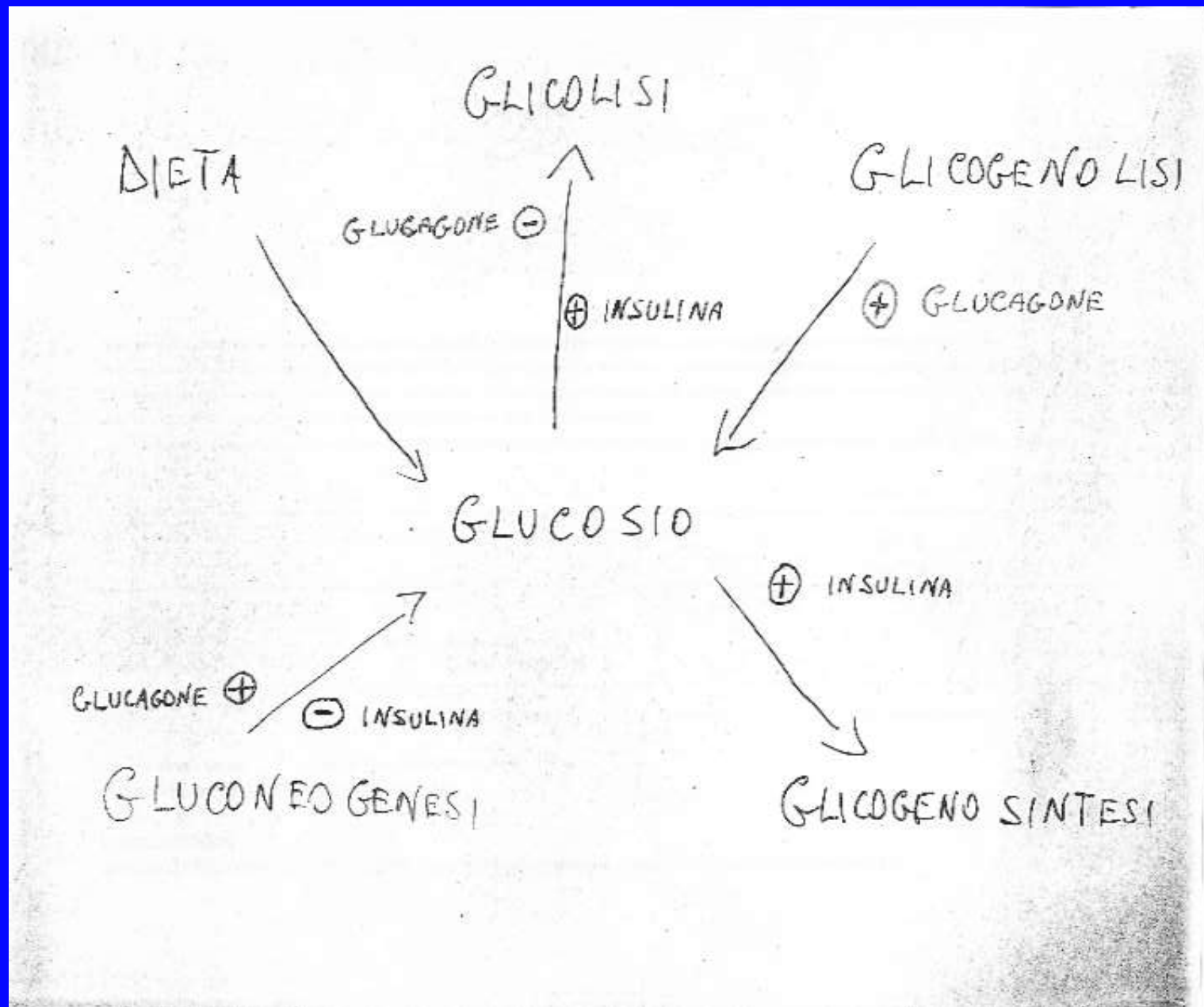


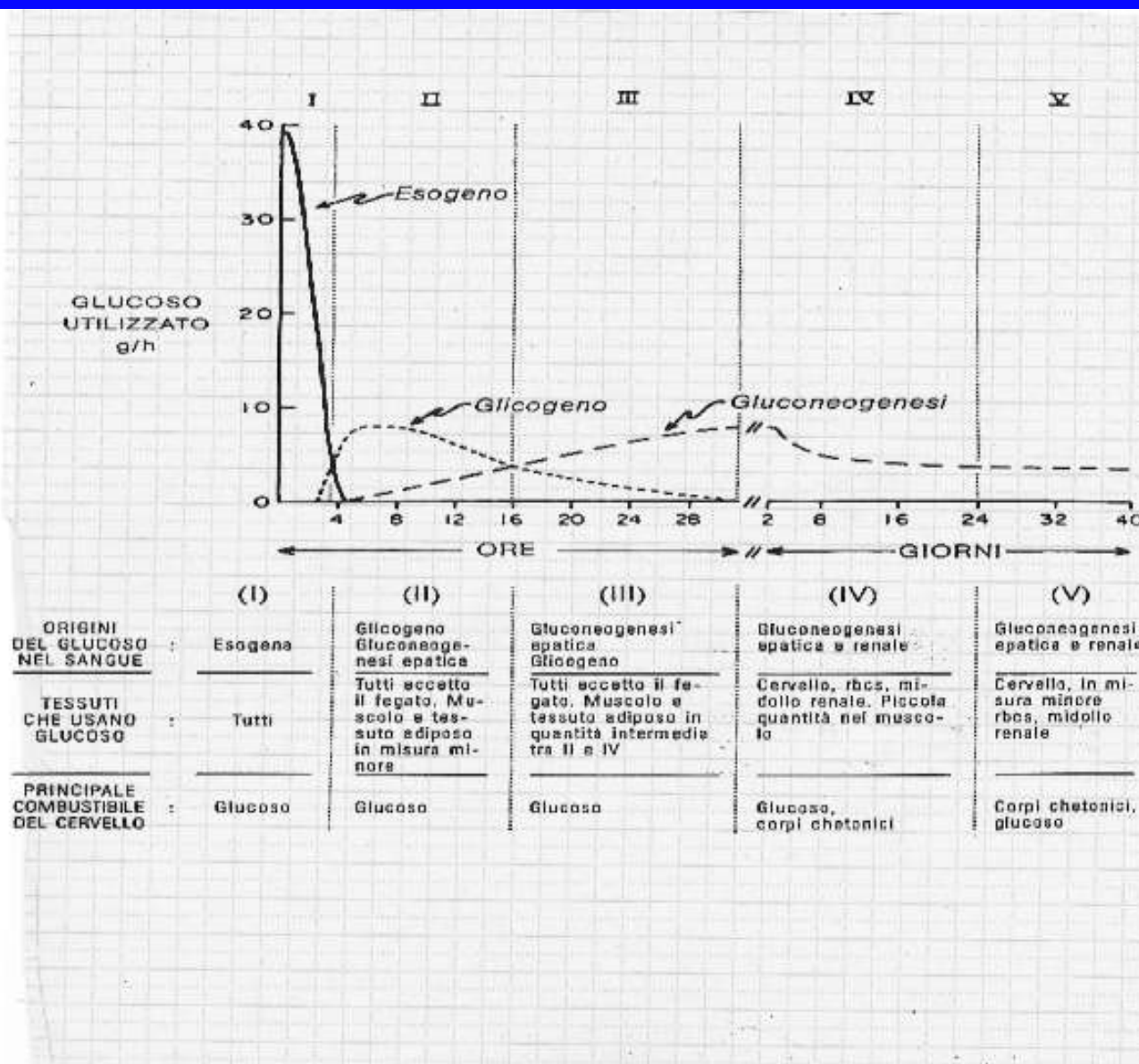
14^a Lezione

Gluconeogenesi

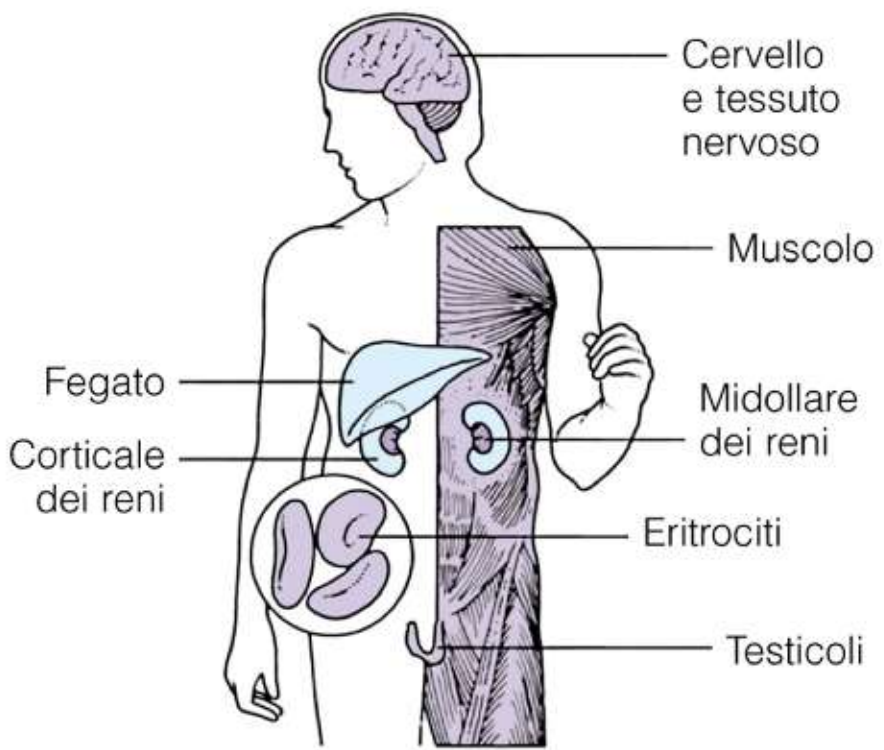


Gluconeogenesi

Controllo dell'omeostasi del glucosio



Gluconeogenesi



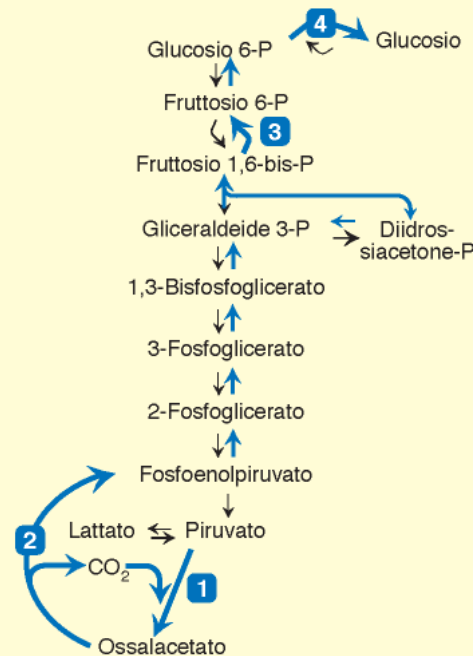
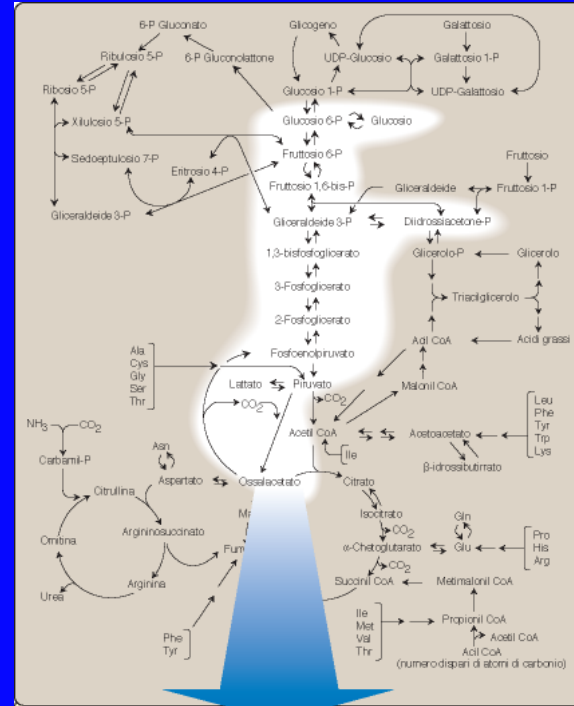
Tessuti che sintetizzano glucosio

Tessuti che usano glucosio come
fonte di energia primaria

La Gluconeogenesi

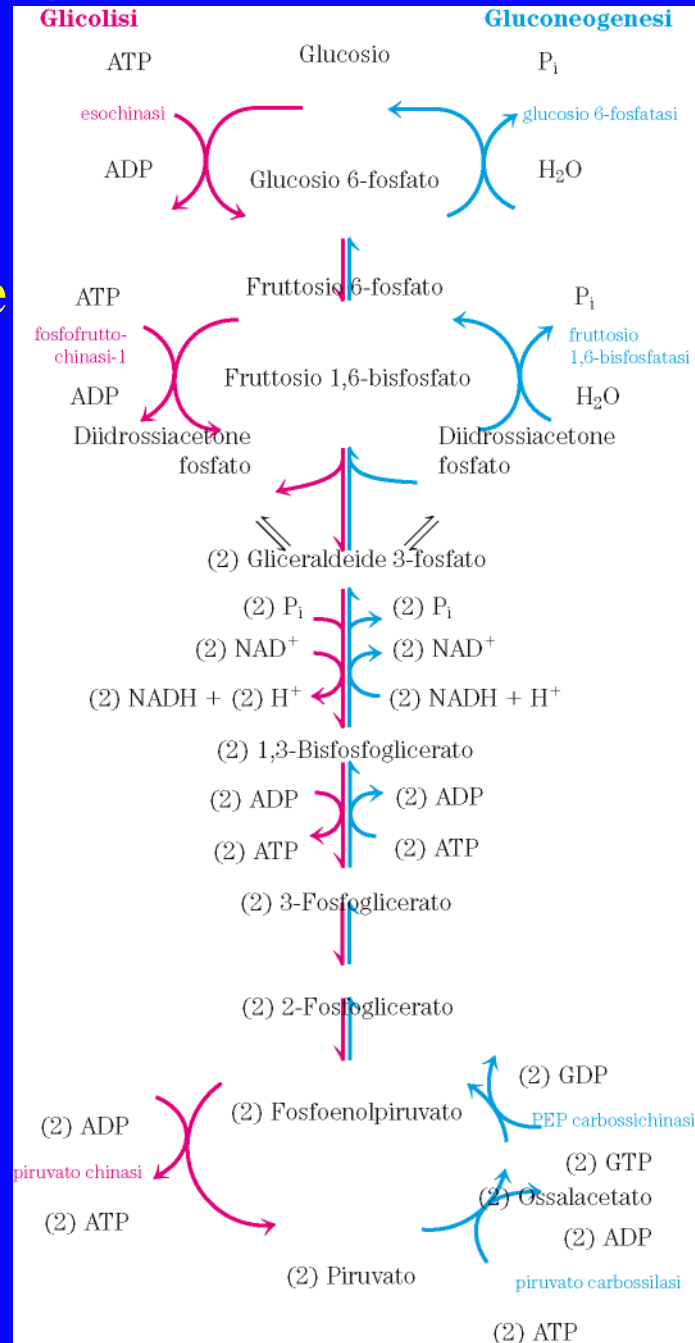
- 1) Le reazioni
- 2) I precursori
- 3) La regolazione

La Gluconeogenesi non è semplicemente il processo contrario della Glicolisi !!!



Gluconeogenesi

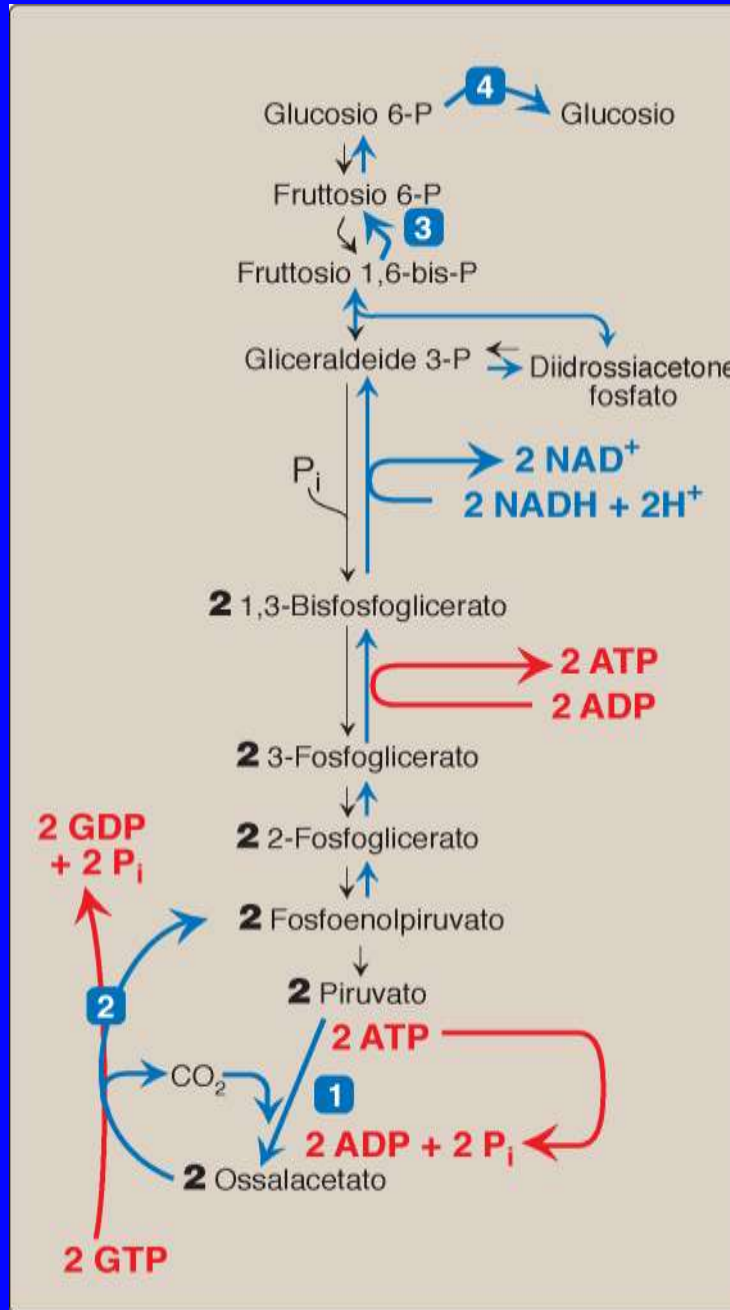
La Gluconeogenesi usa alcune reazioni della Glicolisi !!!



