

# BIOQUIMICA

## 1. Introducción

Concepto y contenido de la Bioquímica. Organización estructural de las células. El agua: su papel biológico.

## 2. Biomoléculas

Carbohidratos. Ácidos grasos y lípidos. Ácidos nucleicos. Proteínas. Vitaminas. Estructura y función de las biomembranas.

## 3. Enzimología

Concepto de actividad enzimática. Cinética e inhibición enzimática. Mecanismos de acción enzimática. Mecanismos reguladores de la actividad enzimática.

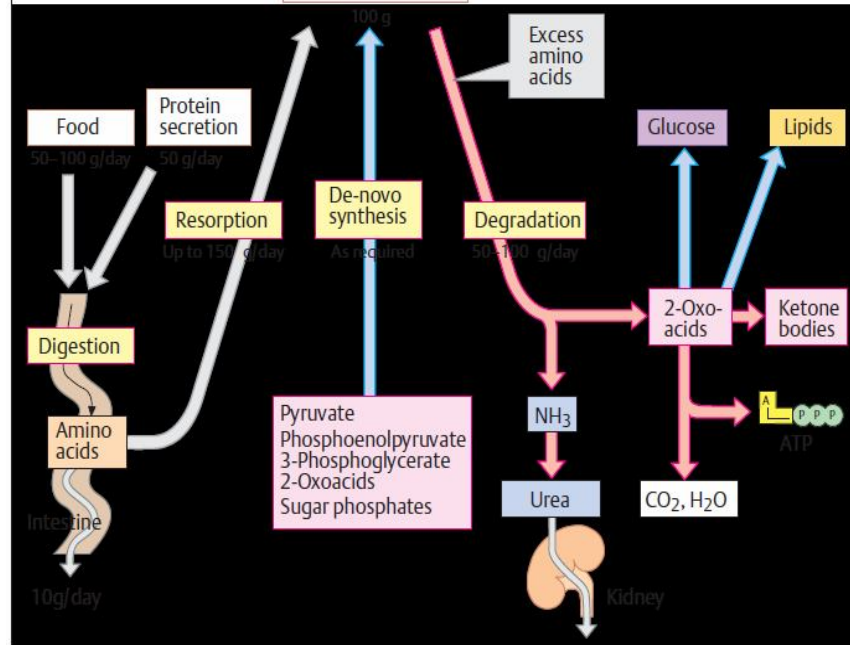
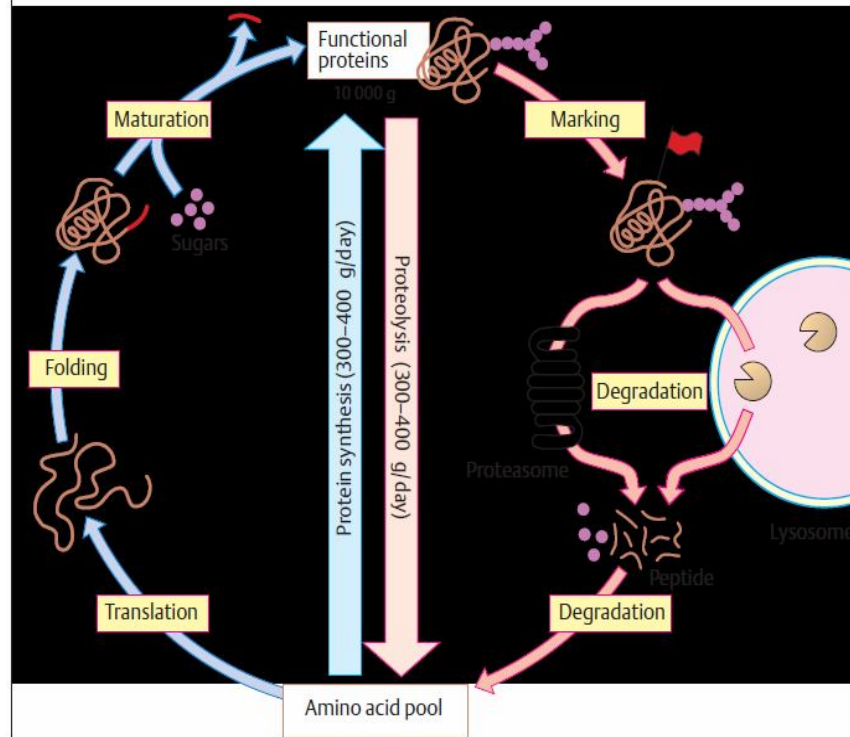
## 4. Metabolismo intermediario

Concepto de metabolismo y bioenergética. Glucólisis. Ciclo de los ácidos tricarboxílicos. Ruta de las pentosas. Cadena de transporte electrónico y fosforilación oxidativa. Gluconeogénesis. Metabolismo del glucógeno. Fotosíntesis. Metabolismo de los lípidos. [Metabolismo del nitrógeno](#).

