

# Glicólise

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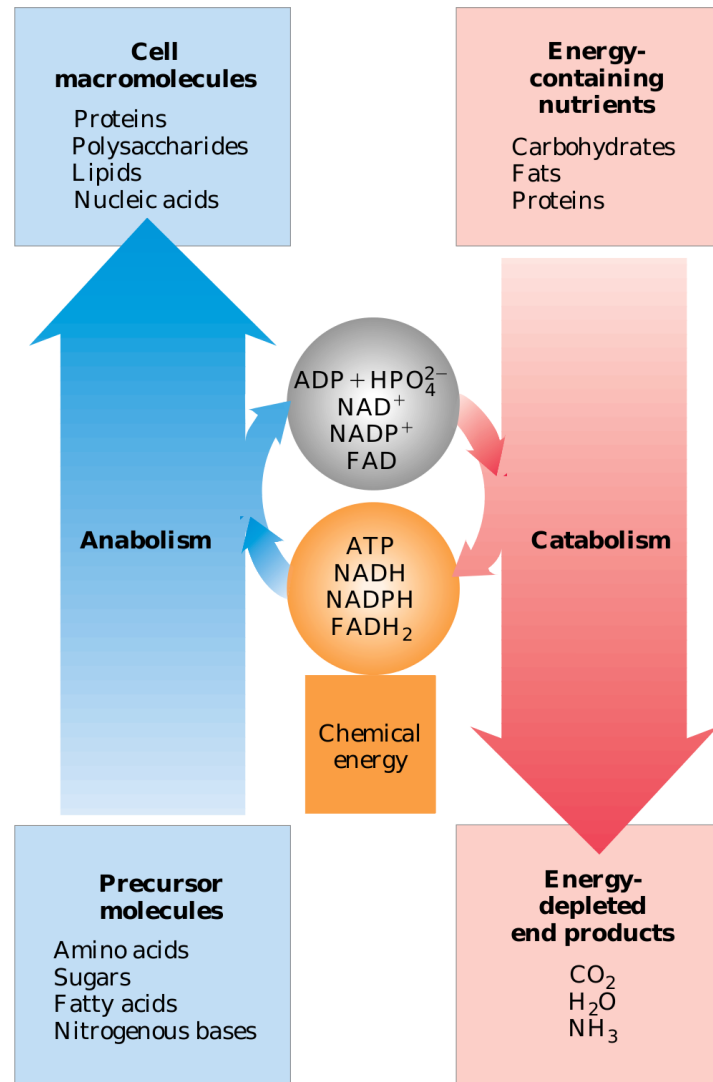


## Resumo da aula

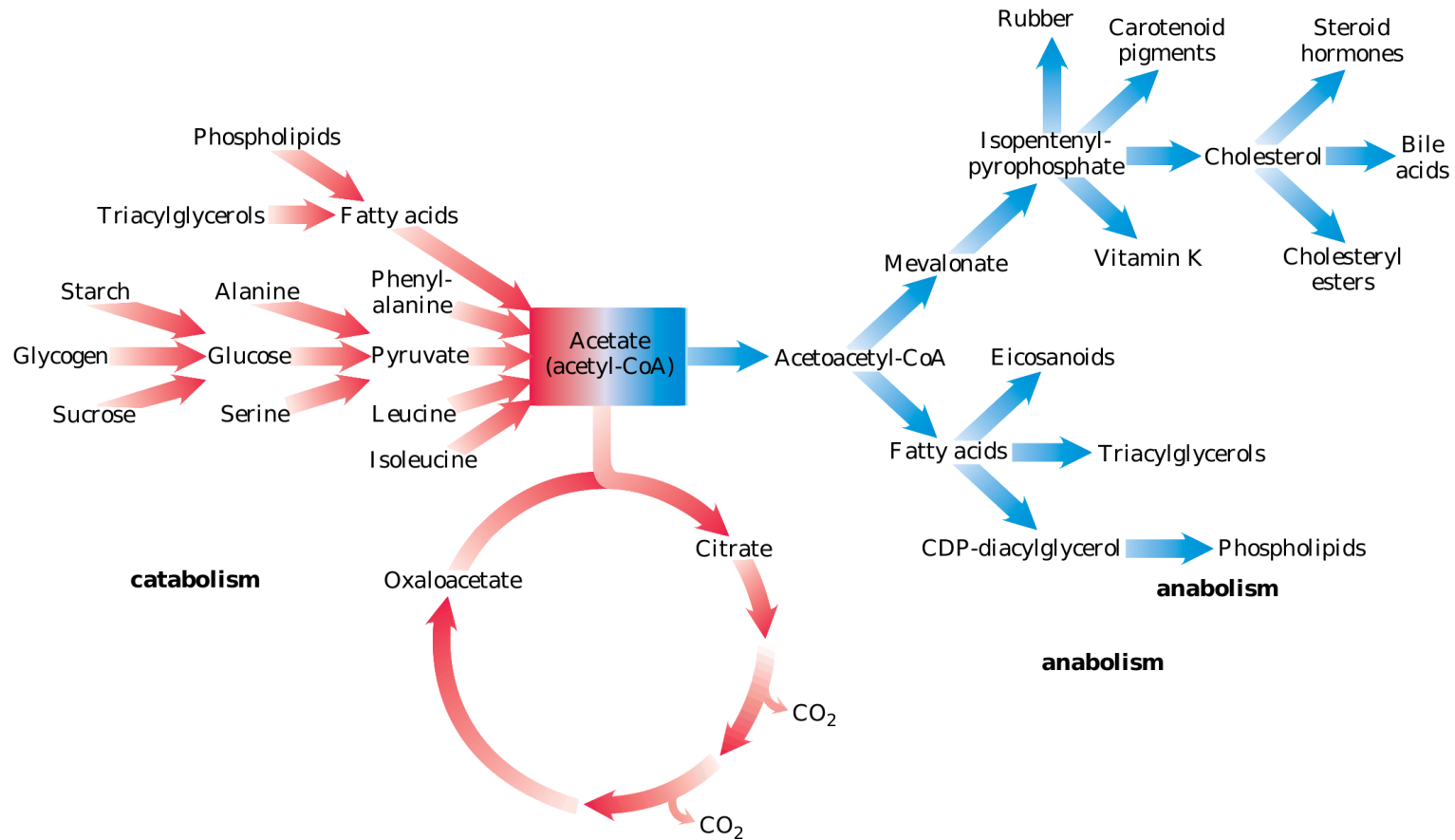
- Visão geral do metabolismo
- Catabolismo de açúcares: glicose
- Transporte para citossol
- Fase preparatória e Fase compensatória
- Alguns mecanismos de reação enzimática
- Balanço energético
- Controle da glicólise
- Aeróbico × anaeróbico