Gluconeogenesi

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**La
Gluconeogenesi è
un processo
alternativo alla
Glicolisi !!!**



III reazione di aggiramento

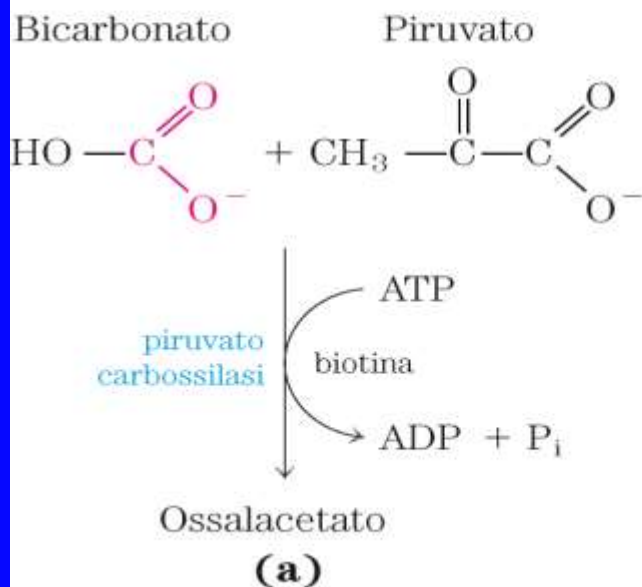
II reazione di aggiramento

I reazione di aggiramento

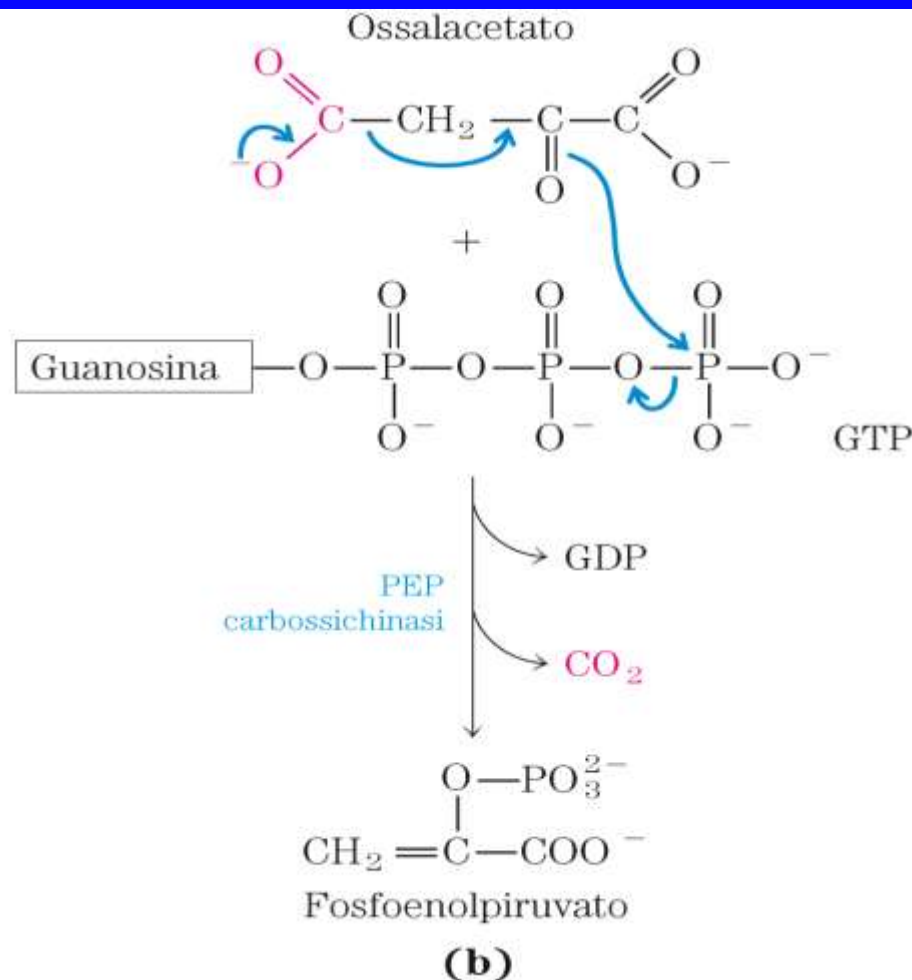
Gluconeogenesi

I reazione di aggiramento

I Fase



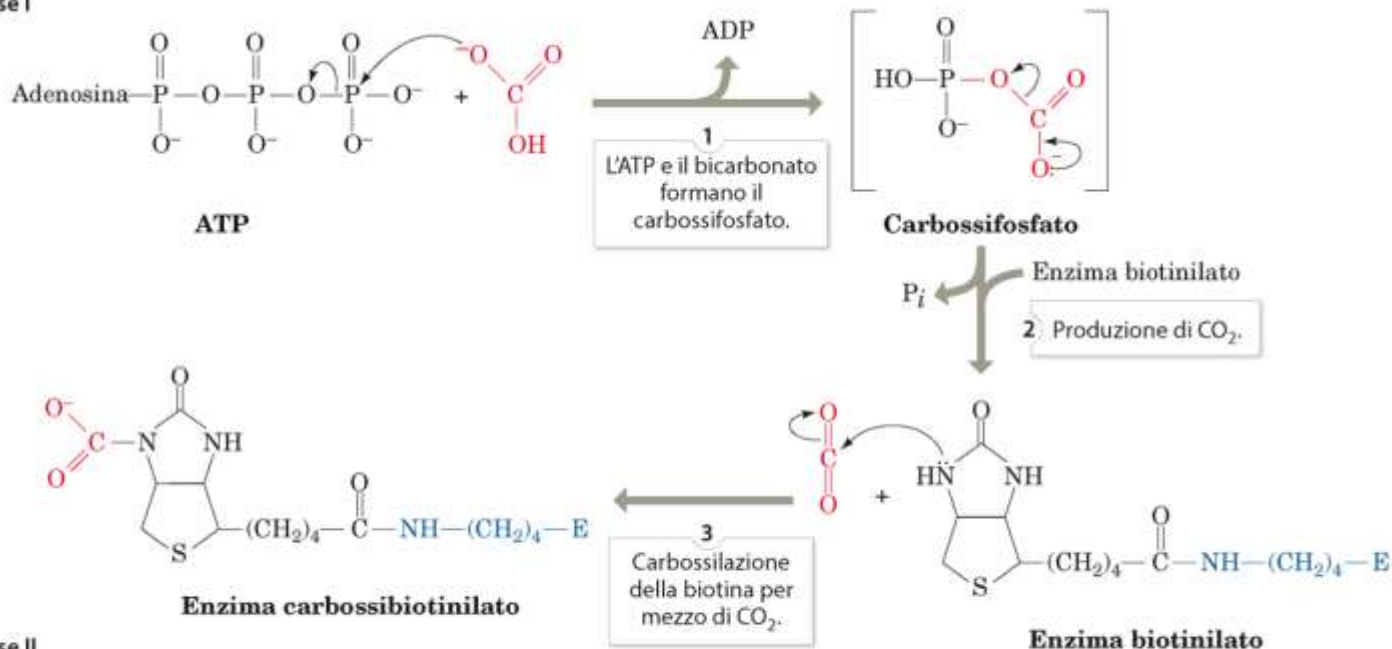
II Fase



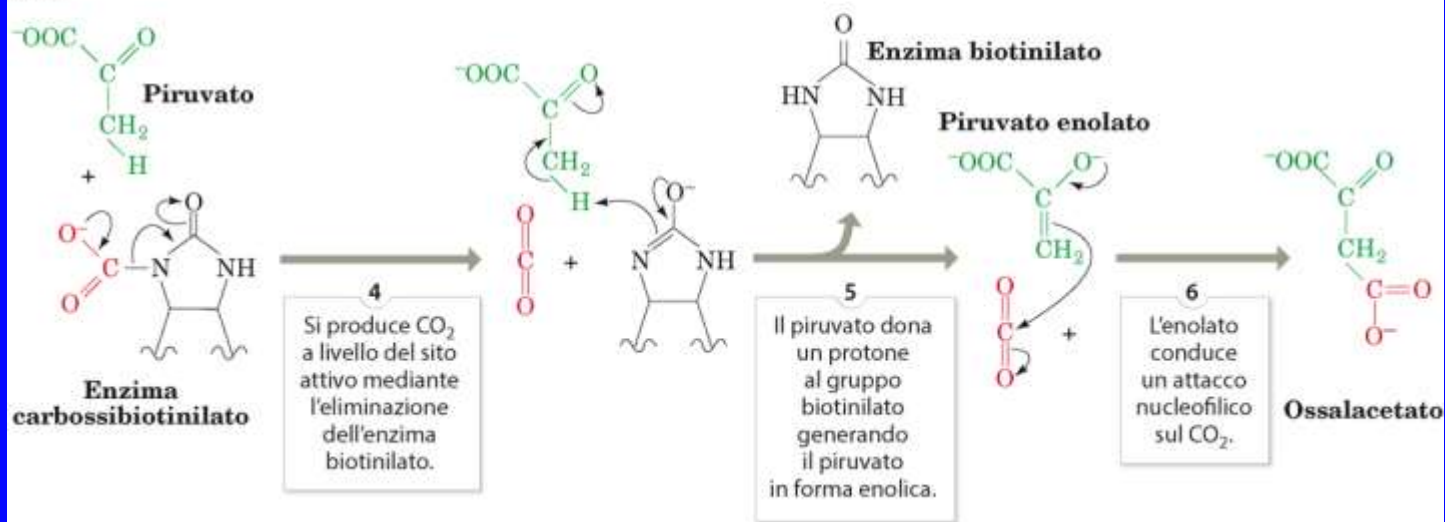
Gluconeogenesi

I Fase

Fase I

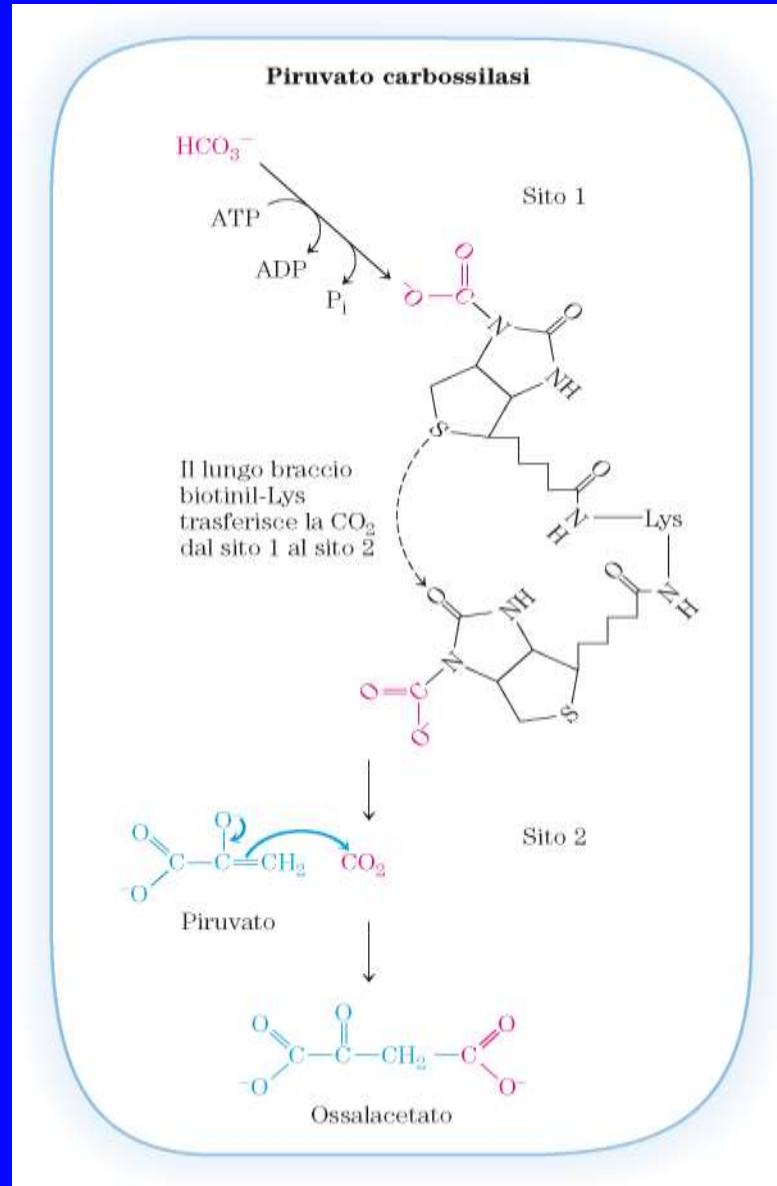


Fase II



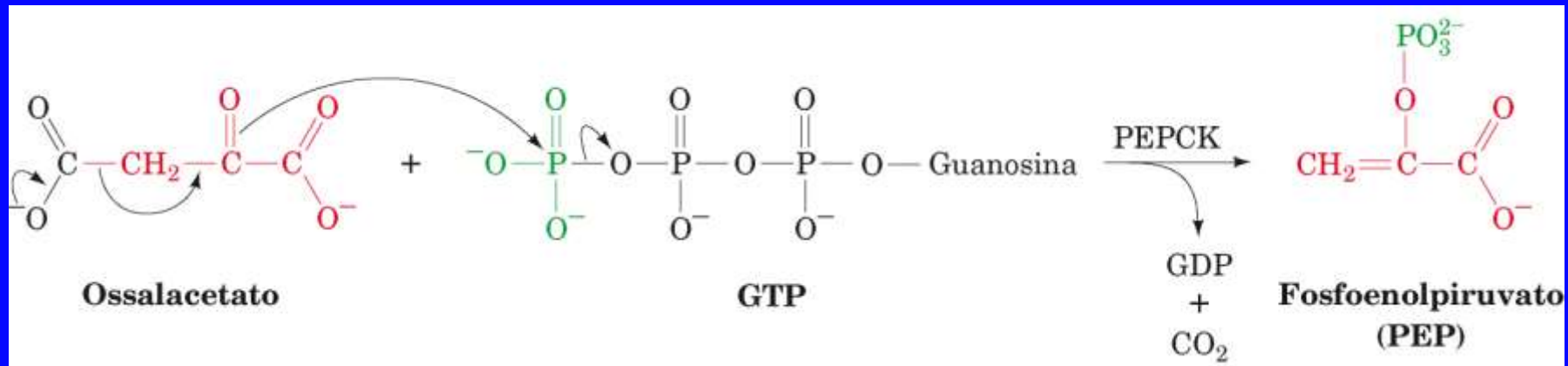
Gluconeogenesi