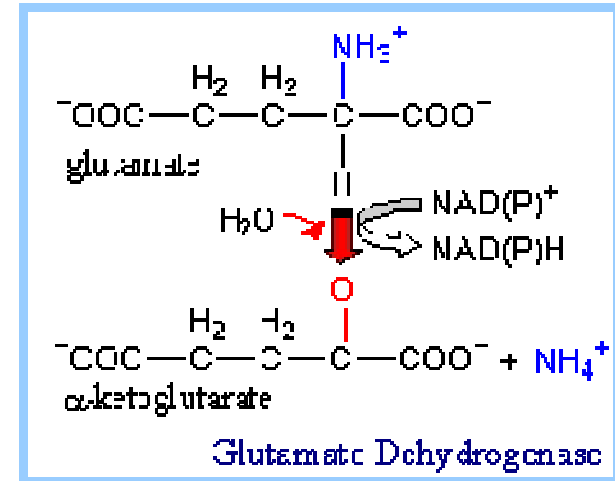
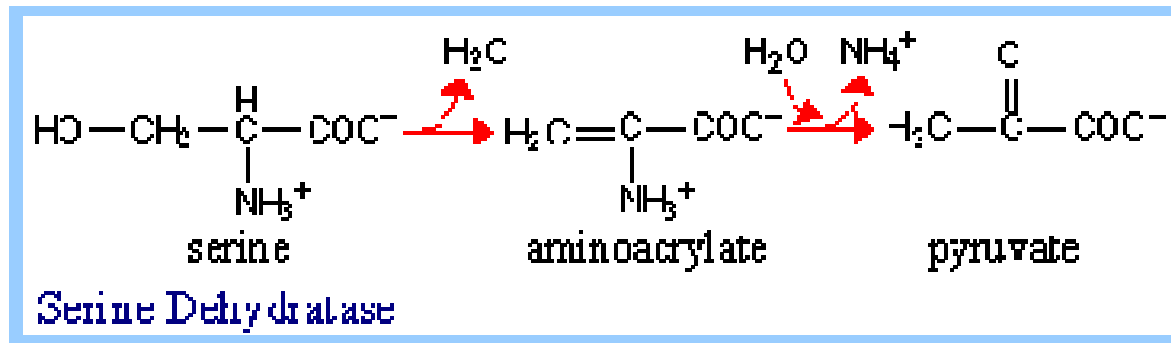
## 5. Flujo de la información genética

Replicación. Transcripción. Traducción y procesamiento de proteínas. Aspectos básicos de la regulación de la expresión genética.

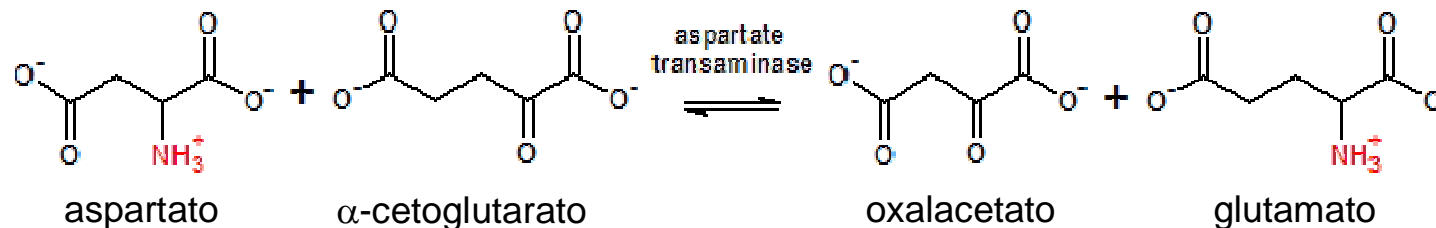
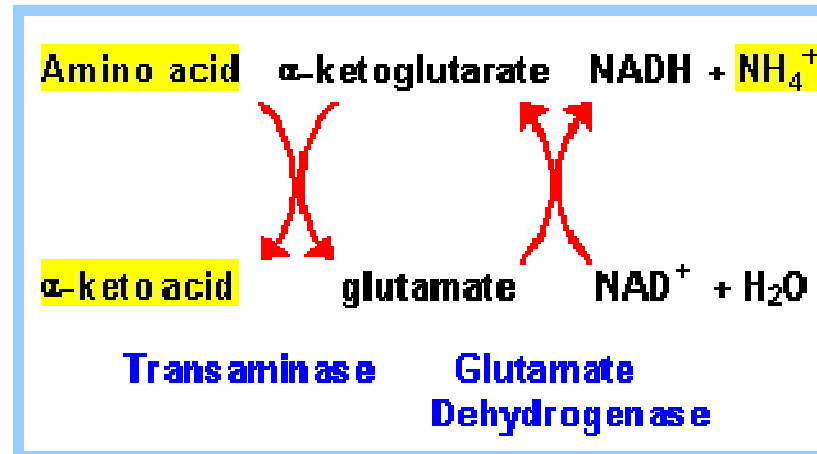
A. Protein metabolism: overview