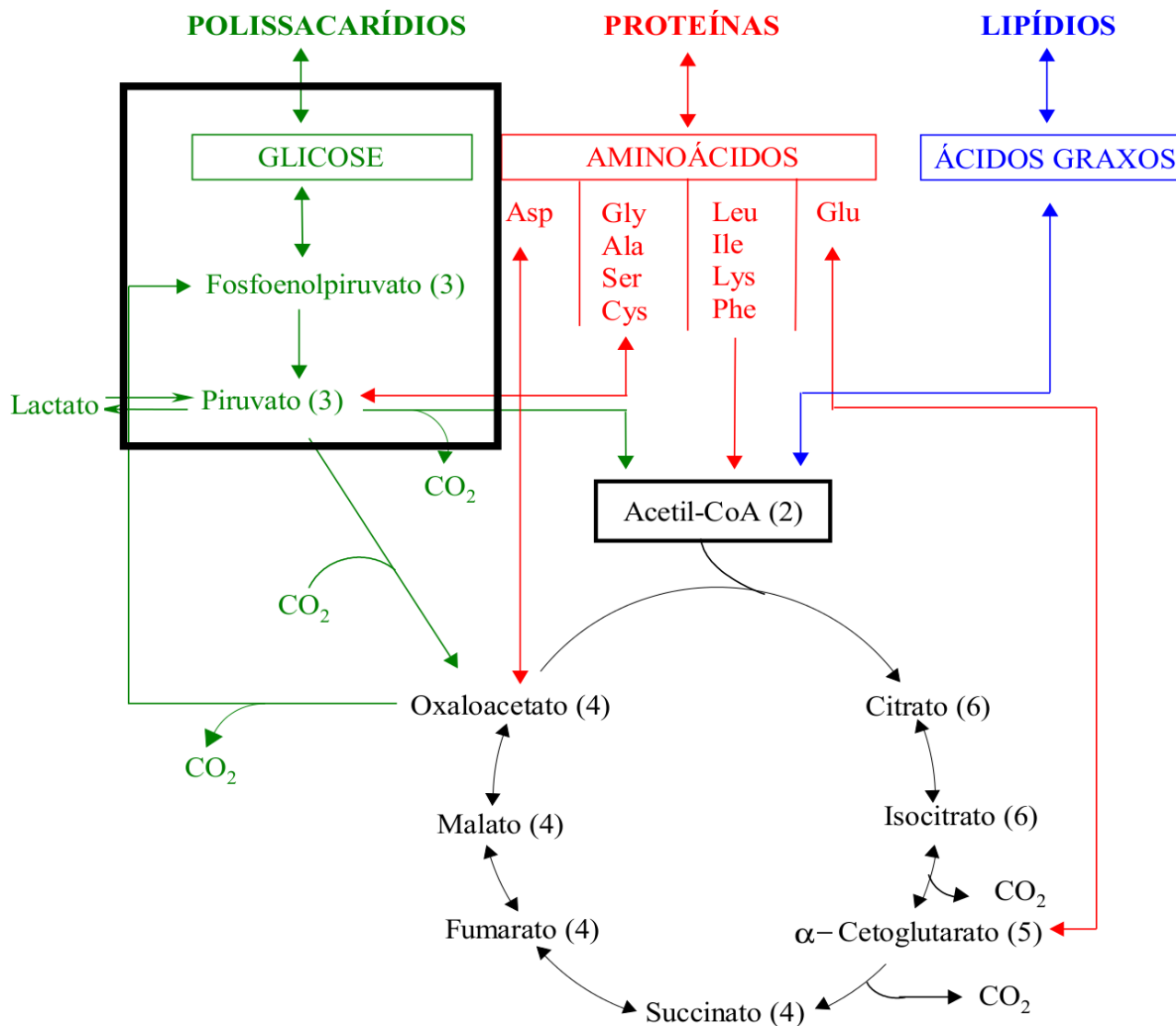
# Visão geral: Catabolismo × anabolismo



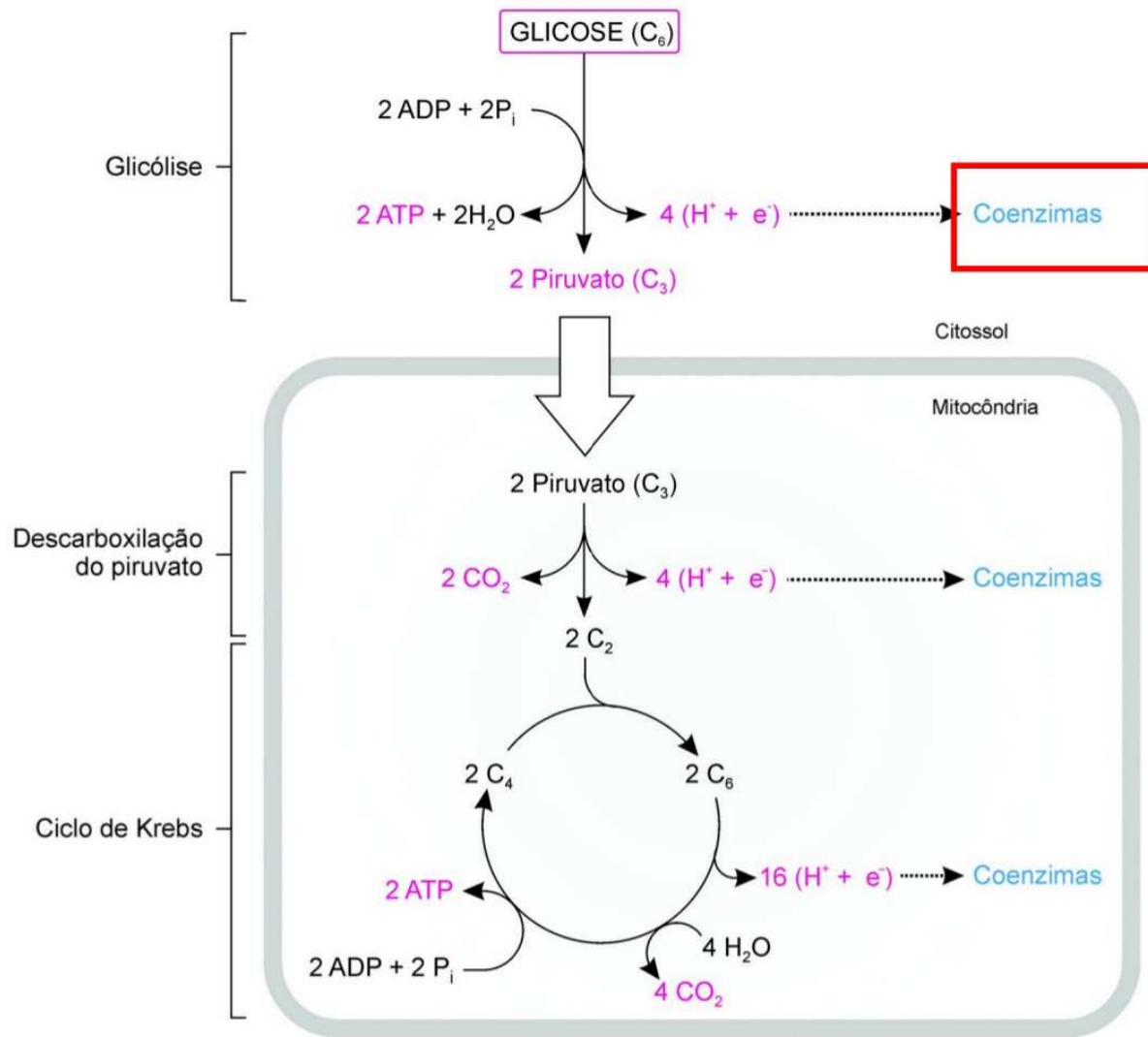
# Visão geral: Catabolismo × anabolismo



# Mapa metabólico resumido

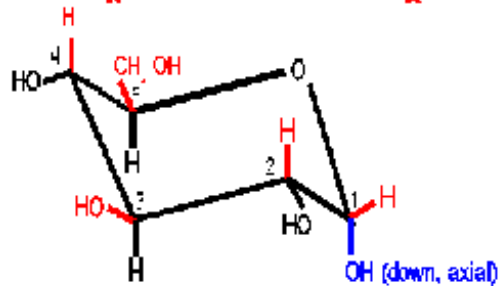
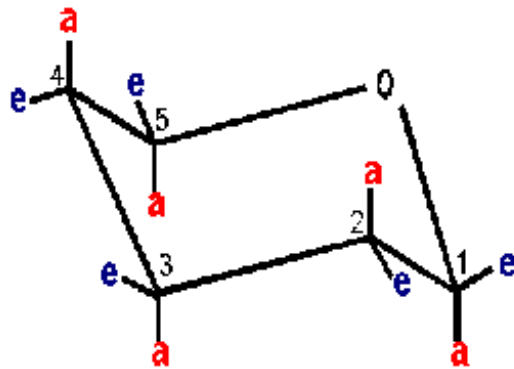


# Metabolismo de carboidratos resumido

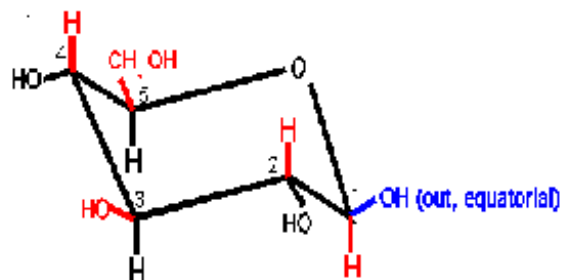


# Glucose

"Chair" structure for glucose  
(closer to reality)  