Il complesso multienzimatico della piruvato carbossilasi



Gluconeogenesi

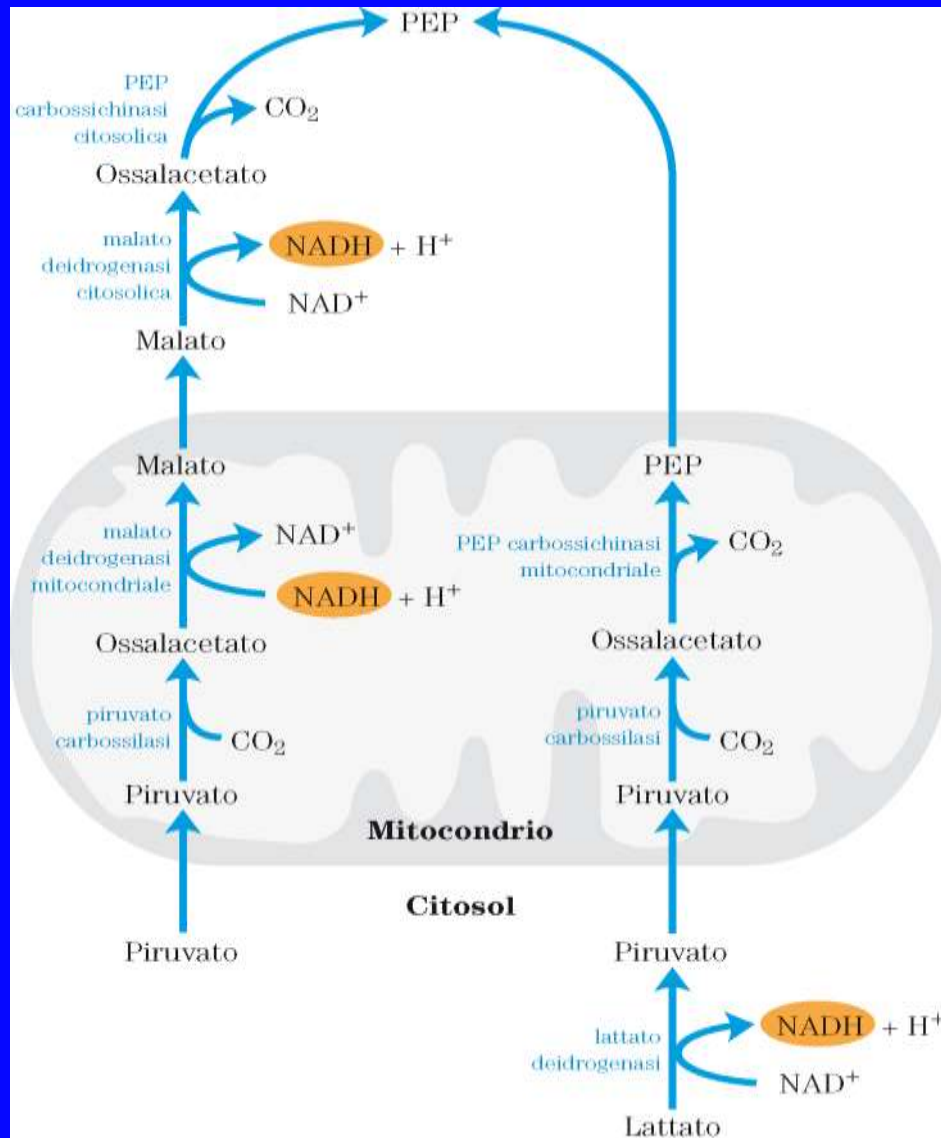
II Fase





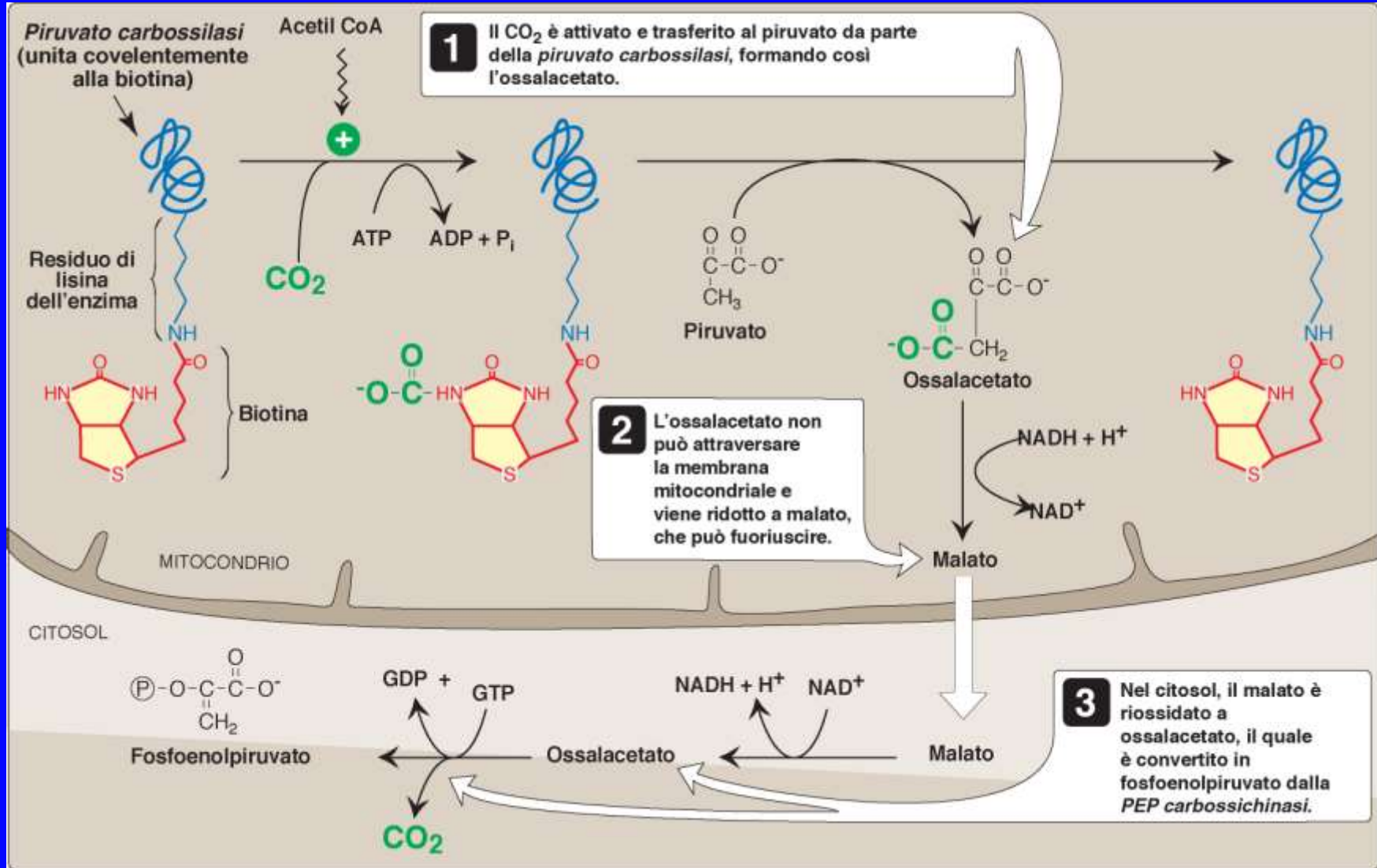
Gluconeogenesi

Il destino del fosfoenolpiruvato

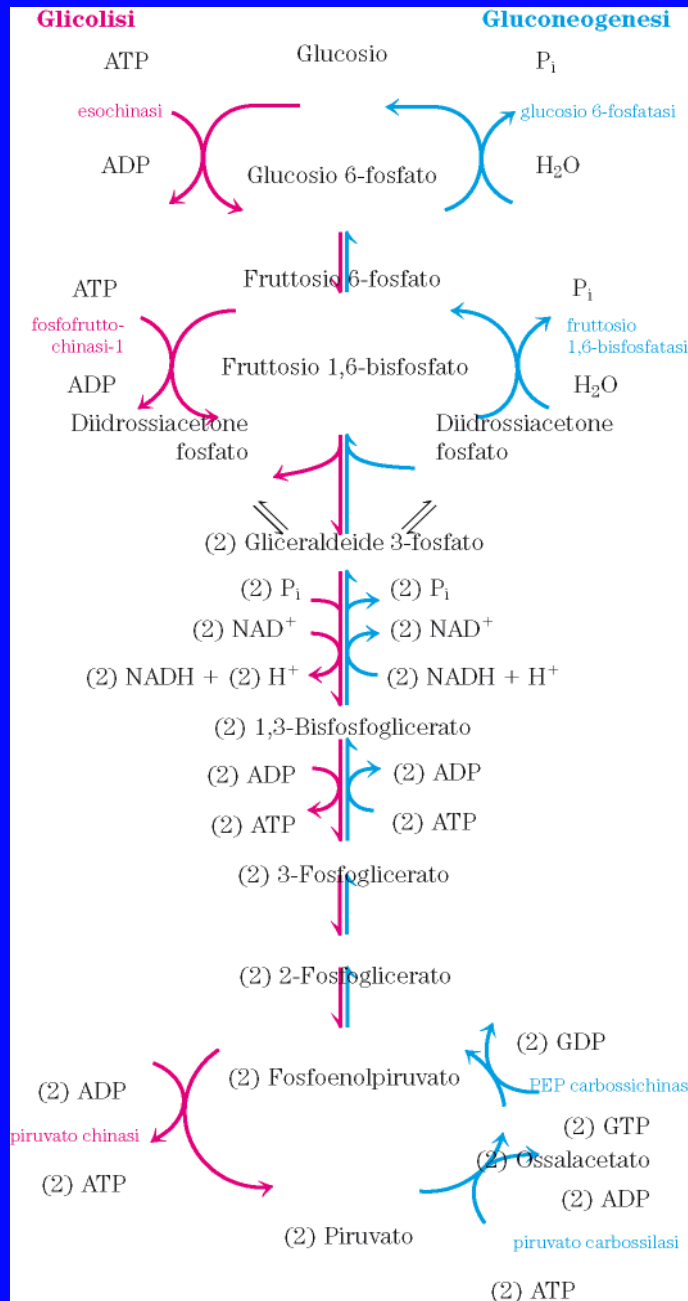


Gluconeogenesi

Il destino del fosfoenolpiruvato



Gluconeogenesi



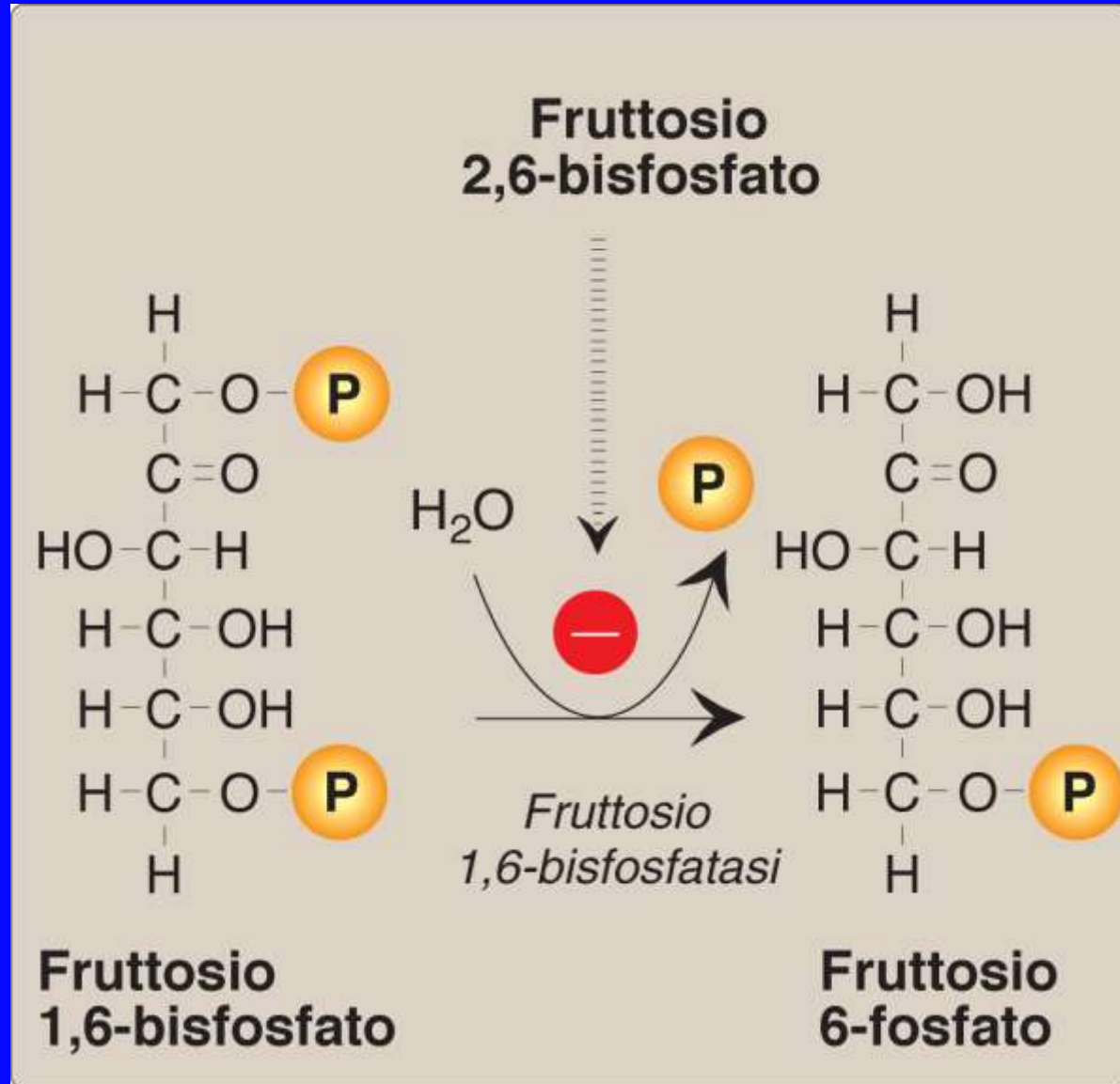
III reazione di aggiramento

II reazione di aggiramento

I reazione di aggiramento

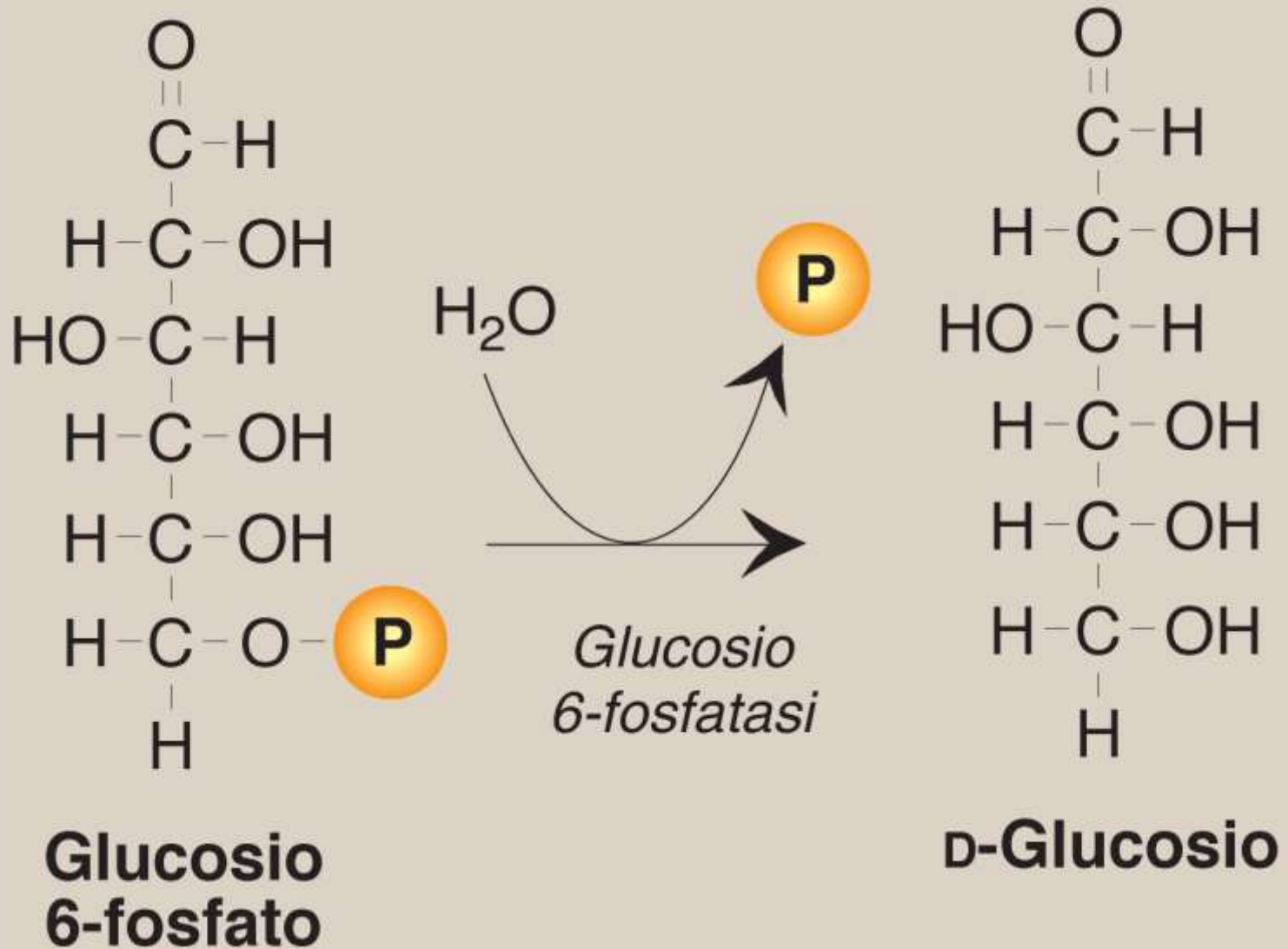
Gluconeogenesi

Il reazione di aggiramento



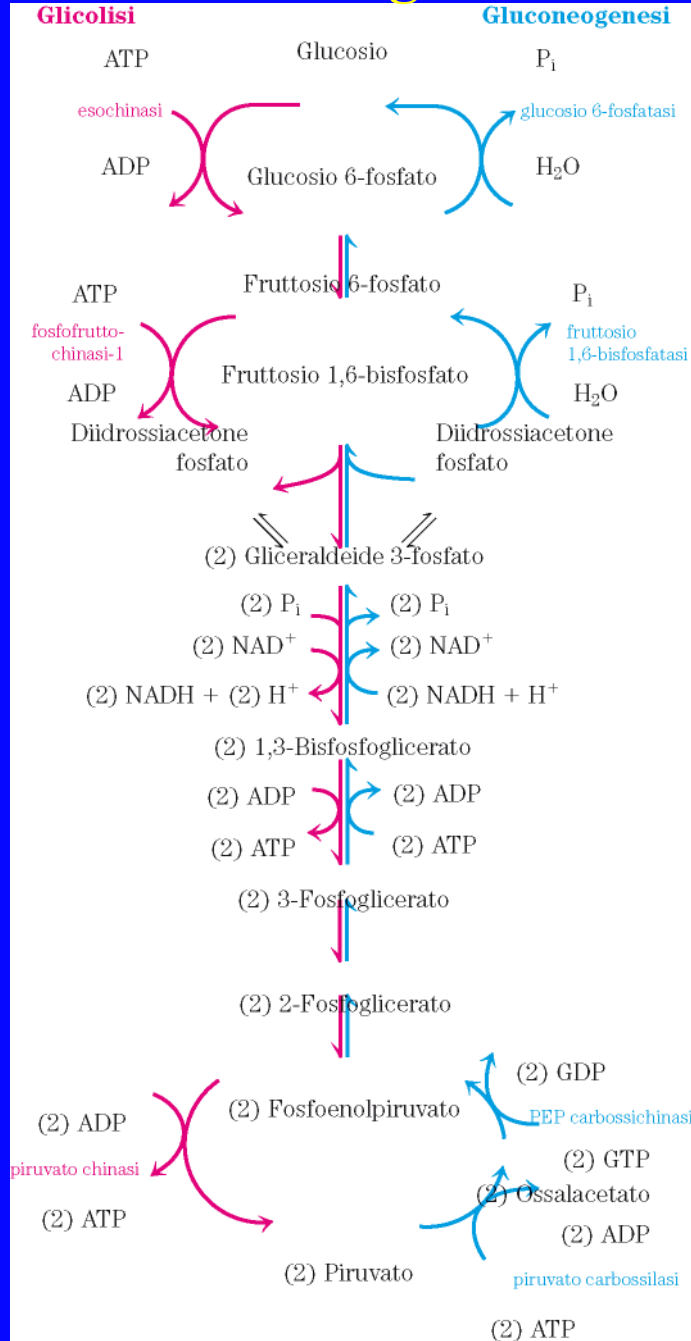
Gluconeogenesi

III reazione di aggiramento