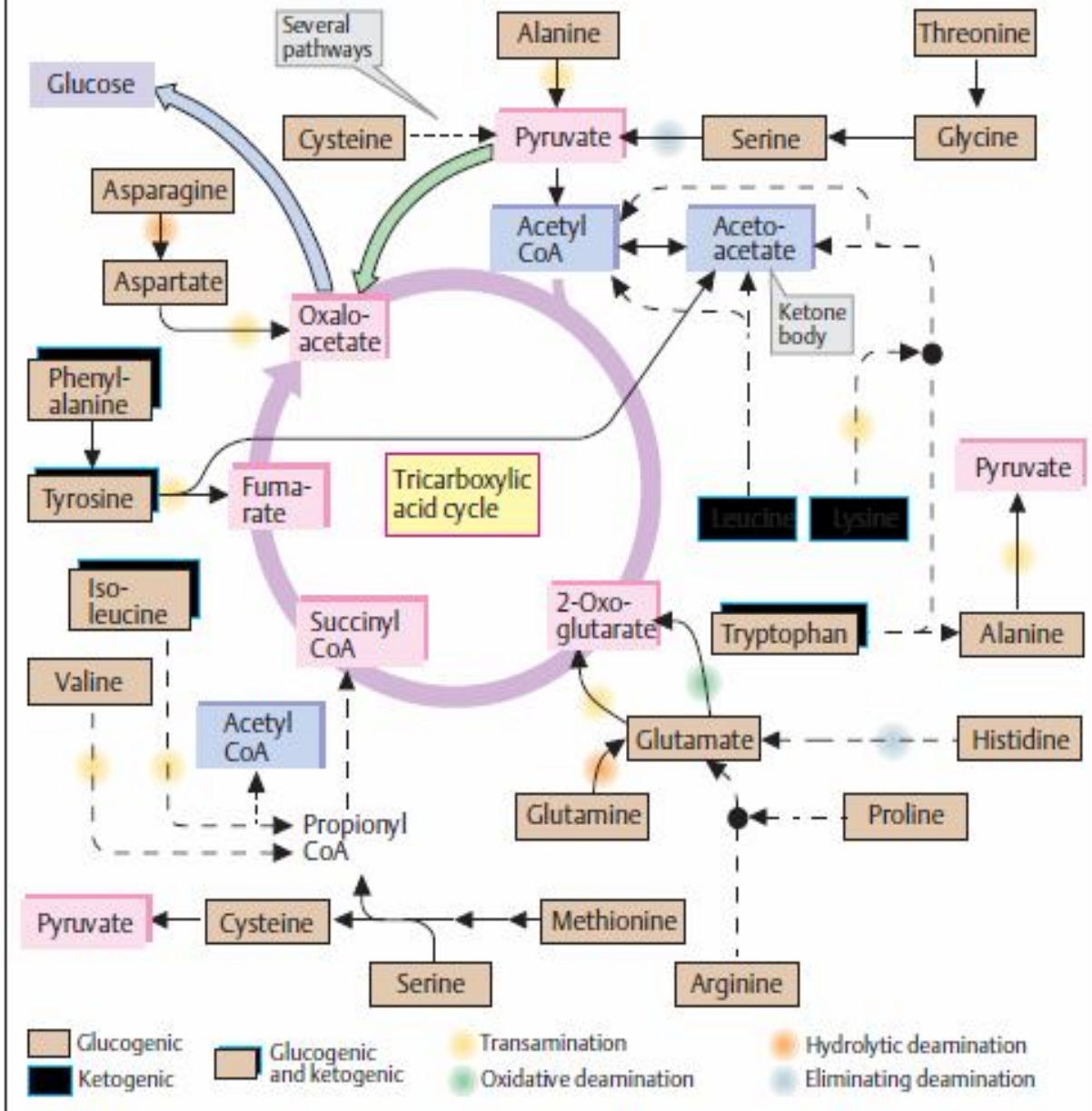
## Eliminación directa del grupo amino



## Eliminación del grupo amino a través del glutámico



### A. Amino acid degradation: overview

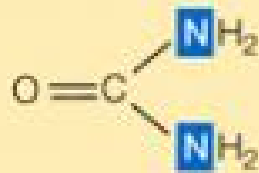




Ammonia



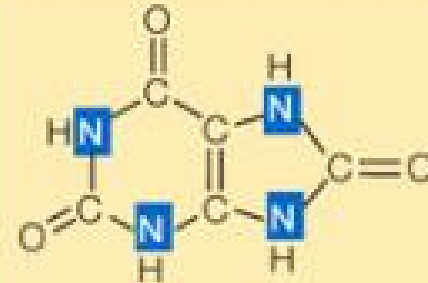
Ammonotelic animals  
(aquatic invertebrates  
and most bony fishes)