a= axial (up or down)  
e= equatorial (out)

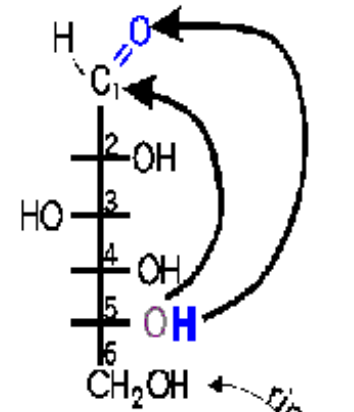
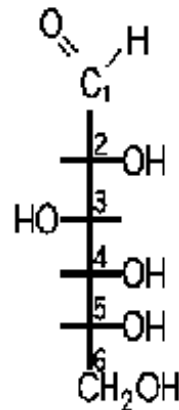


$\alpha$ -Glucopyranose ( $\alpha$ -glucose)

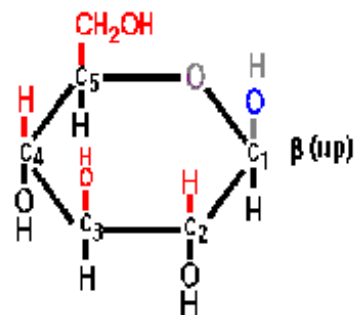
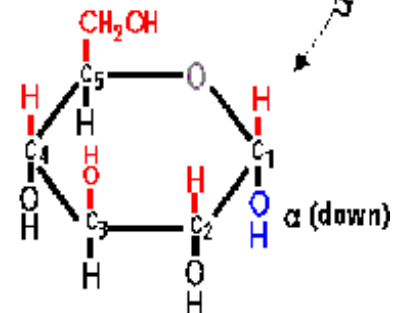


$\beta$ -Glucopyranose ( $\beta$ -glucose)

## GLUCOSE CYCLIZATION



(Drawing assumptions:  
always 4 bonds to C,  
C at line joints,  
H at termini)