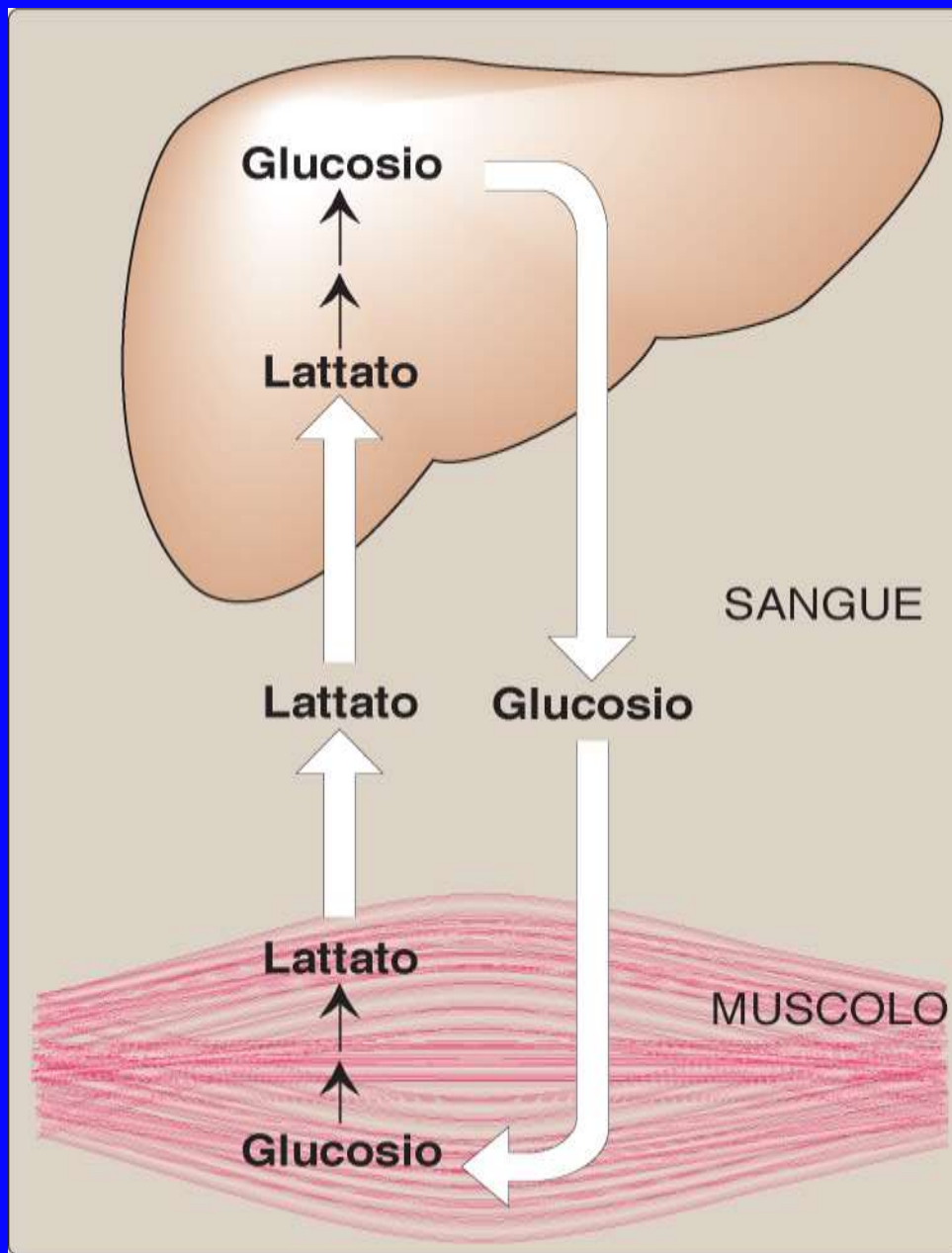




Gluconeogenesi

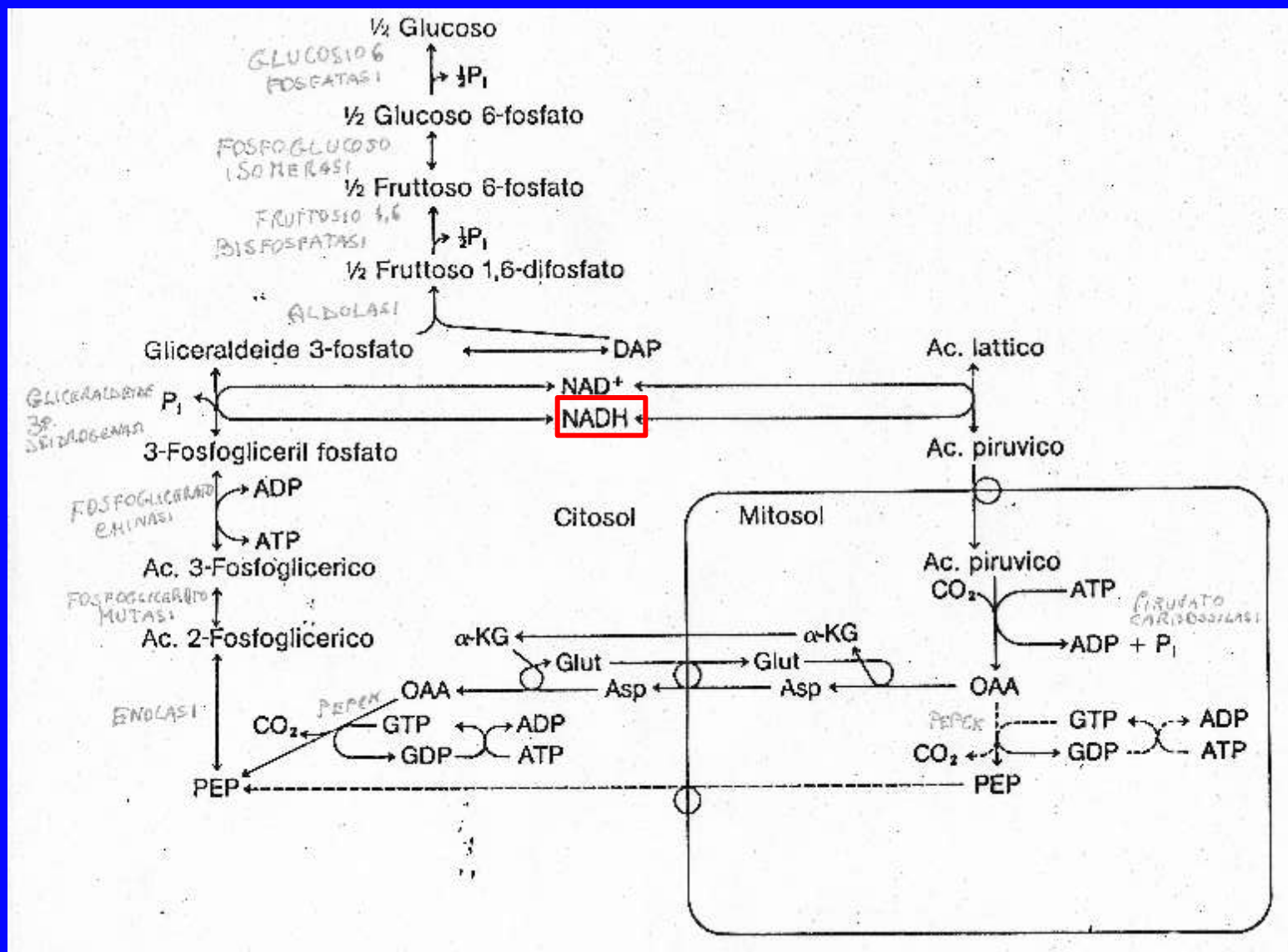


Gluconeogenesi da lattato

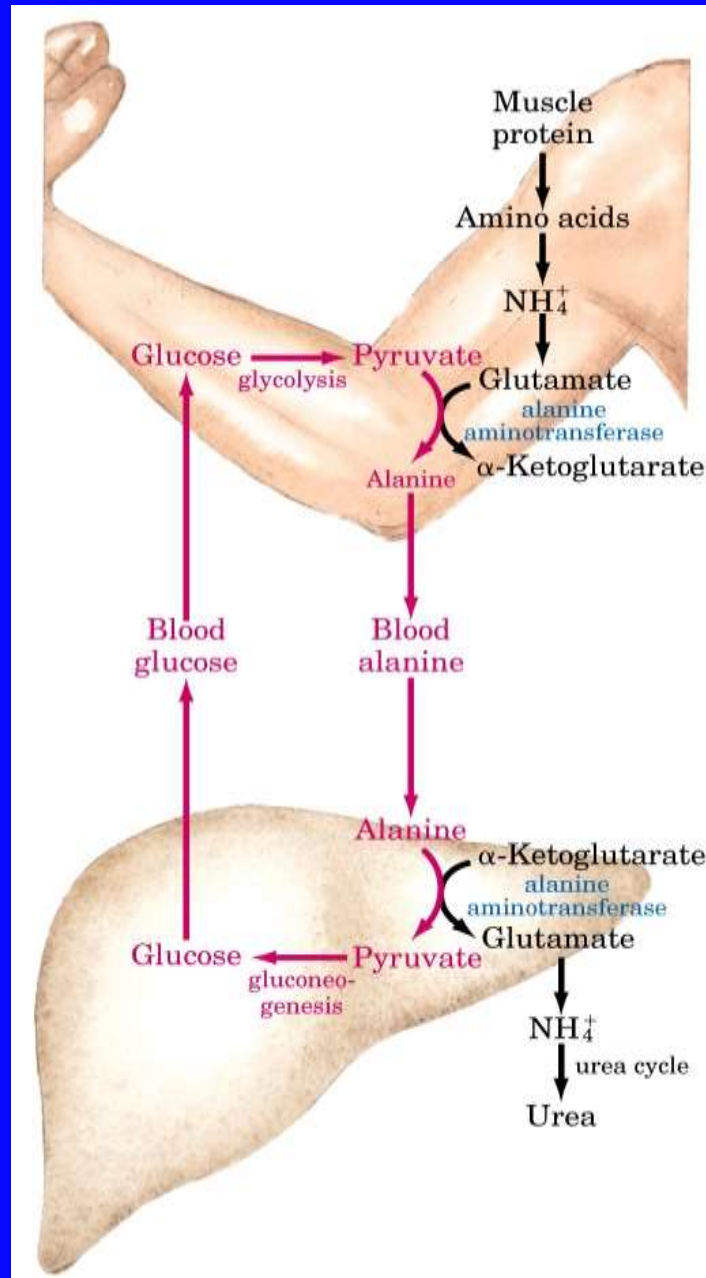


Gluconeogenesi da lattato

Rigenerazione del NADH per la reazione catalizzata dalla gliceraldeide deidrogenasi



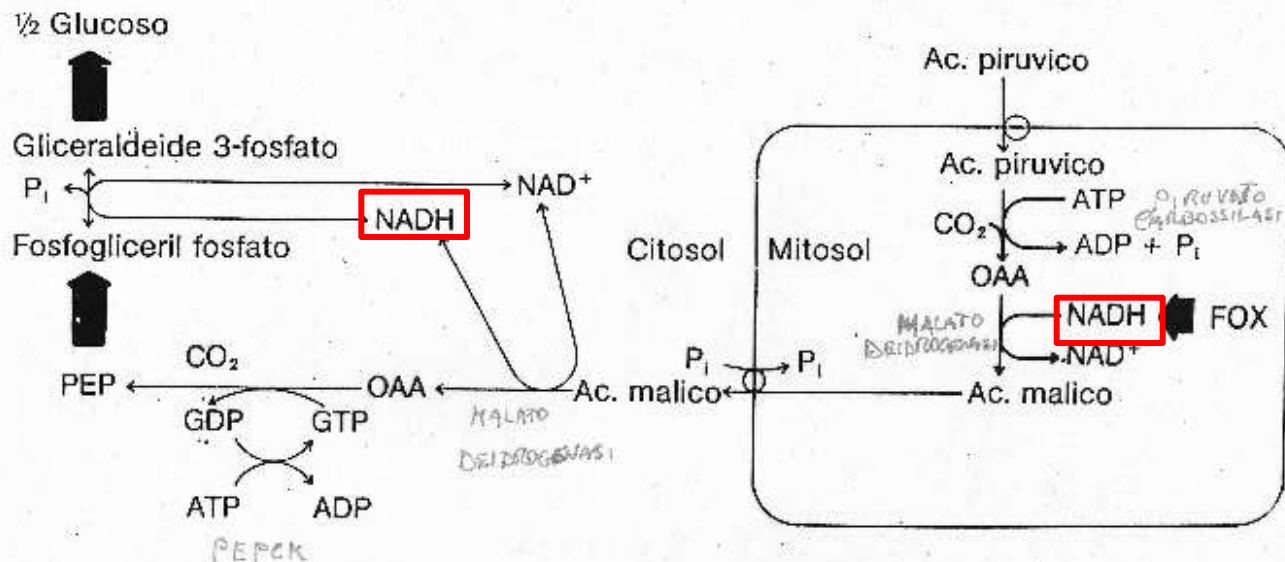
Gluconeogenesi da alanina



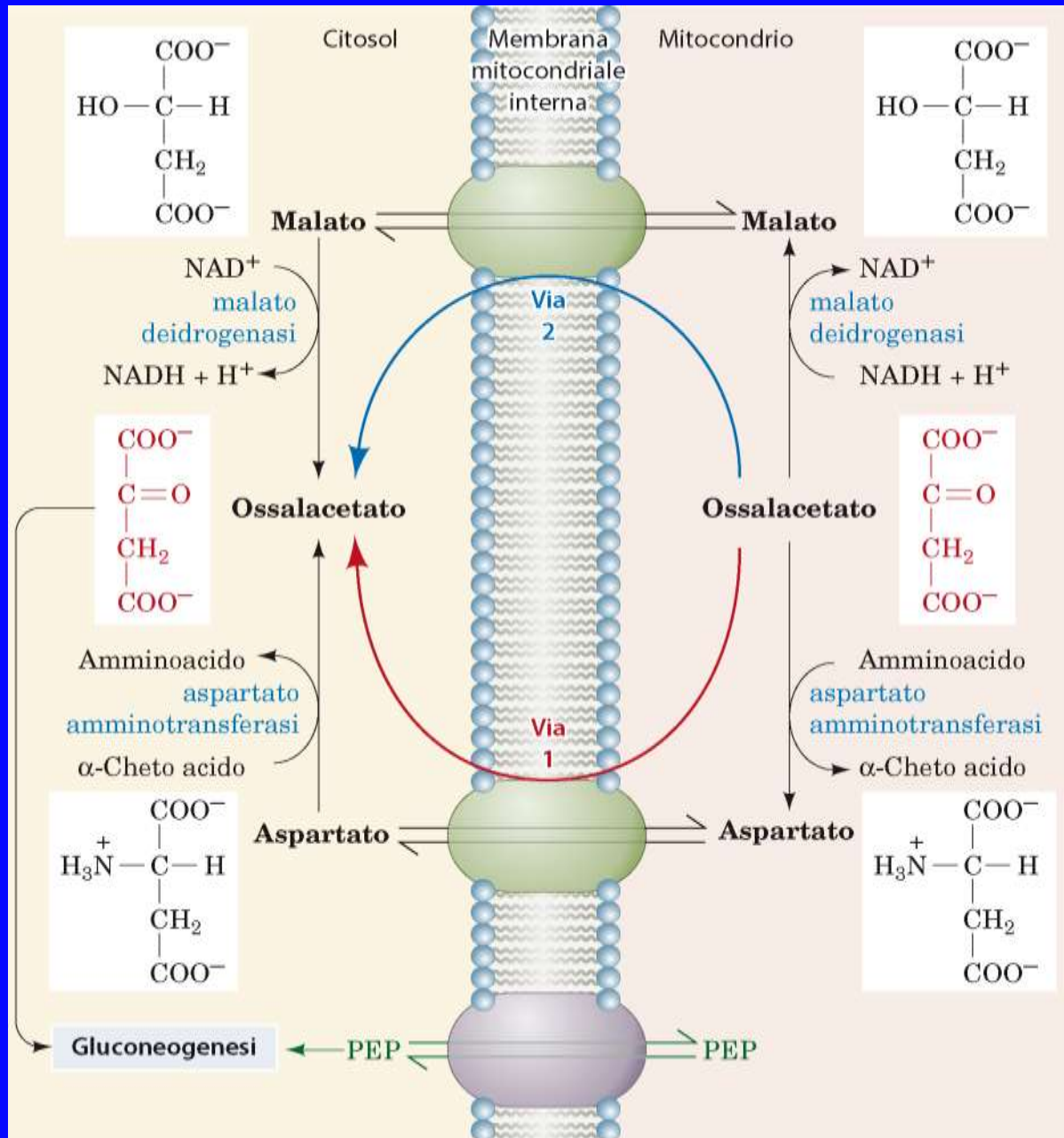
Gluconeogenesi da alanina

Rigenerazione del NADH per la reazione catalizzata dalla gliceraldeide deidrogenasi

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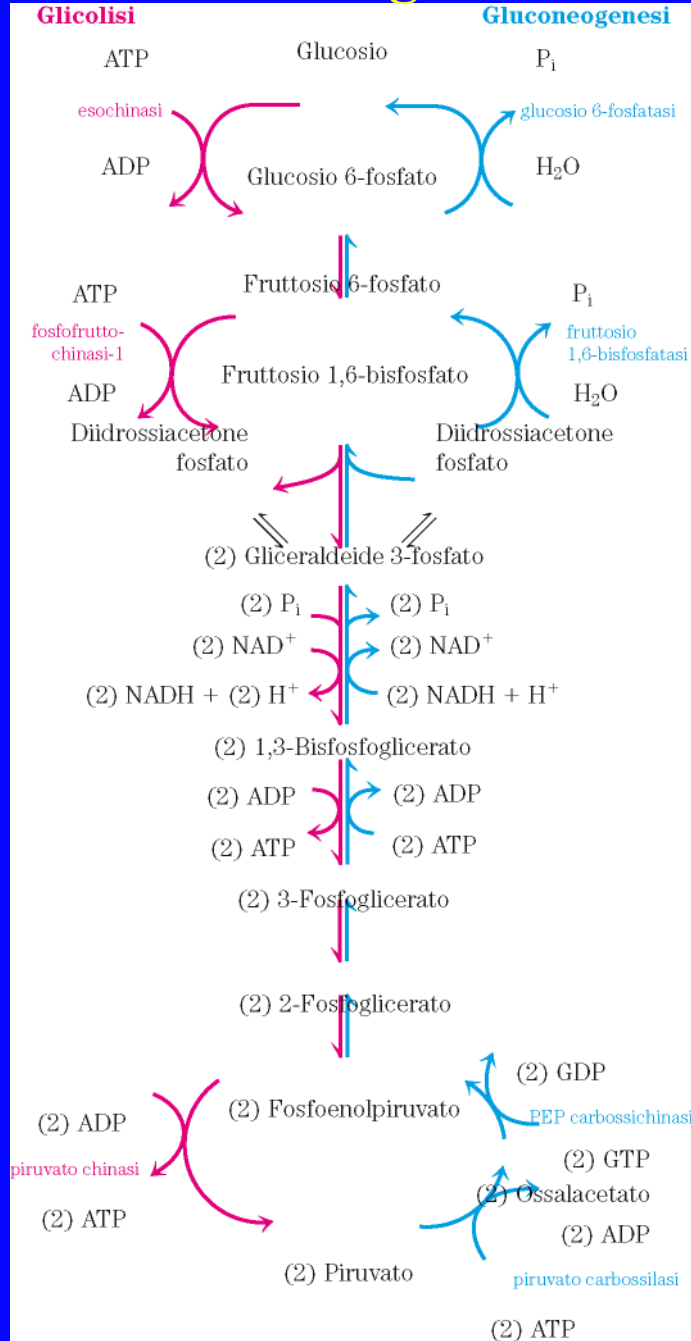


