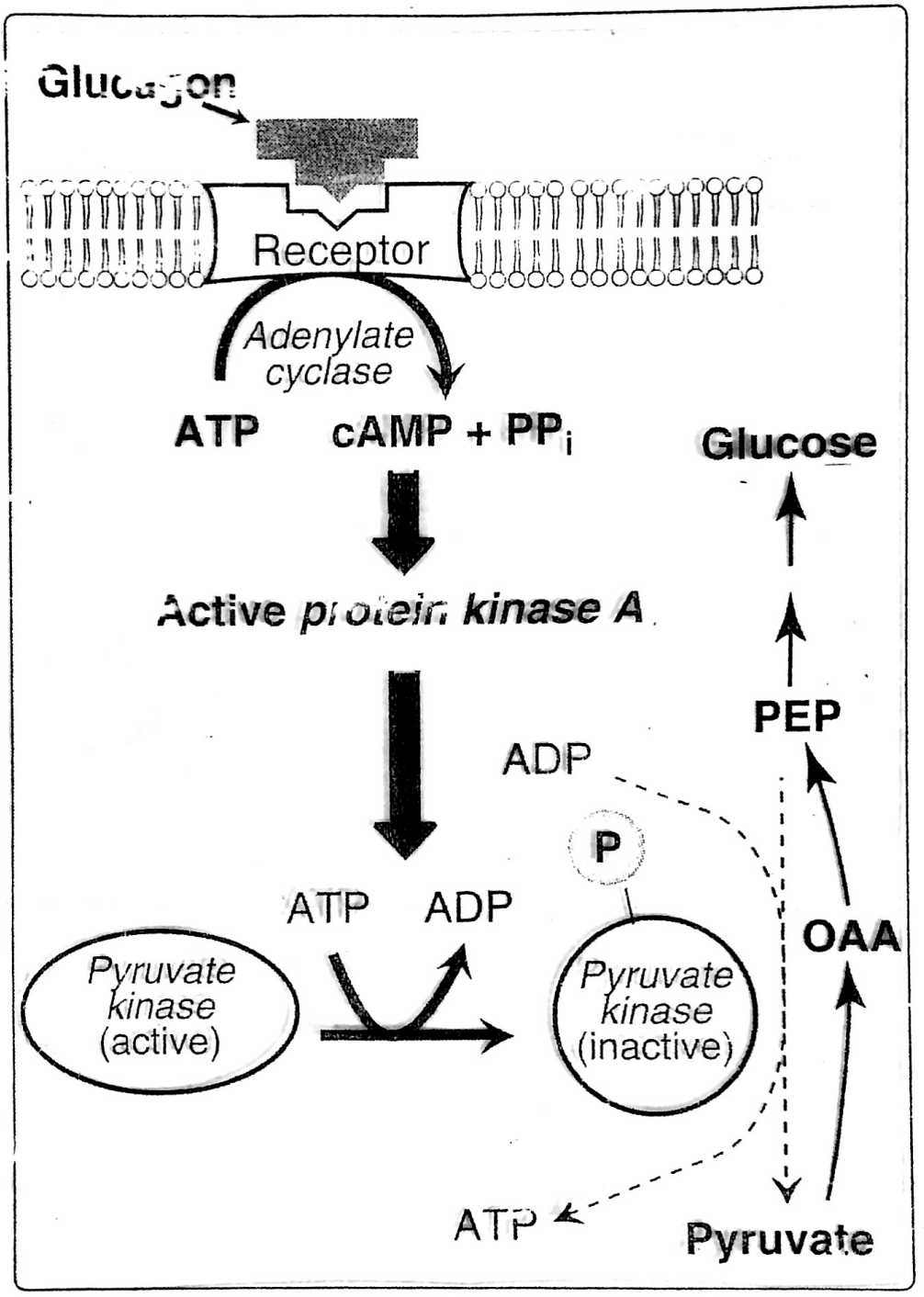


Figure 10.8
Covalent modification of *pyruvate kinase* results in inactivation of the enzyme. OAA = oxaloacetate.