## Transportadores de glicose

**GLUT-1** → eritrócito, retina, placenta

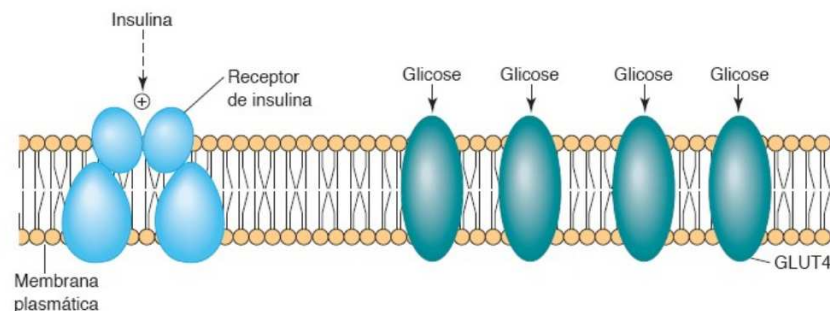
**GLUT-2** → fígado e pâncreas

**GLUT-3** → cérebro e células nervosas

**GLUT-4** → tecido adiposo e muscular

**GLUT-5** → enterócito e epitélio renal, transporta pref. a frutose

**GLUT-6** → Na<sup>+</sup> dependente: enterócito e epitélio renal, cotransporte

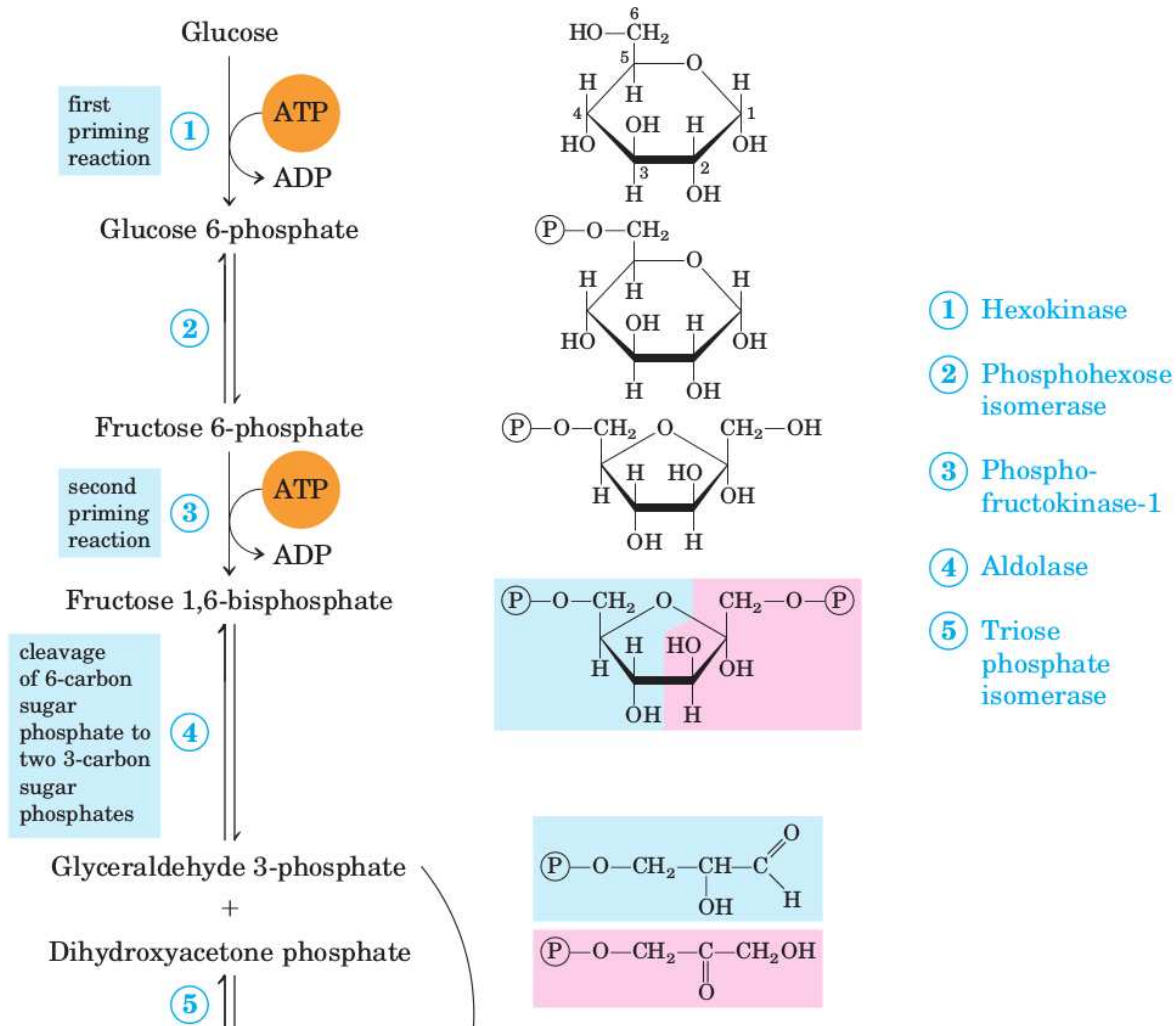