I trasportatori nella Gluconeogenesi

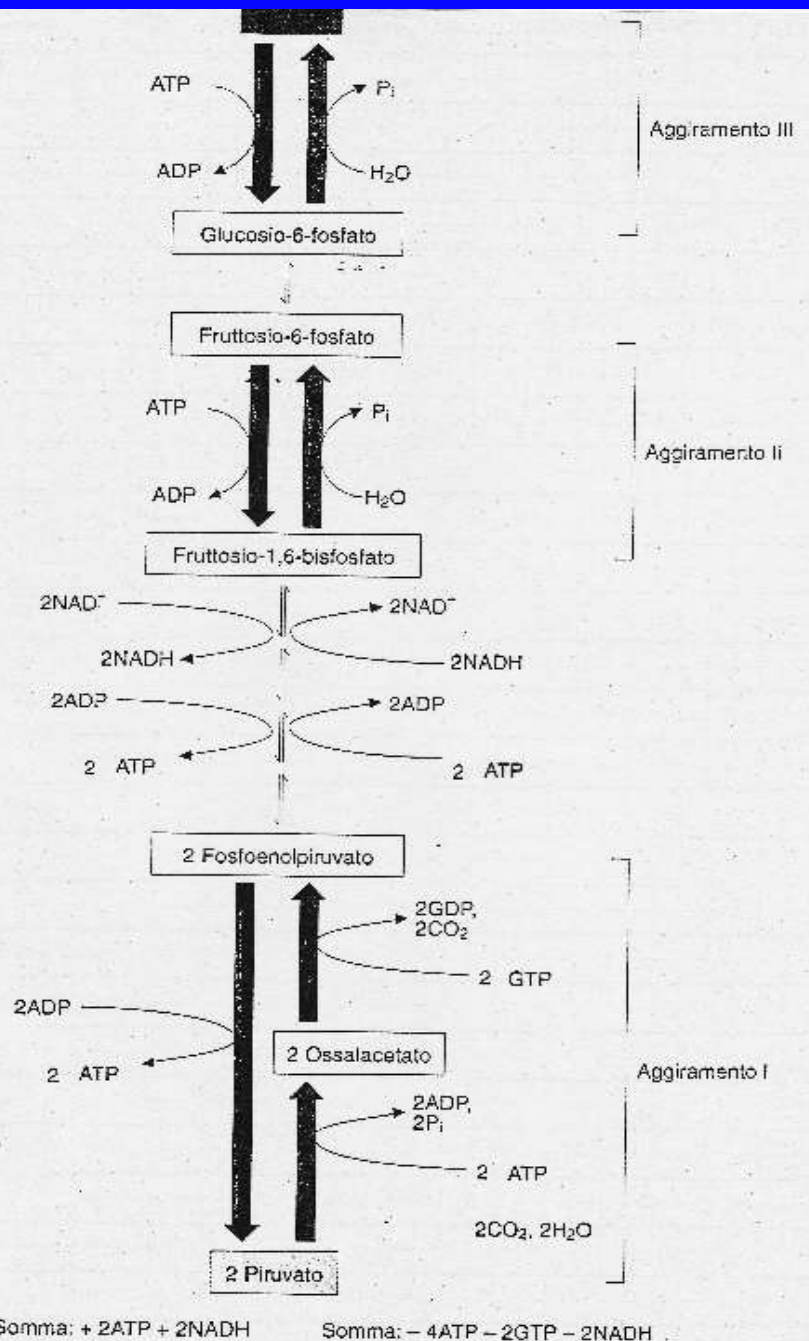




Gluconeogenesi



Gluconeogenesi

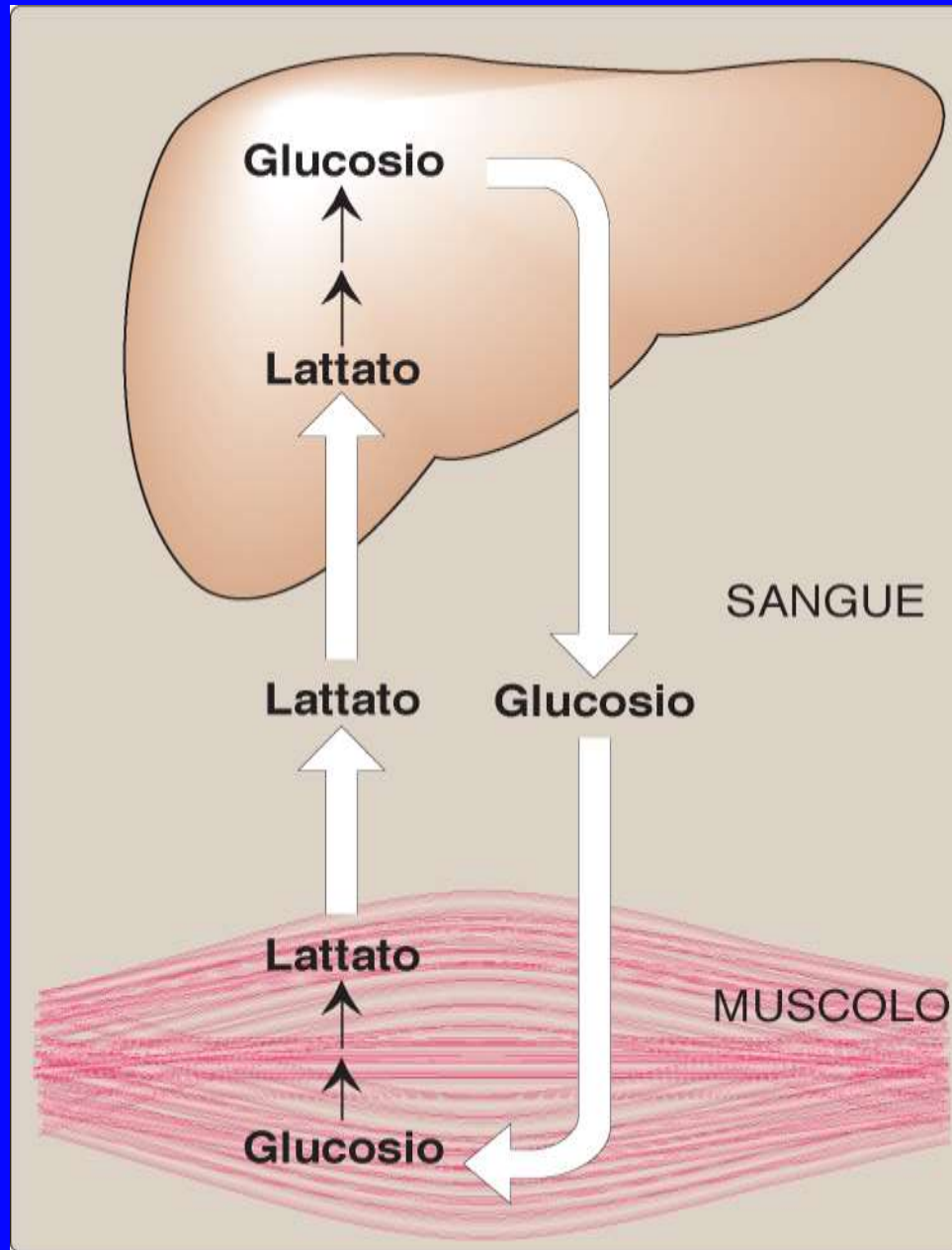


Gluconeogenesi

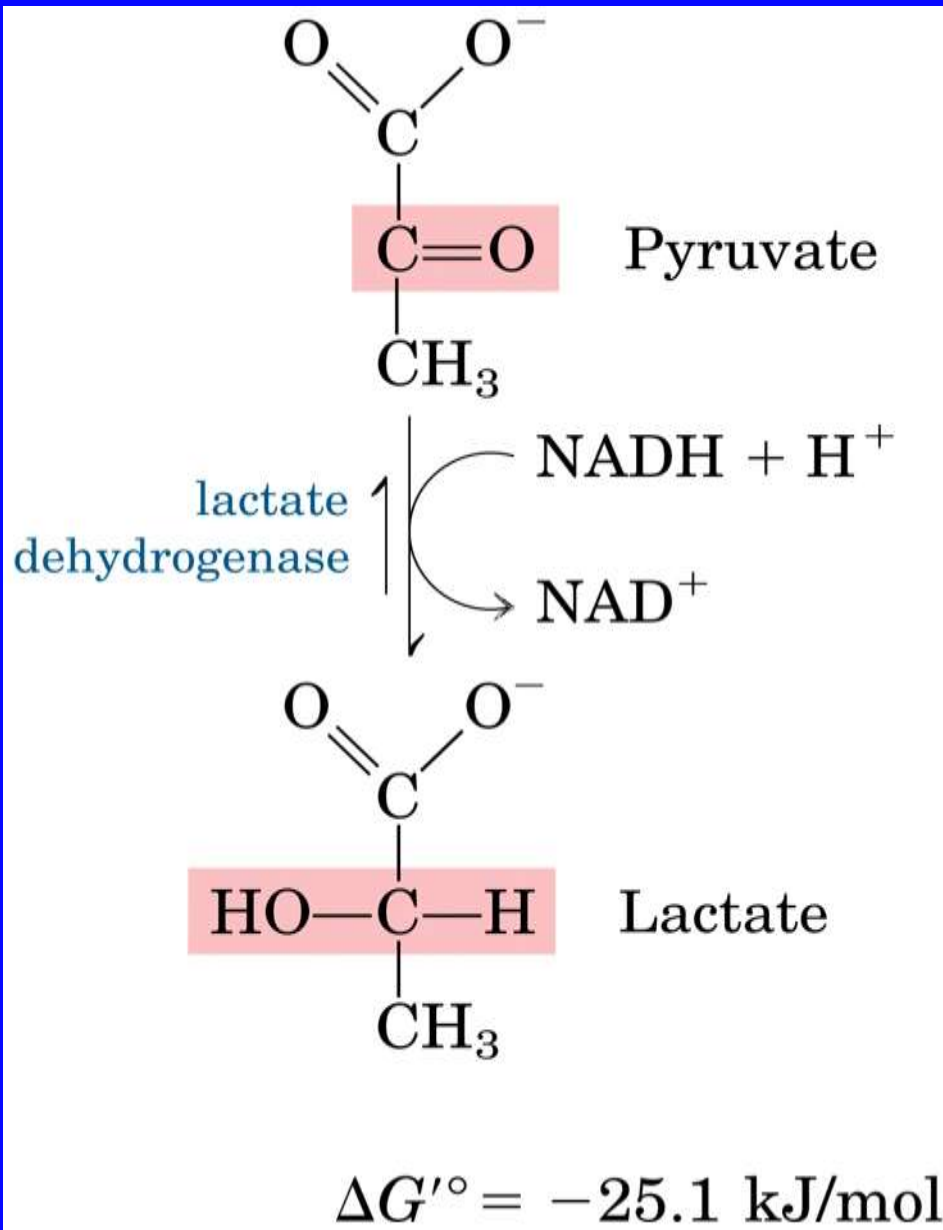
La Gluconeogenesi è il processo di sintesi di glucosio che utilizza substrati non saccaridici quali:

- Lattato
- Alanina
- Amminoacidi
- Glicerolo
- PropionilCoA

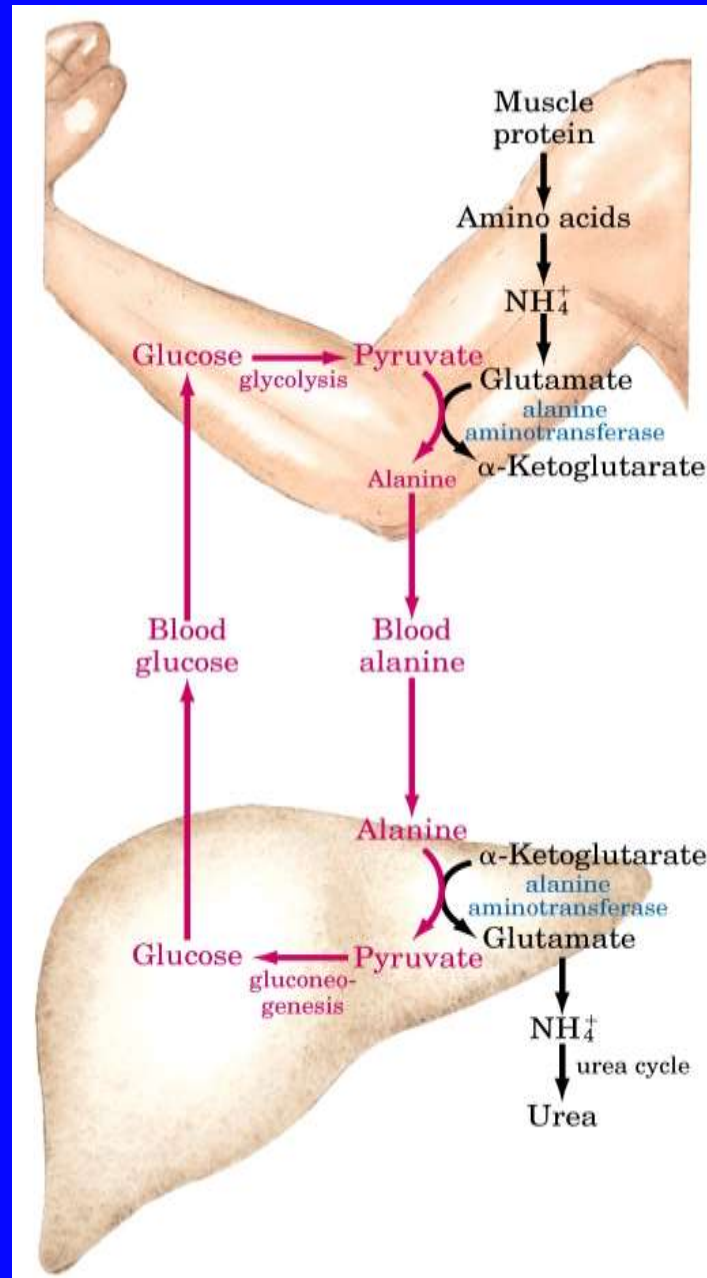
Gluconeogenesi da lattato



Gluconeogenesi da lattato

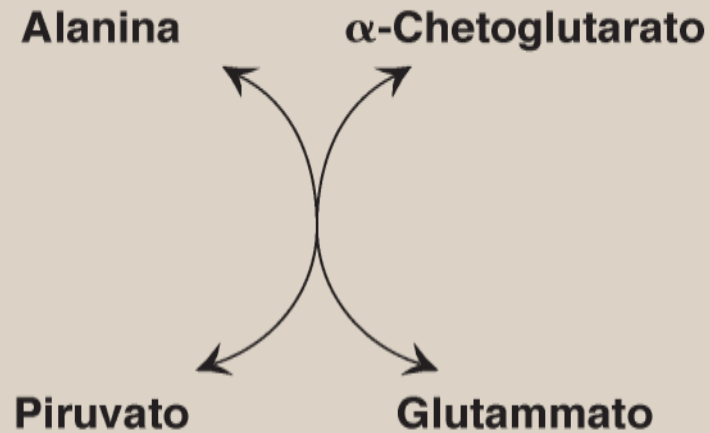


Gluconeogenesi da alanina

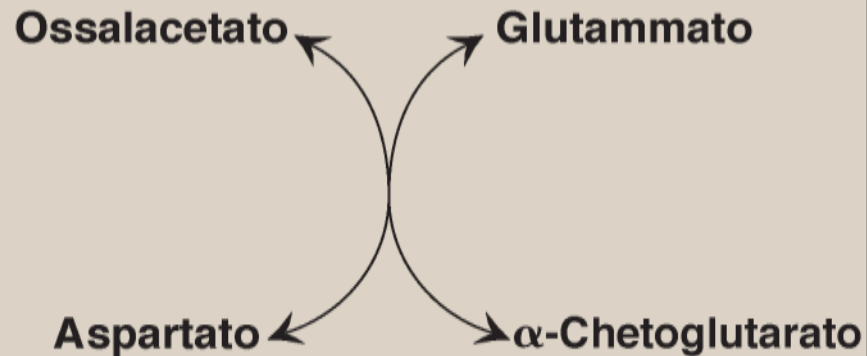


Gluconeogenesi da aminoacidi

A *Alanina amminotransferasi*

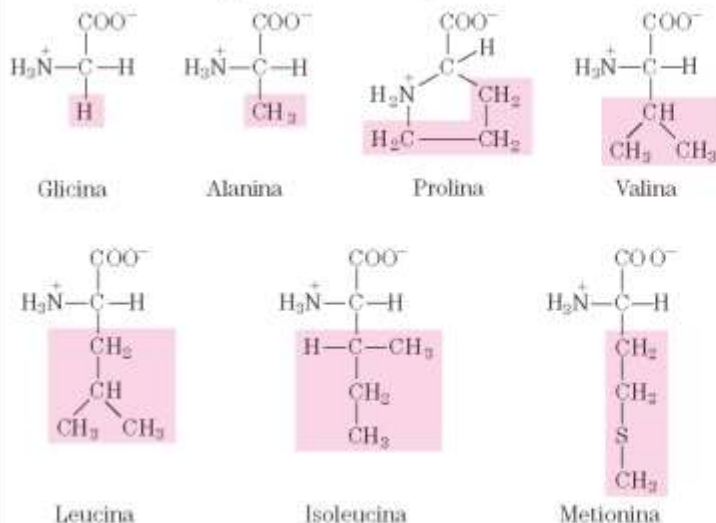


B *Aspartato amminotransferasi*

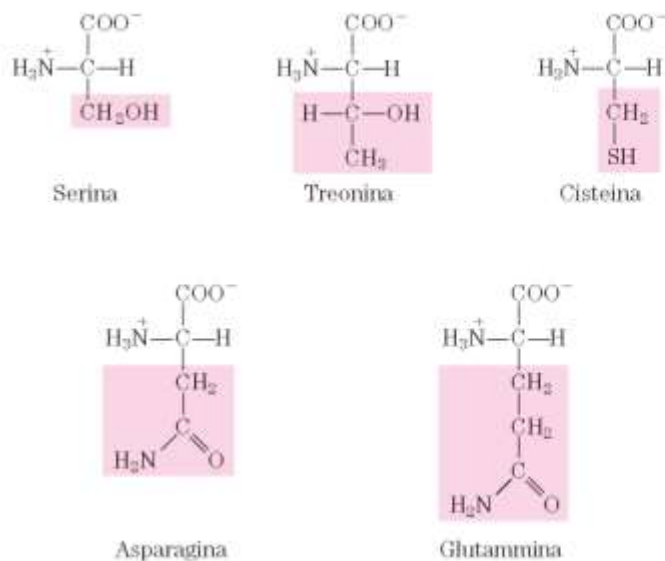


Gluconeogenesi da aminoacidi

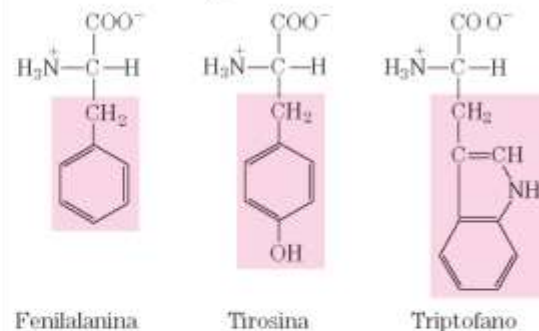
Gruppi R alifatici, non polari



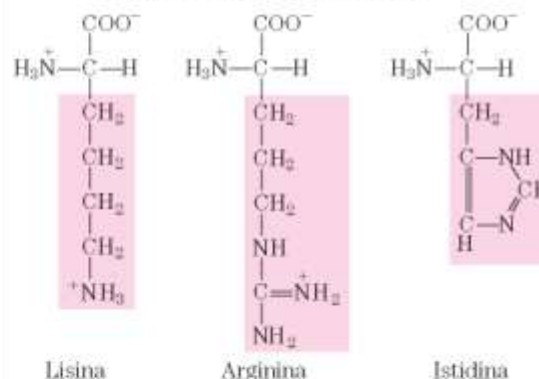
Gruppi R polari, non carichi



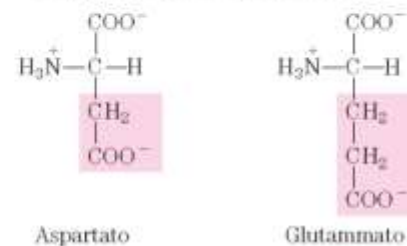
Gruppi R aromatici



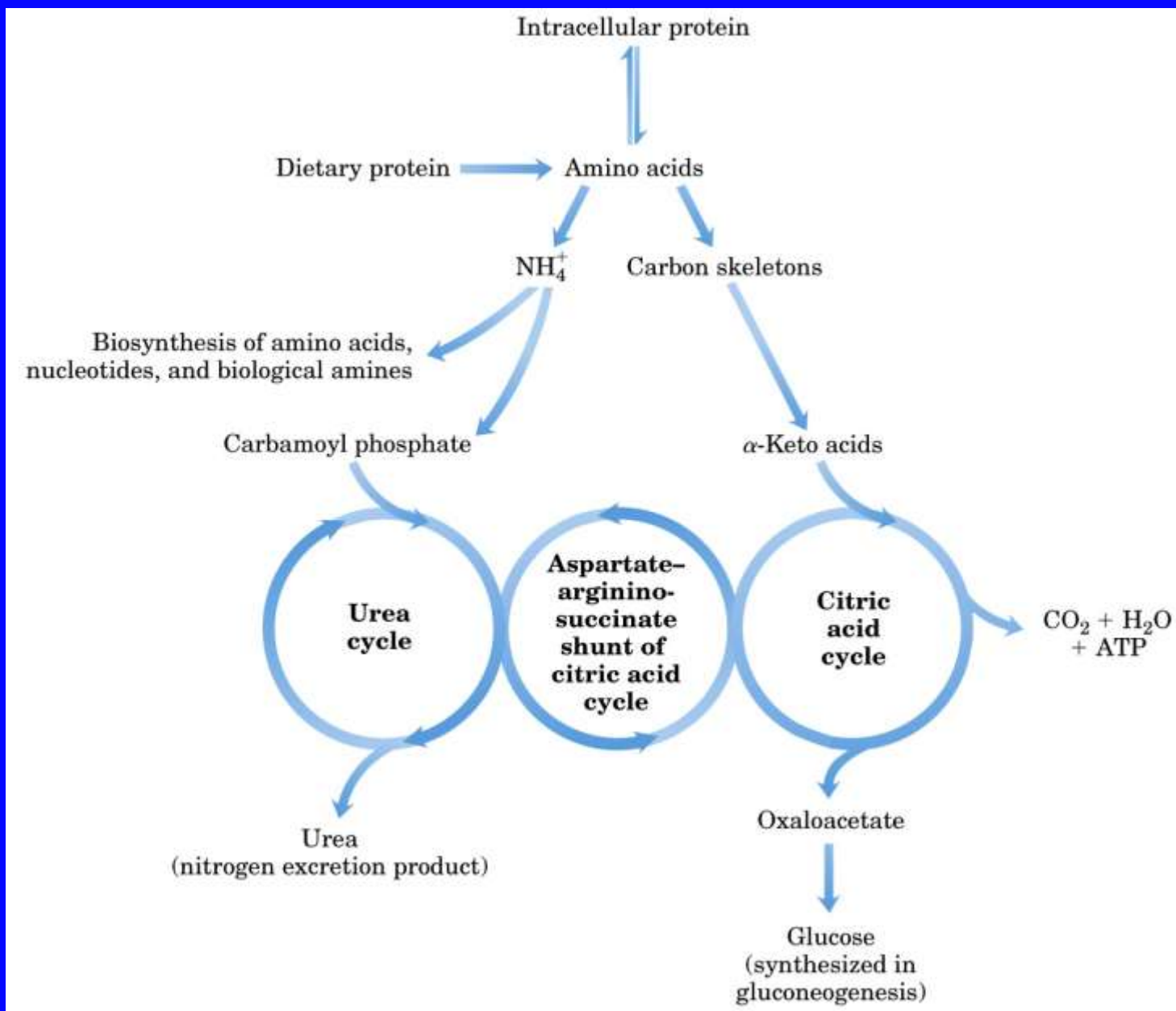
Gruppi R carichi positivamente



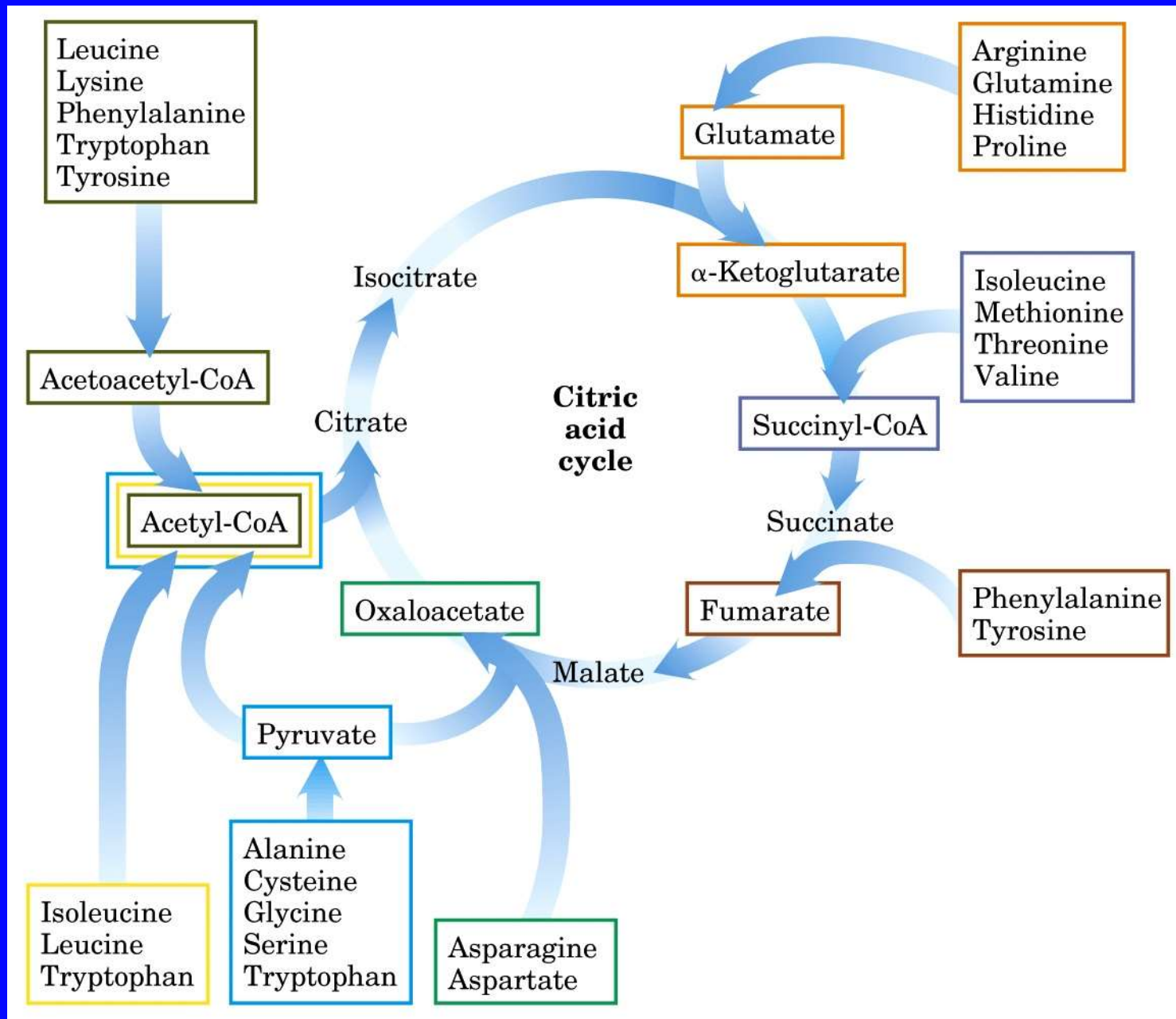
Gruppi R carichi negativamente



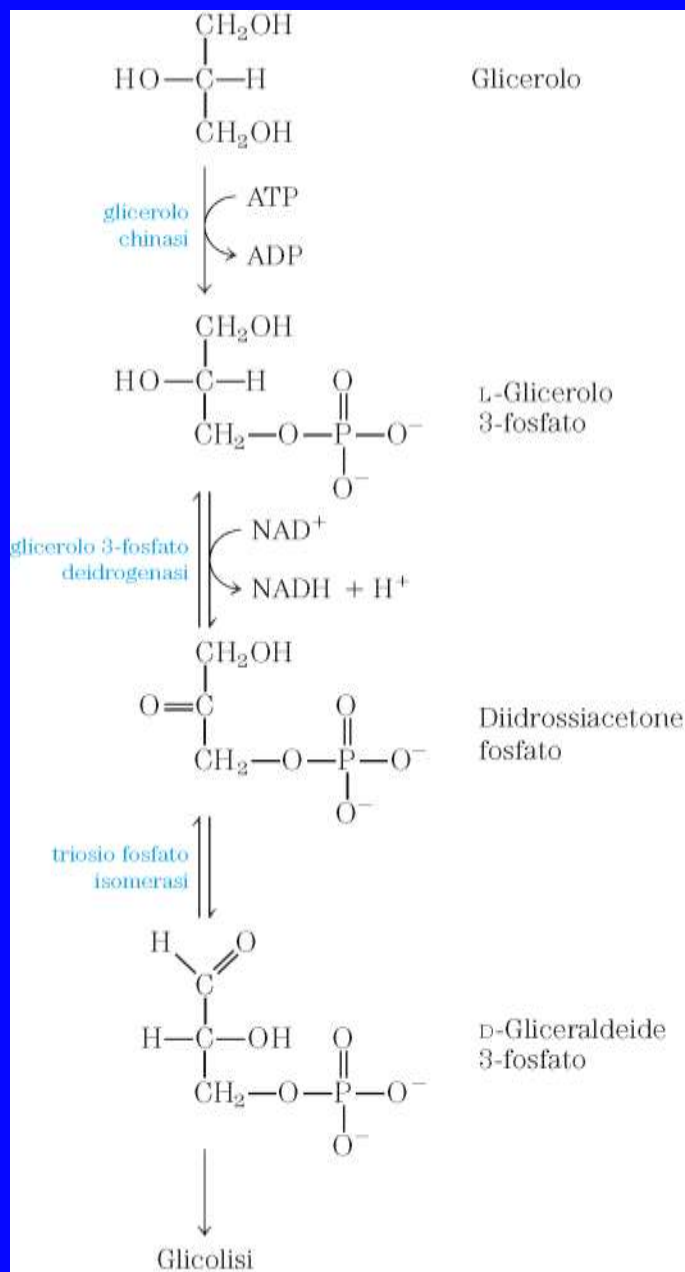
Gluconeogenesi da aminoacidi



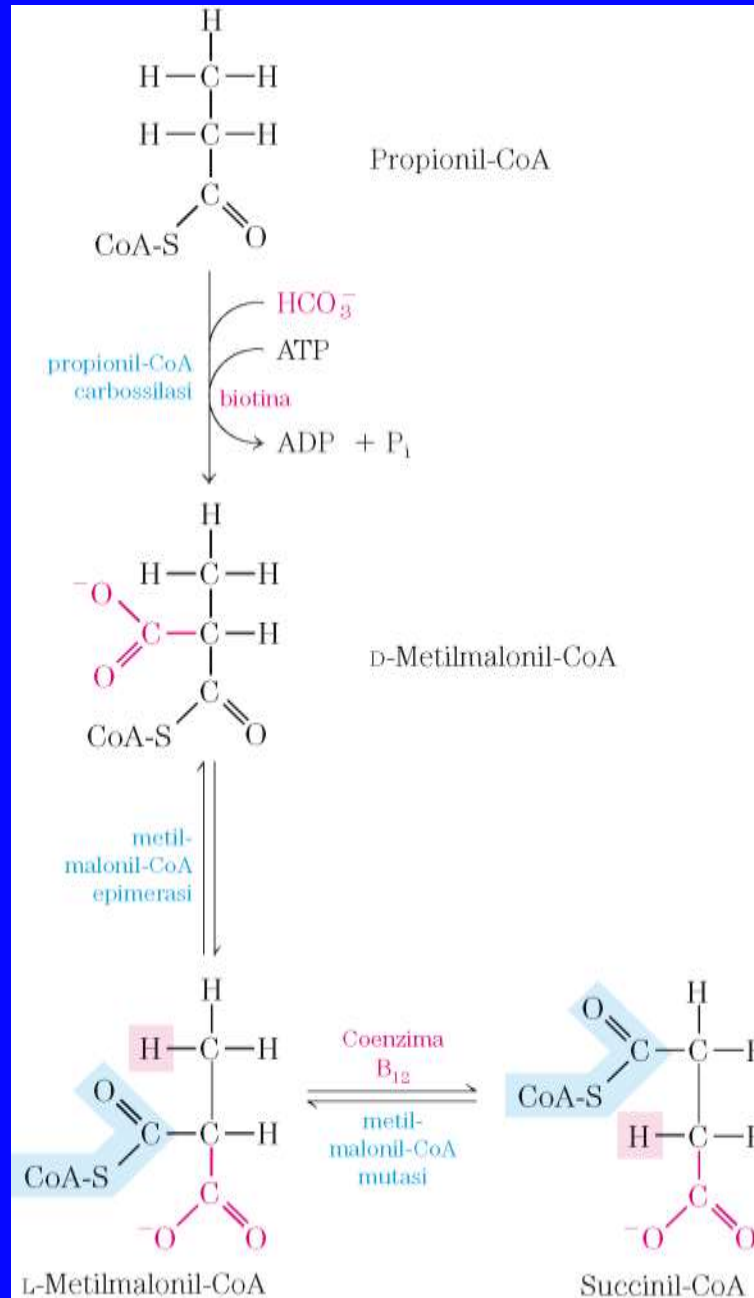
Gluconeogenesi da aminoacidi



Gluconeogenesi da glicerolo



Gluconeogenesi da propionil-CoA



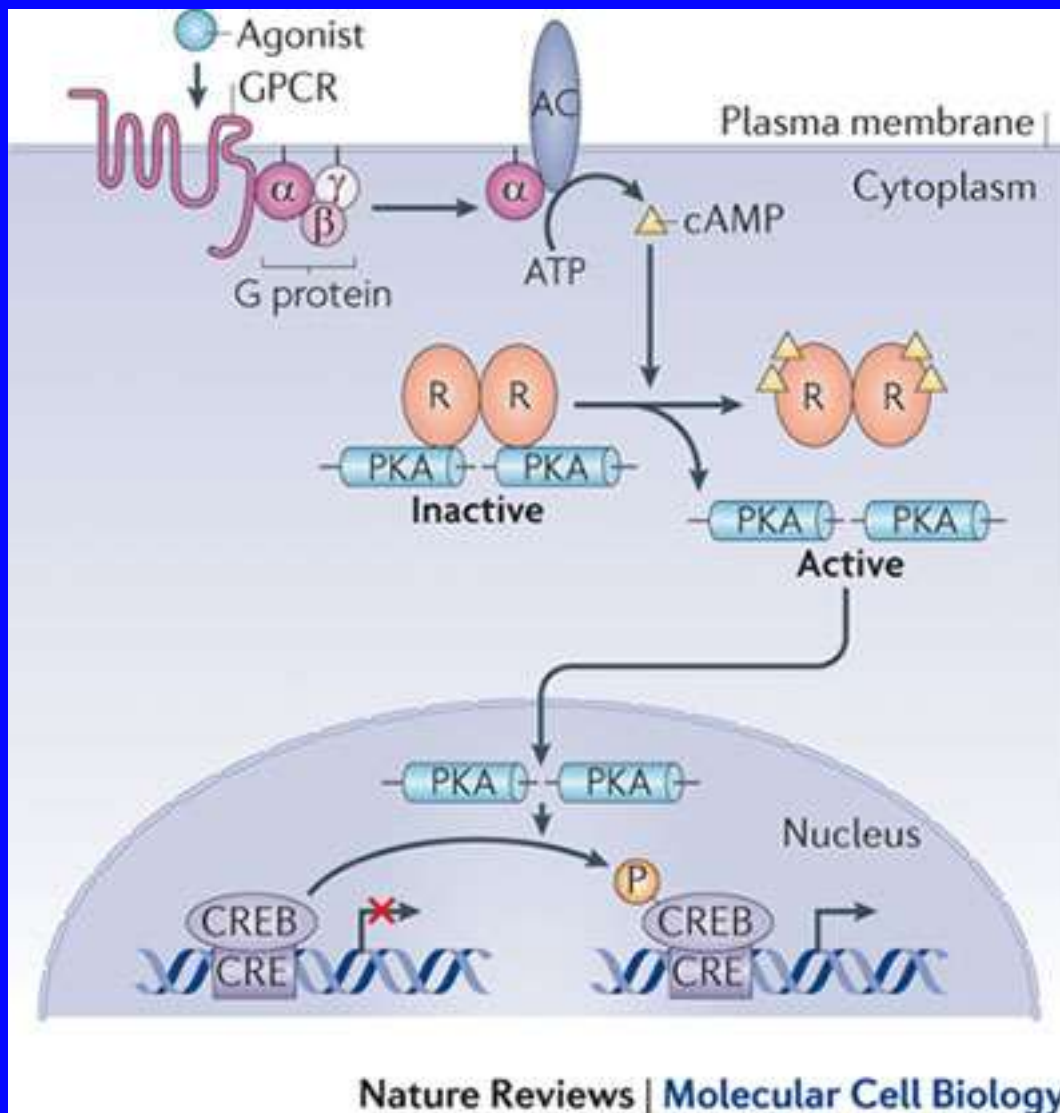
Gluconeogenesi

Meccanismi di regolazione enzimatica
coinvolti nel metabolismo del
glucosio

- 1) Induzione (o repressione) delle
attività enzimatiche
- 2) Regolazione allosterica
- 3) Modificazioni covalenti

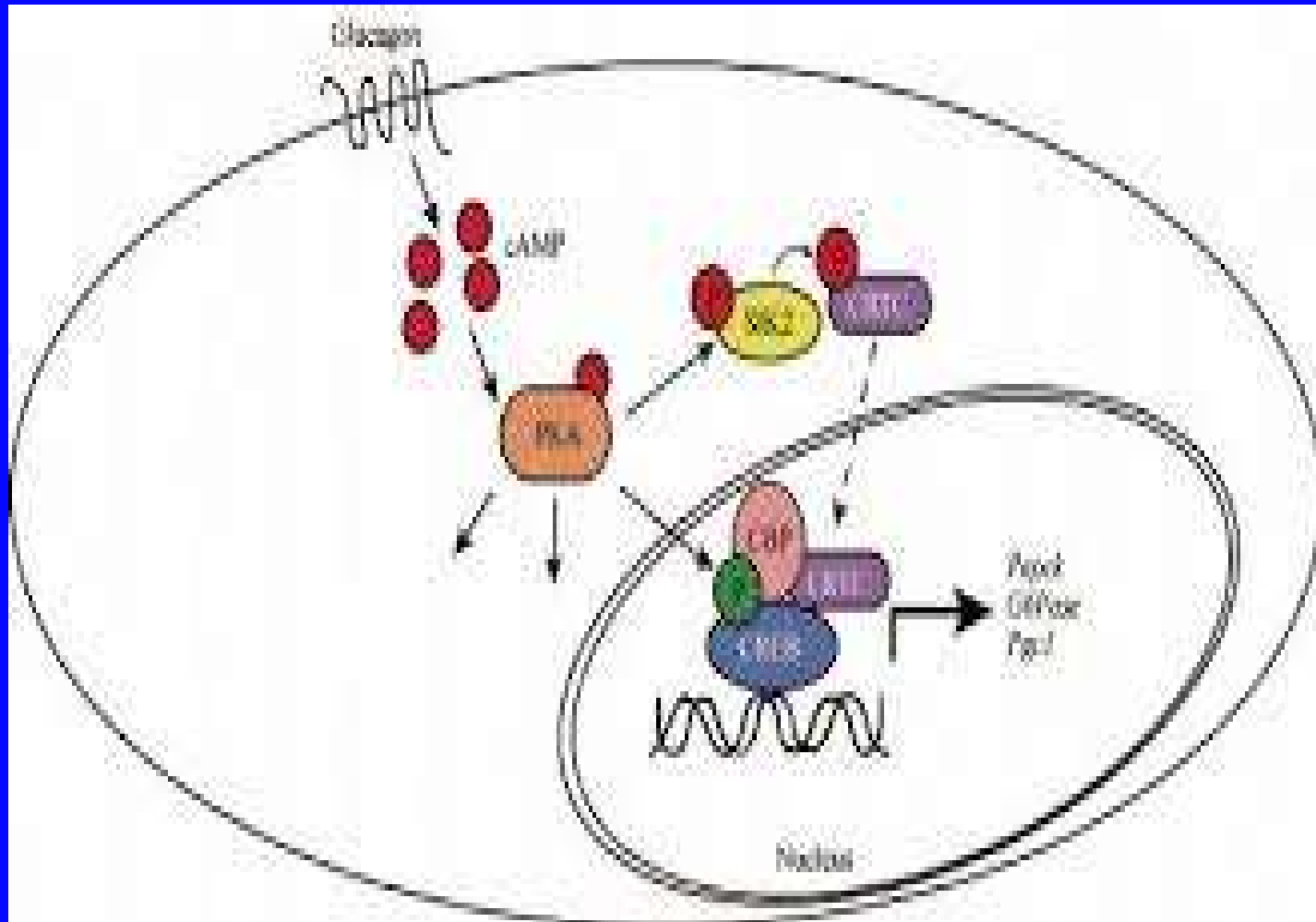
Gluconeogenesi

Attivazione delle attività enzimatiche mediante
l'azione ormonale nella gluconeogenesi