**GLUT-7** → retículo endoplasmático em células hepáticas

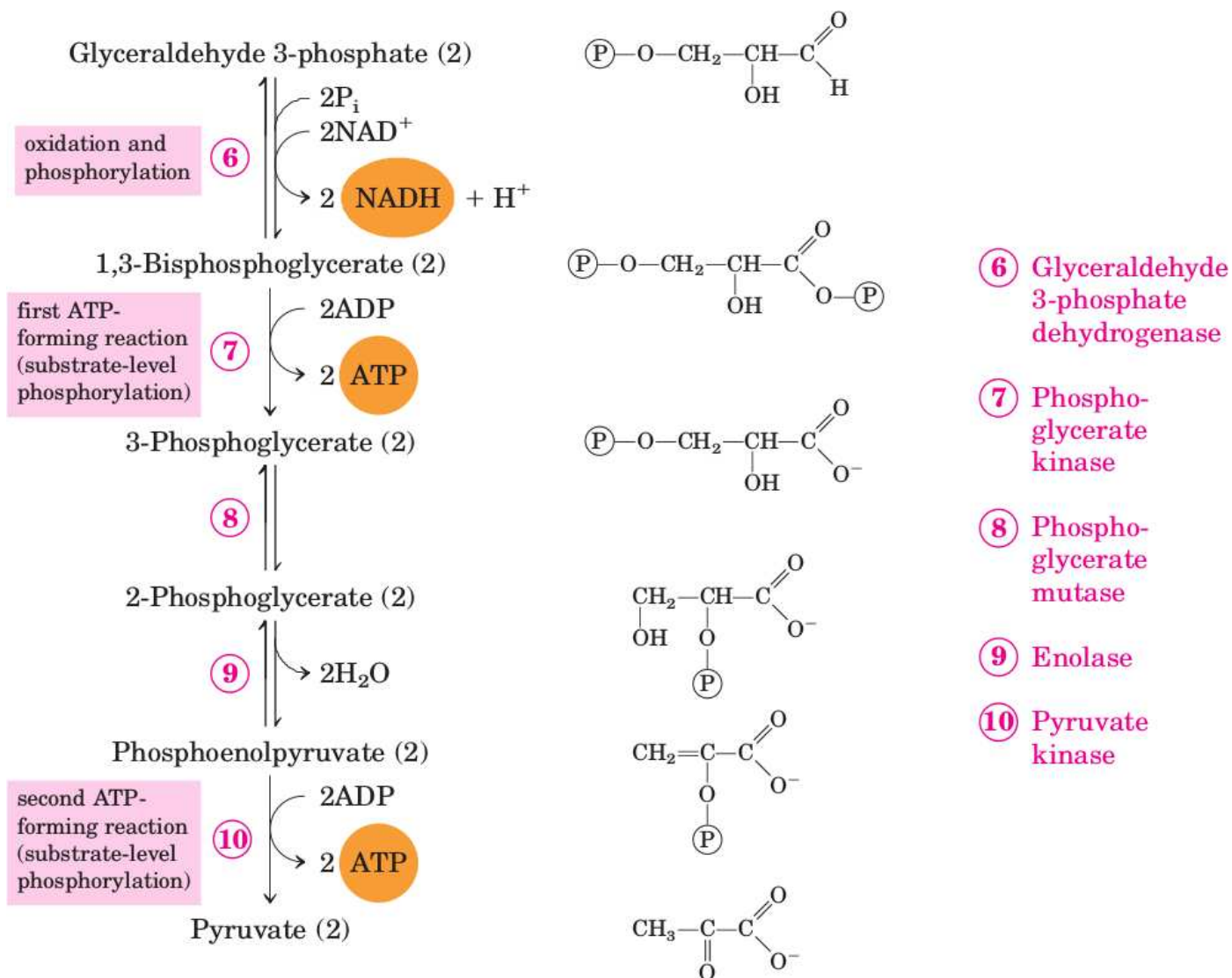




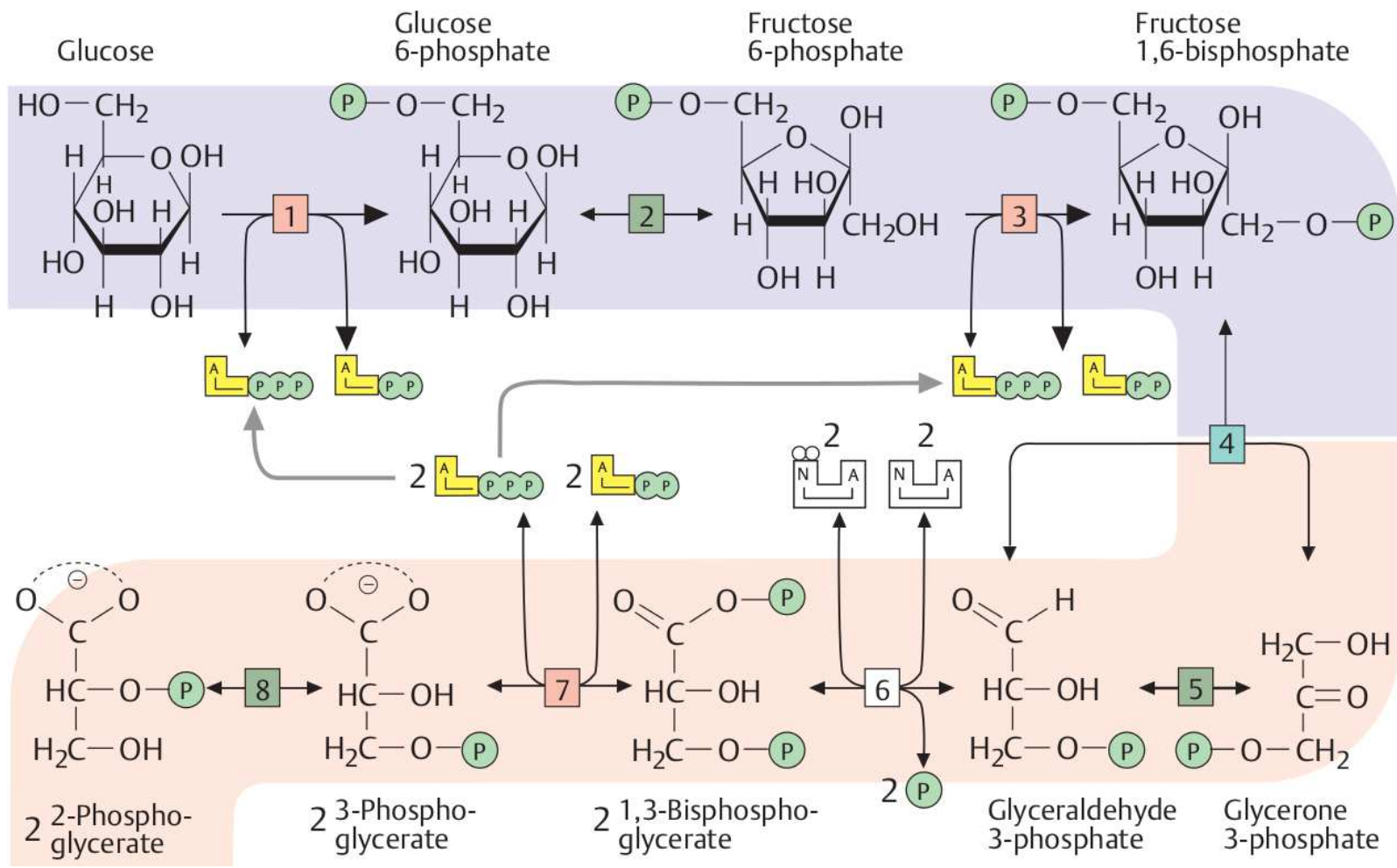
# Glicólise: fase preparatória



# Glicólise: fase compensatória

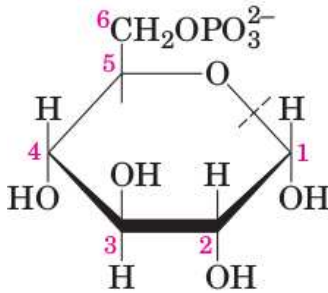


# Glicólise geral

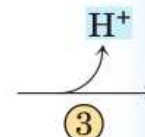
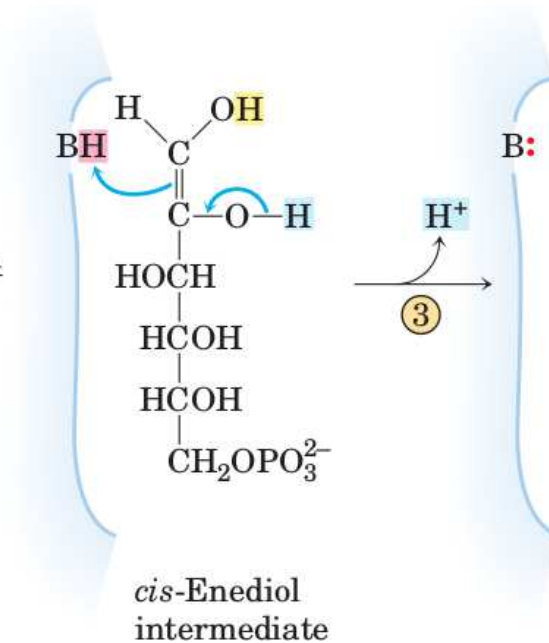
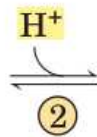
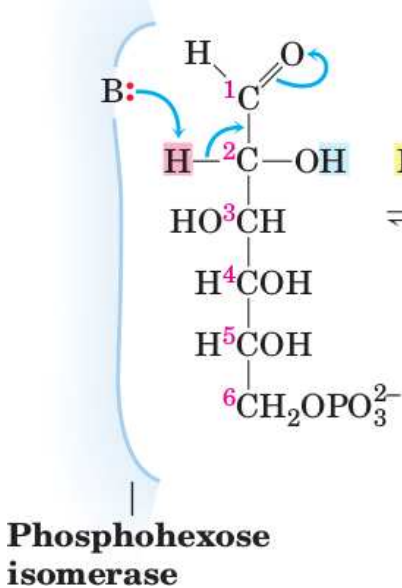