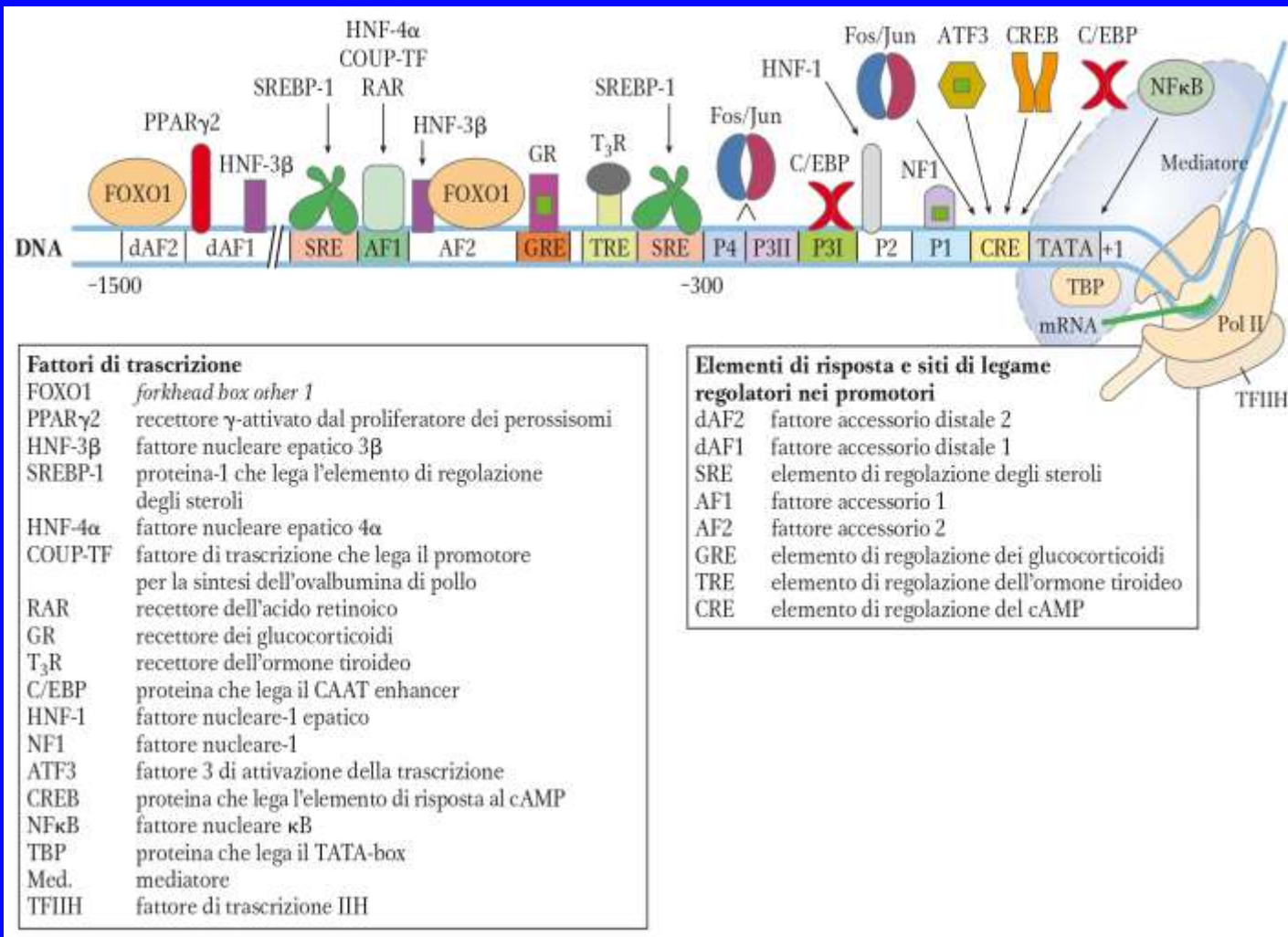
Gluconeogenesi

Regolazione mediata da ormoni della trascrizione dei geni codificanti per la PEPCK e Glucosio 6 fosfato fosfatasi



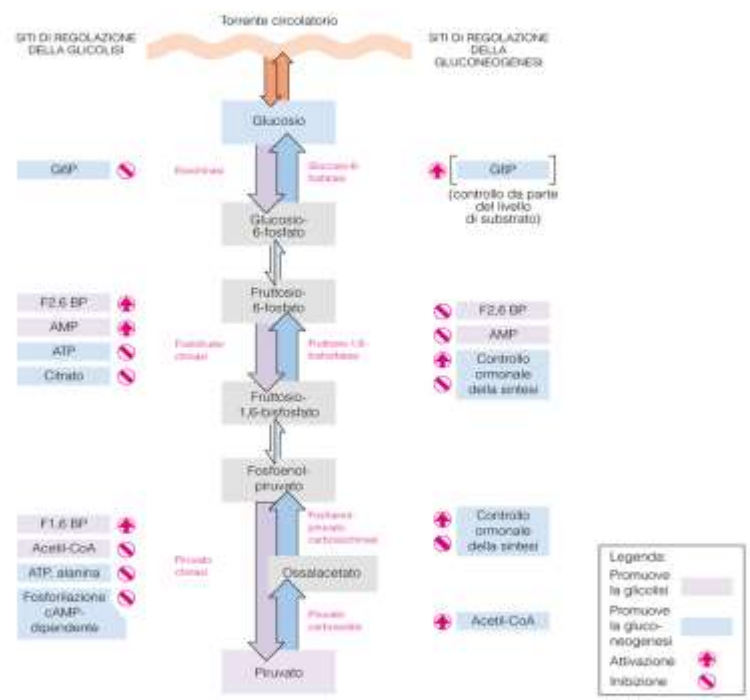
Gluconeogenesi

Elementi di regolazione della trascrizione presenti sul promotore del gene codificante per la PEPCCK