# Mecanismo: Glicose 6P isomerase

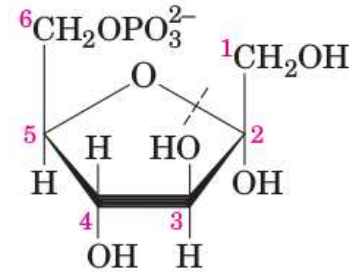
Glucose 6-phosphate



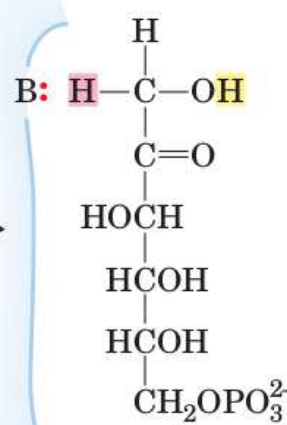
① binding and ring opening



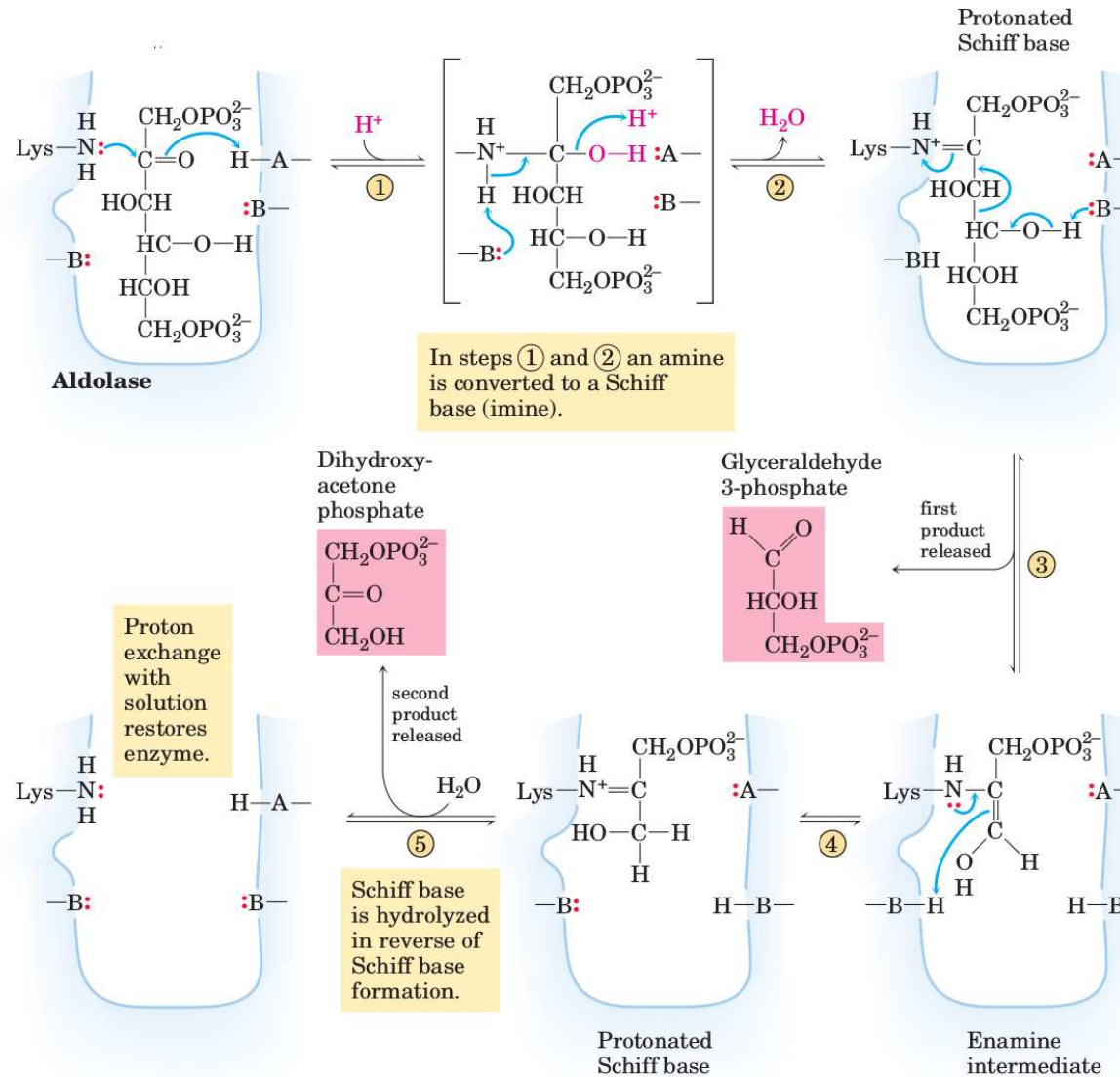
Fructose 6-phosphate



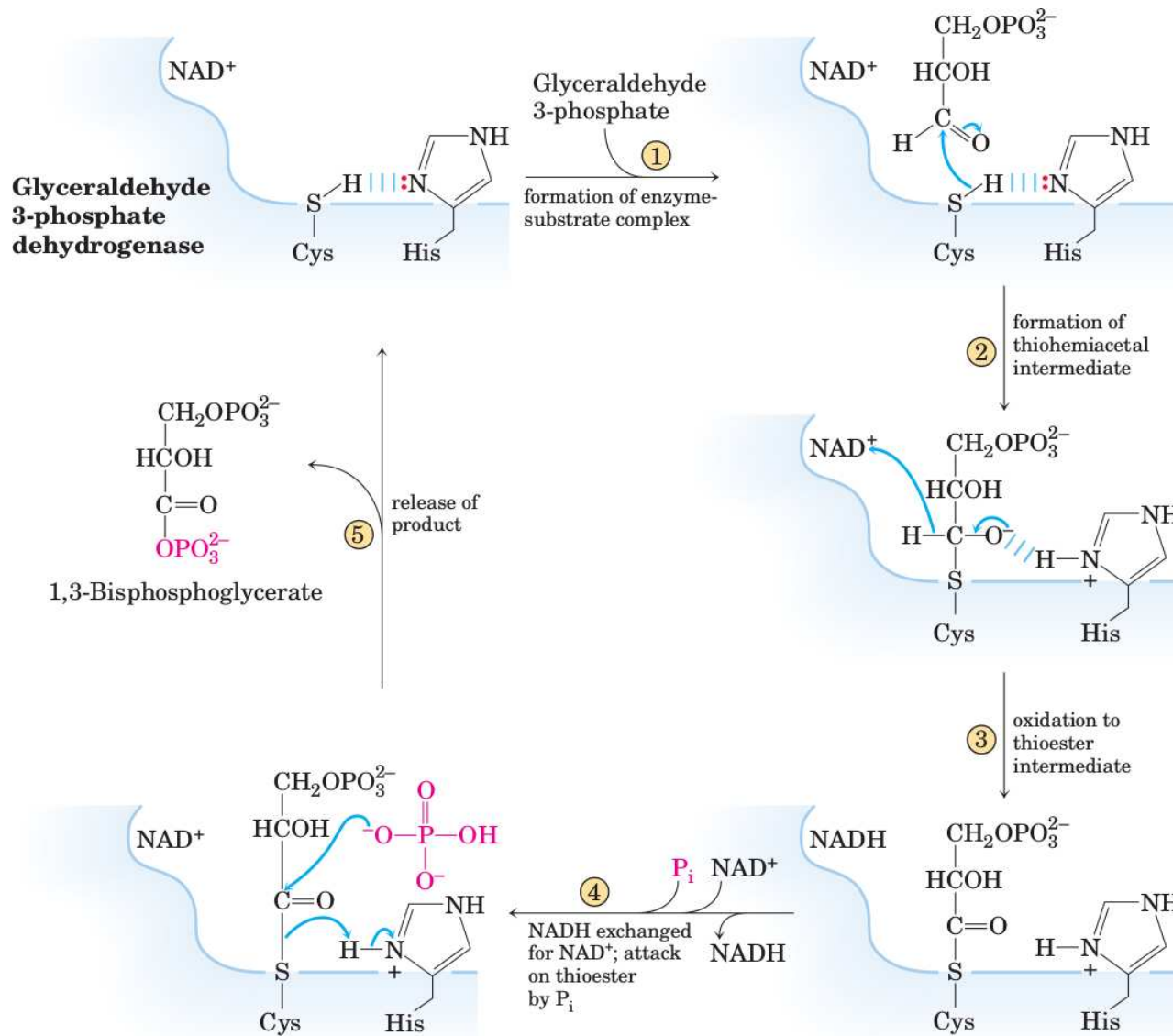
④ ring closing and dissociation



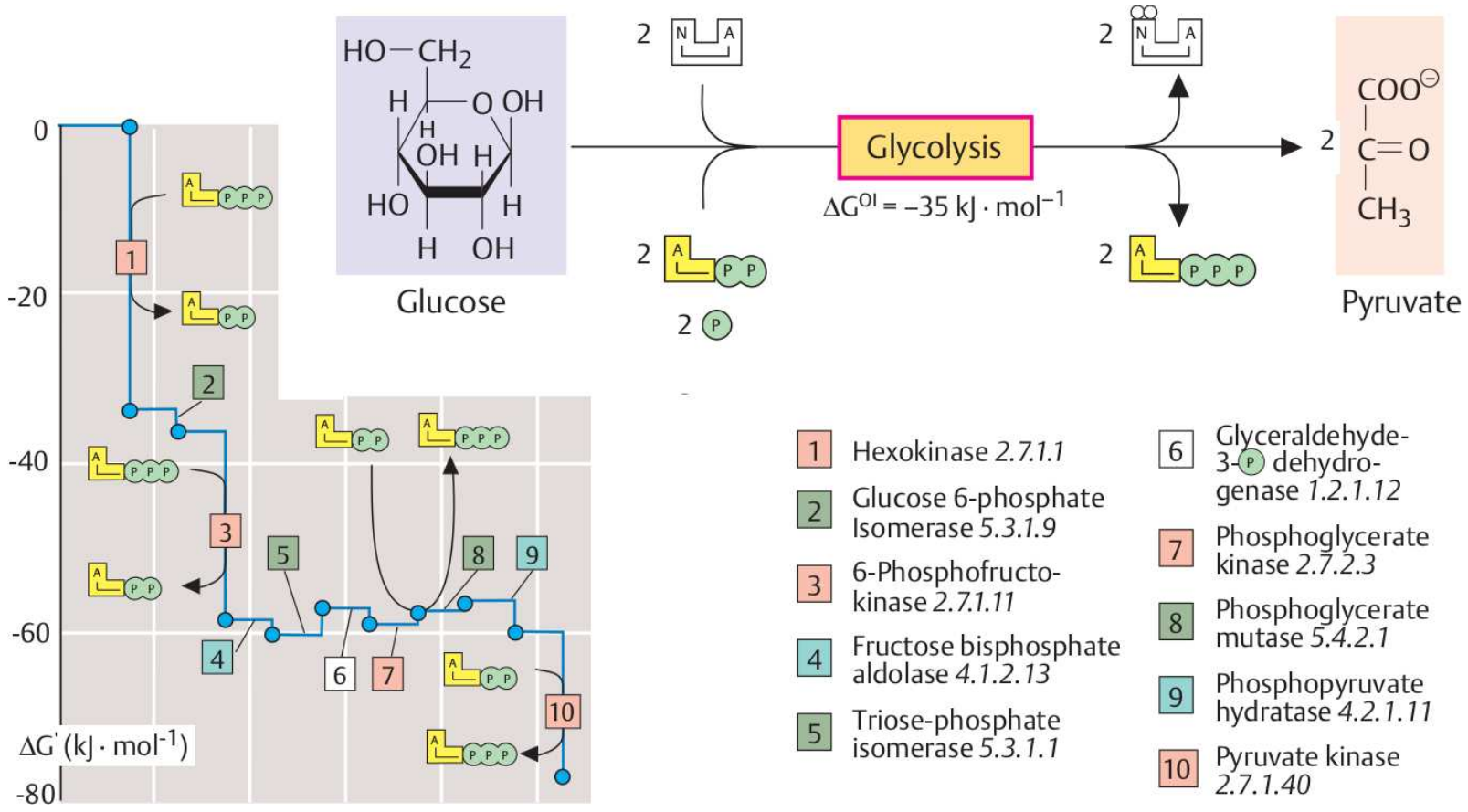