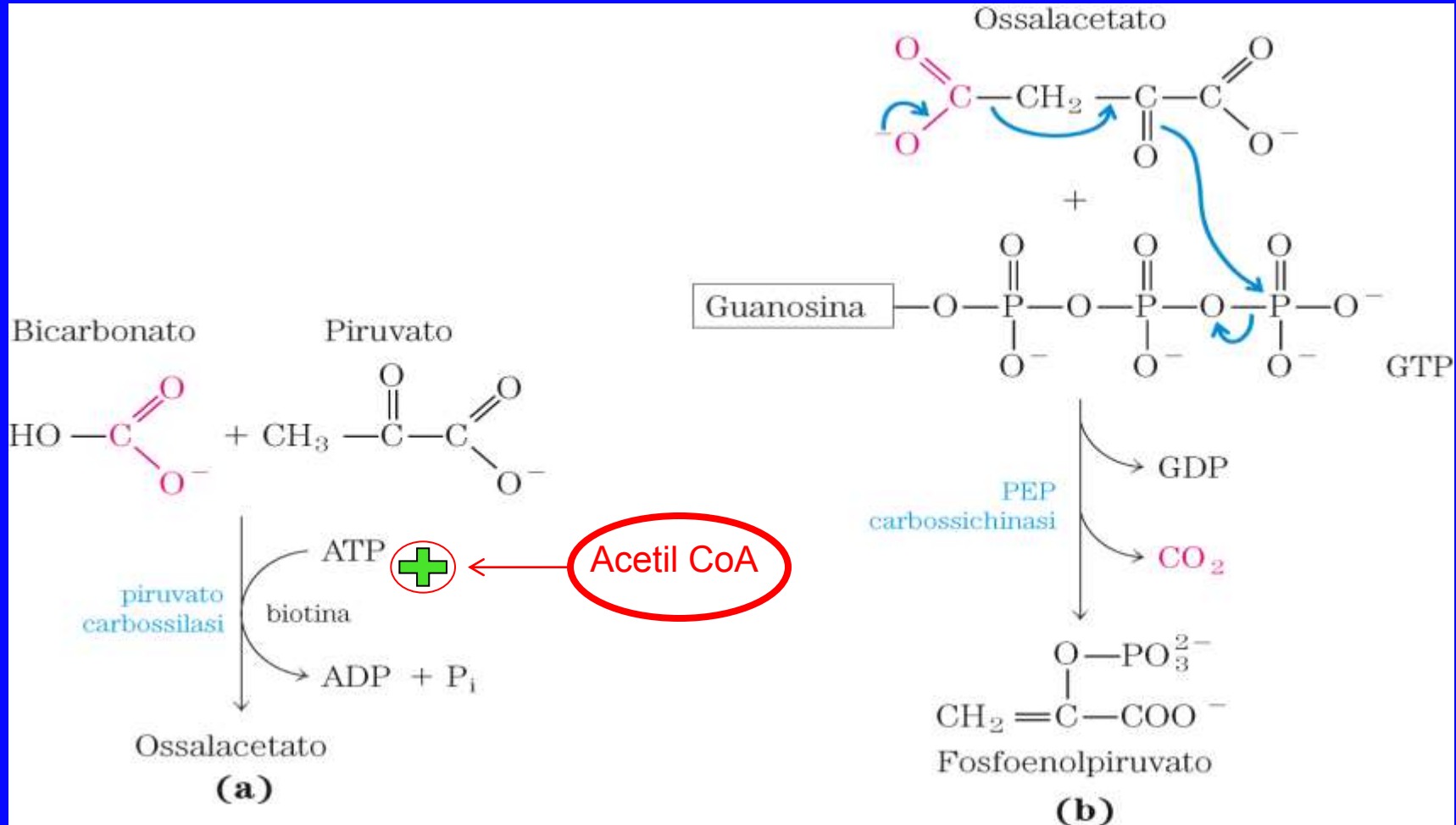
Gluconeogenesi

Regolazione reciproca e alternativa della gluconeogenesi e della glicolisi

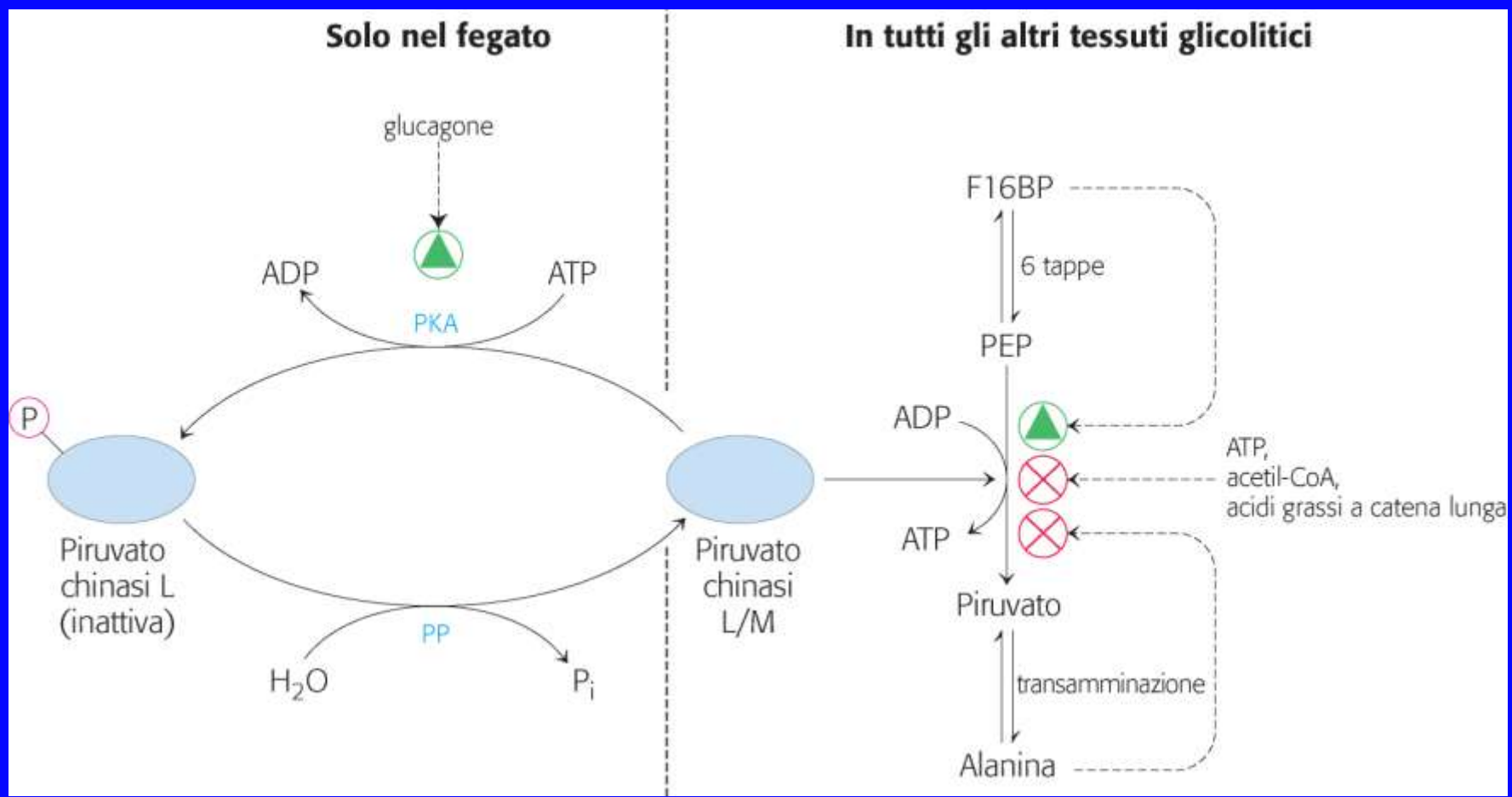


Gluconeogenesi

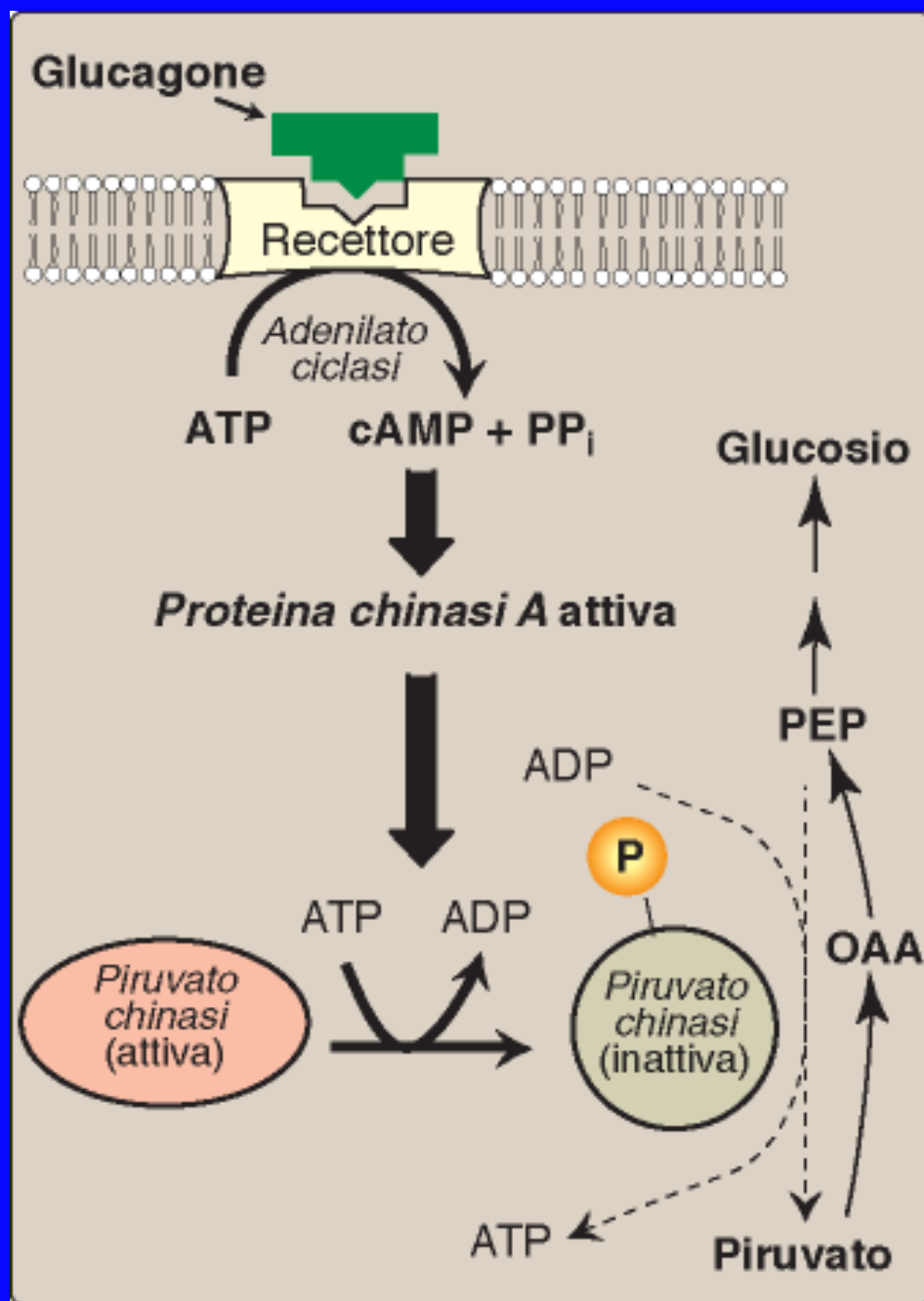
Attivazione della piruvato carbossilasi



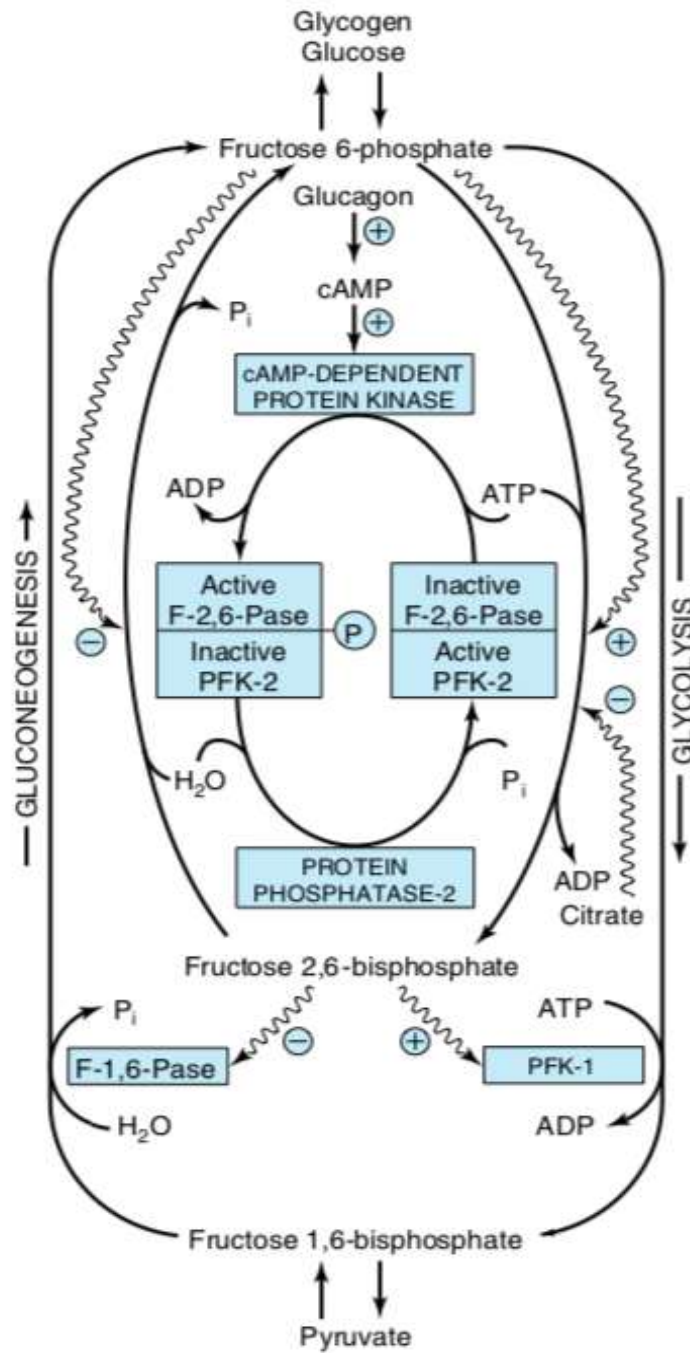
Glicolisi



Gluconeogenesi



Gluconeogenesis



Gluconeogenesi

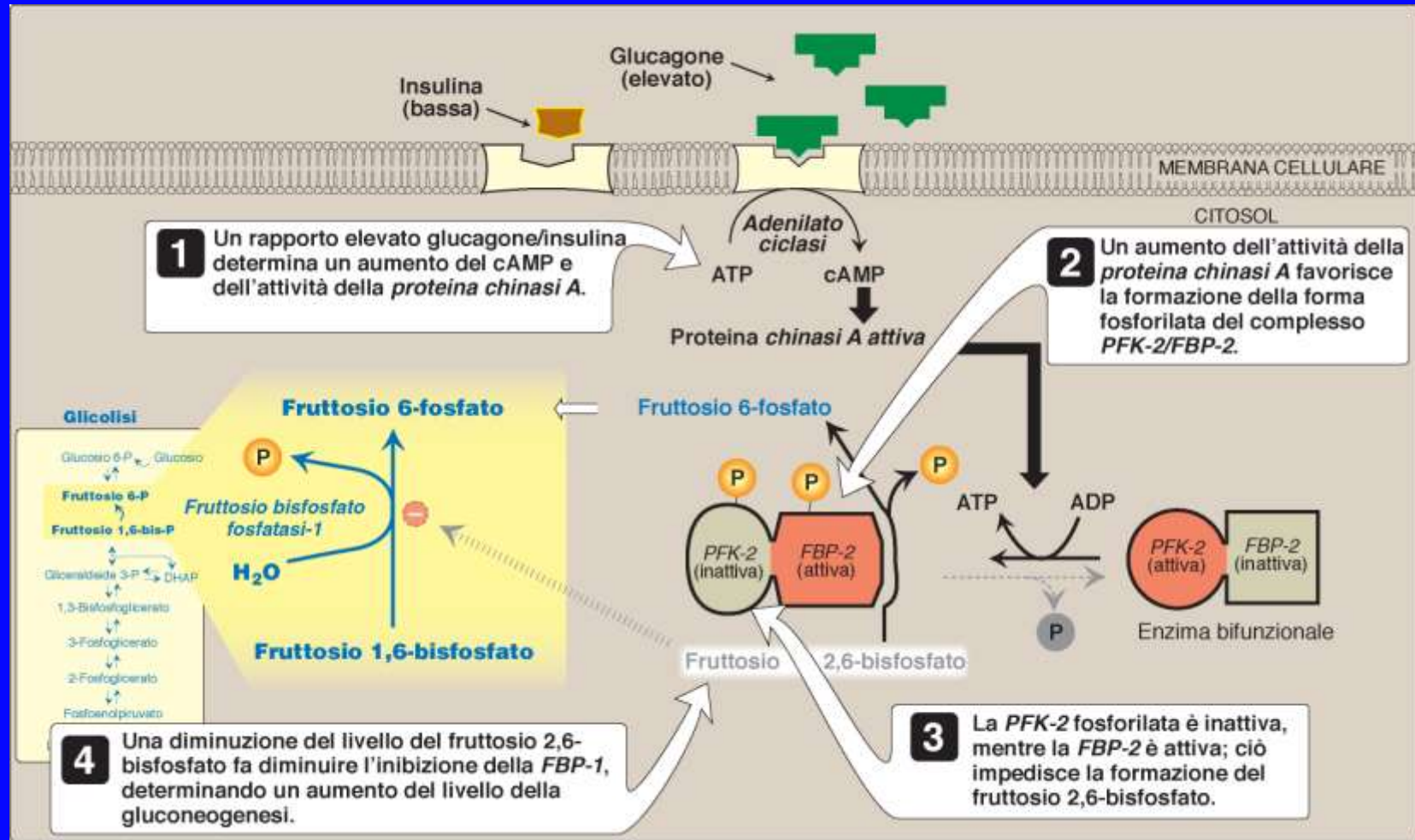
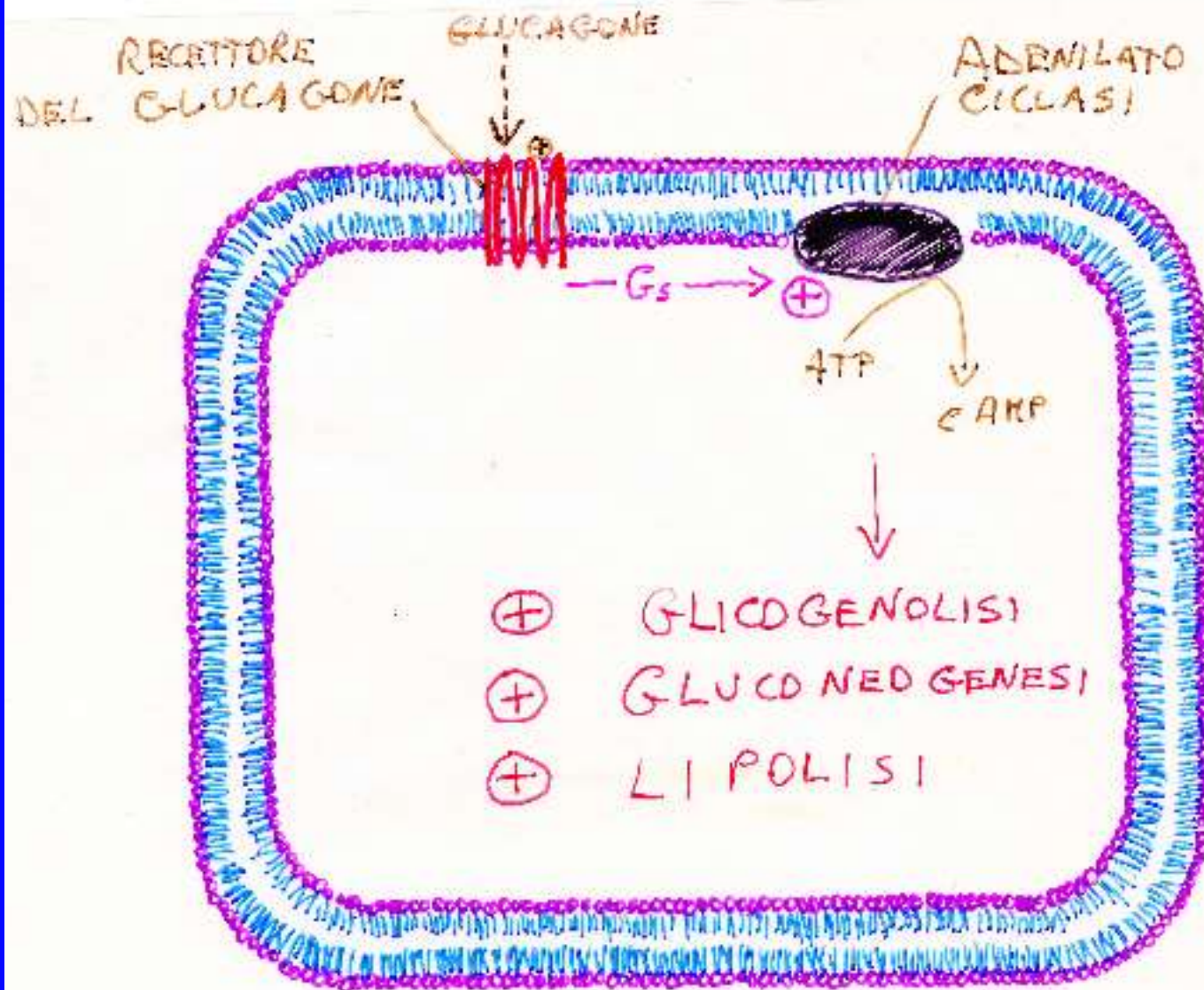


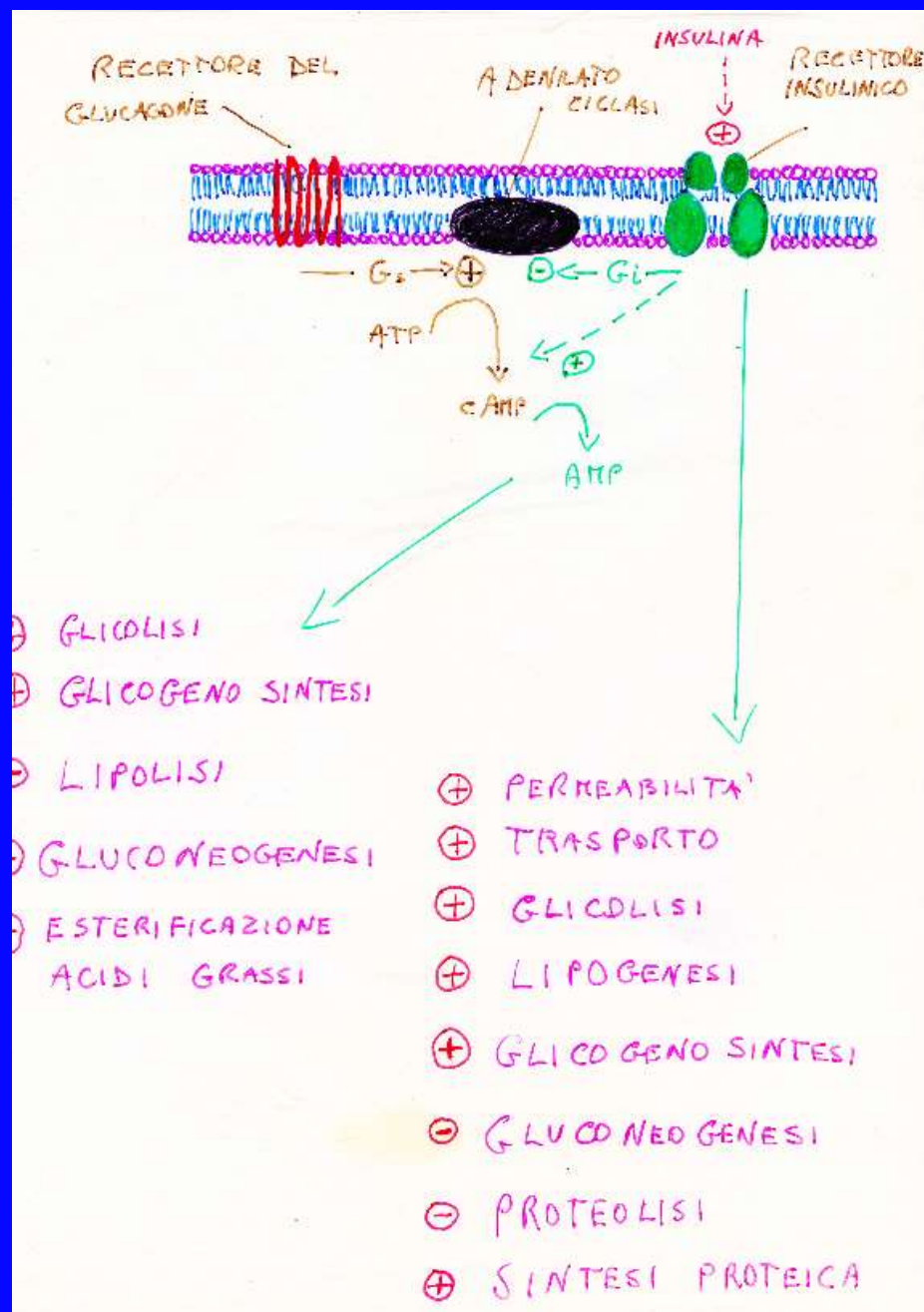
Table 19-1. Regulatory and adaptive enzymes of the rat (mainly liver).

	Activity In		Inducer	Repressor	Activator	Inhibitor
	Carbo- hydrate Feeding	Starva- tion and Diabetes				
Enzymes of glycogenesis, glycolysis, and pyruvate oxidation						
Glycogen synthase system	↑	↓	Insulin		Insulin Glucose 6-phosphate ¹	Glucagon (cAMP) phosphorylase, glycogen
Hexokinase	↑	↓				Glucose 6-phosphate ¹
Glucokinase			Insulin	Glucagon (cAMP)		
Phosphofructokinase-1			Insulin	Glucagon (cAMP)	AMP, fructose 6-phosphate, P _i , fructose 2,6-bisphosphate ¹	Citrate (fatty acids, ketone bodies), ¹ ATP, ¹ glucagon (cAMP)
Pyruvate kinase			Insulin, fructose	Glucagon (cAMP)	Fructose 1,6-bisphosphate ¹ , insulin	ATP, alanine, glucagon (cAMP), epinephrine
Pyruvate dehydrogenase	↑	↓			CoA, NAD ⁺ , insulin, ² ADP, pyruvate	Acetyl-CoA, NADH, ATP (fatty acids, ketone bodies)
Enzymes of gluconeogenesis						
Pyruvate carboxylase	↓	↑	Glucocorticoids, glucagon, epinephrine (cAMP)	Insulin	Acetyl-CoA ¹	ADP ¹
Phosphoenolpyruvate carboxykinase	↓	↑	Glucocorticoids, glucagon, epinephrine (cAMP)	Insulin	Glucagon?	
Fructose-1,6-bisphosphatase	↓	↑	Glucocorticoids, glucagon, epinephrine (cAMP)	Insulin	Glucagon (cAMP)	Fructose 1,6-bisphosphate, AMP, fructose 2,6-bisphosphate ¹
Glucose-6-phosphatase	↓	↑	Glucocorticoids, glucagon, epinephrine (cAMP)	Insulin		
Enzymes of the pentose phosphate pathway and lipogenesis						
Glucose-6-phosphate dehydrogenase	↑	↓	Insulin			
6-Phosphogluconate dehydrogenase	↑	↓	Insulin			
"Malic enzyme"	↑	↓	Insulin			
ATP-citrate lyase	↑	↓	Insulin			
Acetyl-CoA carboxylase	↑	↓	Insulin?		Citrate, ¹ insulin	Long-chain acyl-CoA, cAMP, glucagon
Fatty acid synthase	↑	↓	Insulin?			

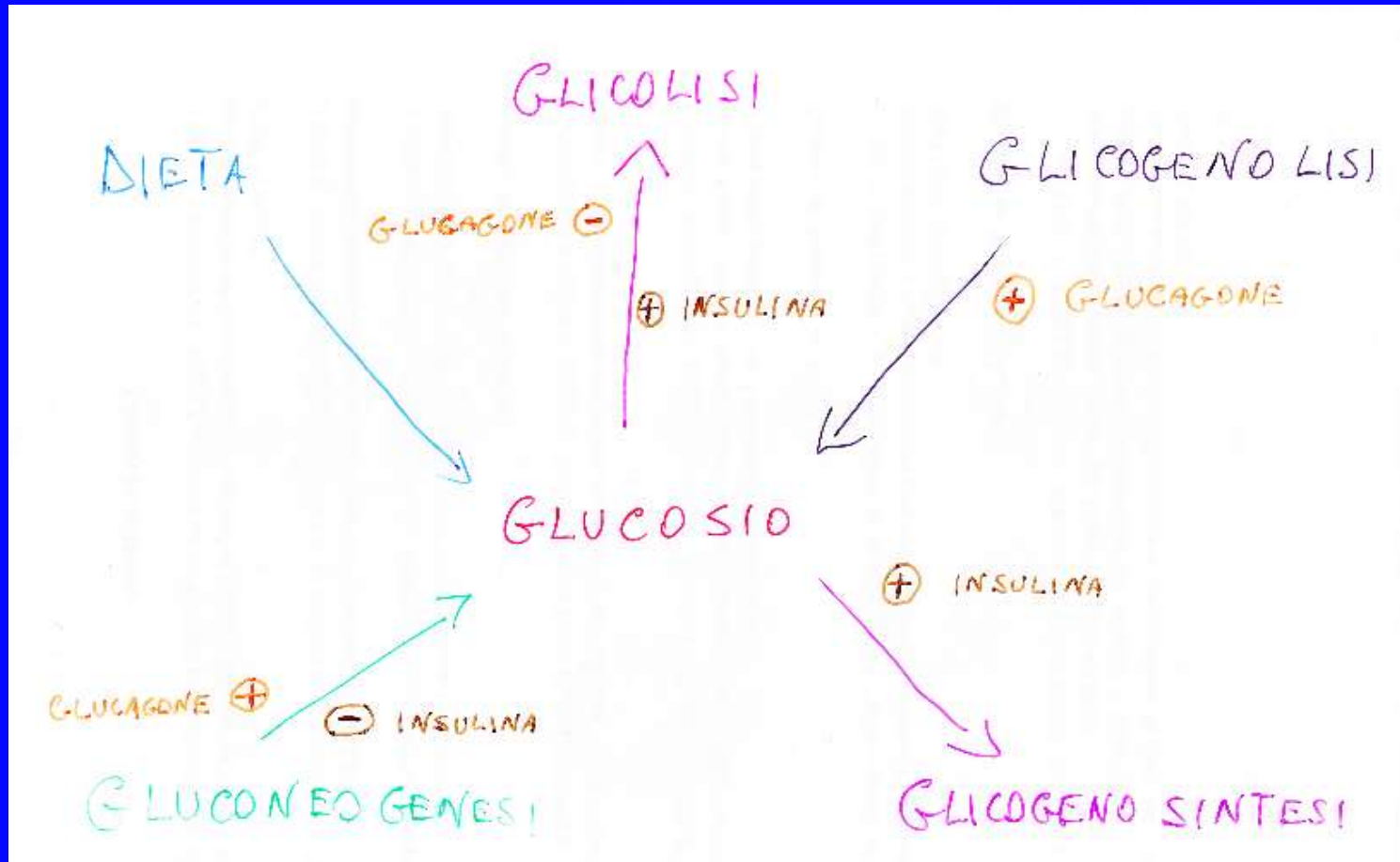
Gluconeogenesi



Gluconeogenesi



Gluconeogenesi



Il flusso di metaboliti nel Metabolismo intermedio