# Mecanismo: Aldolase



# Mecanismo: G3P desidrogenase



# Balanço energético



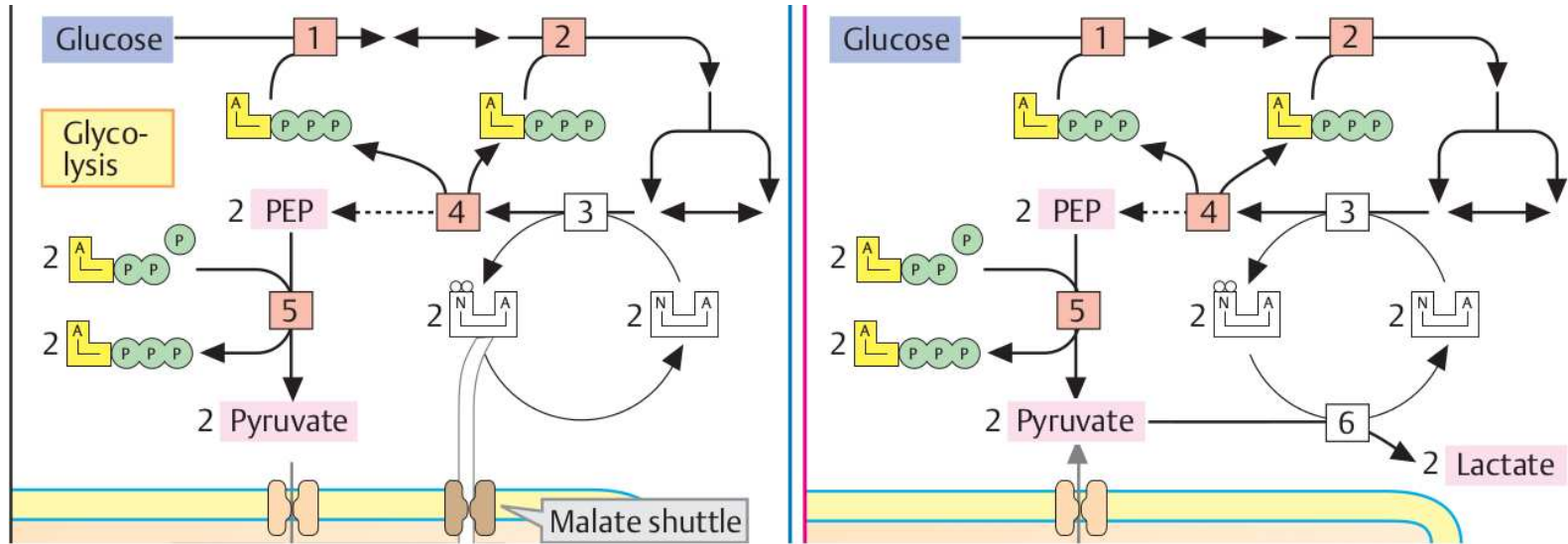
## Regulação

- Controle de longo prazo: síntese e degradação enzimática
- Curto prazo: alosteria
  - Hexoquinase: G6P ↓
  - Fosfofrutoquinase: ATP e citrato ↓ ; ADP e F2,6P ↑
  - Piruvato quinase: ATP, AcetilCoA, Ac. graxos ↓





# Glicólise: aeróbica × anaeróbica



ATP	Coenzymes	Enzymes	Coenzymes	ATP
-1	-1 ATP	1 Hexokinase	-1 ATP	-1
-2	-1 ATP	2 6-Phosphofruktokinase	-1 ATP	-2
+3	+5 ATP ← +2 NADH	3 Glyceraldehyde-3(P)DH	+2 NADH ←	-2
+5	+2 ATP	4 Phosphoglycerate kinase	+2 ATP	0
+7	+2 ATP	5 Pyruvate kinase	+2 ATP NAD <sup>+</sup> recycled	+2
		6 Lactate dehydrogenase	-2 NADH ←	