Urea



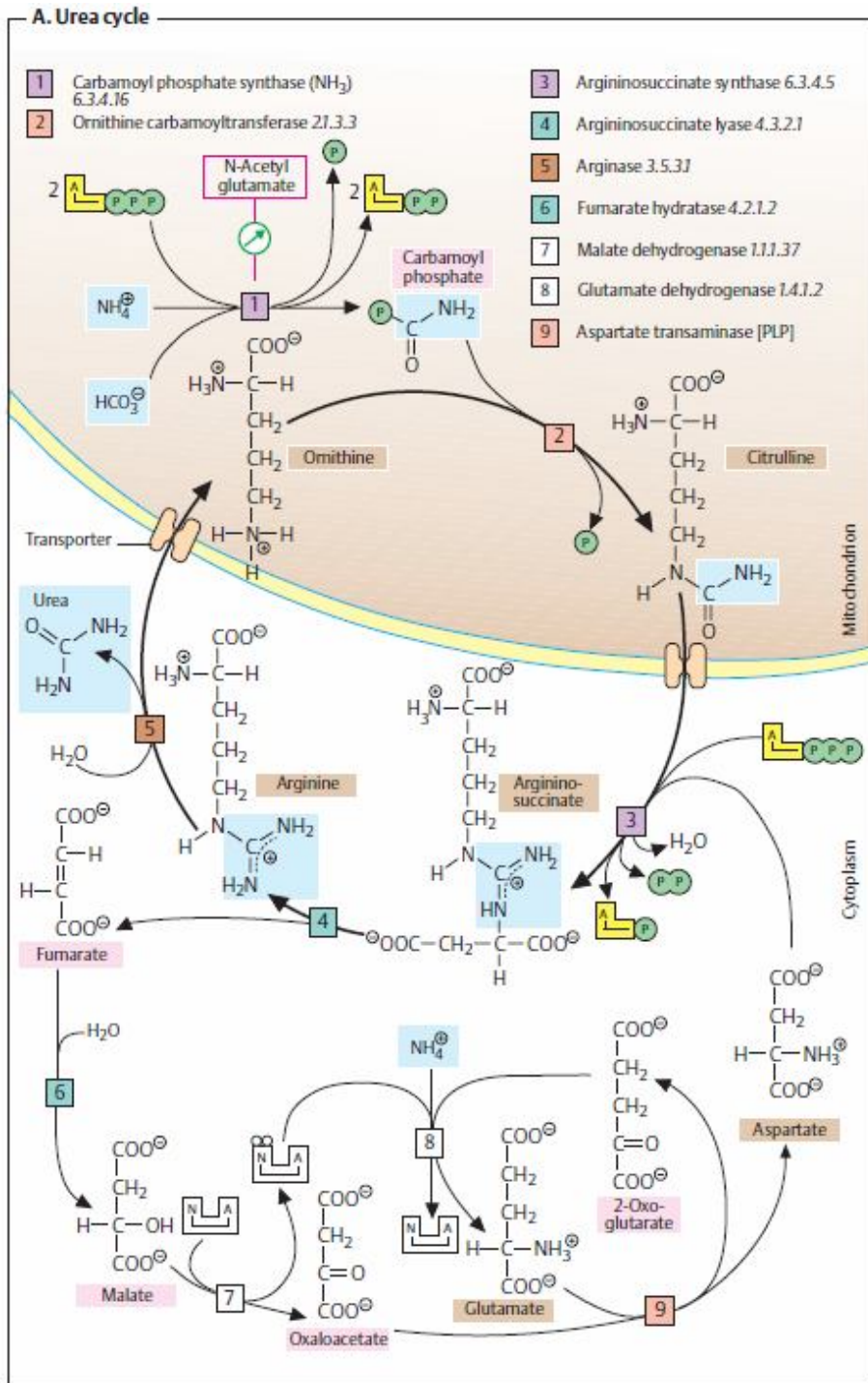
Ureotelic animals (mammals,  
most amphibians,  
cartilaginous fishes)



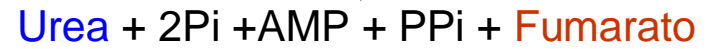
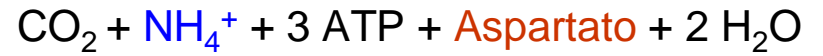
Uric acid



Uricotelic animals  
(birds, insects, reptiles)



Ciclo de la urea:



Ciclo de Krebs:

Fumarato



Malato

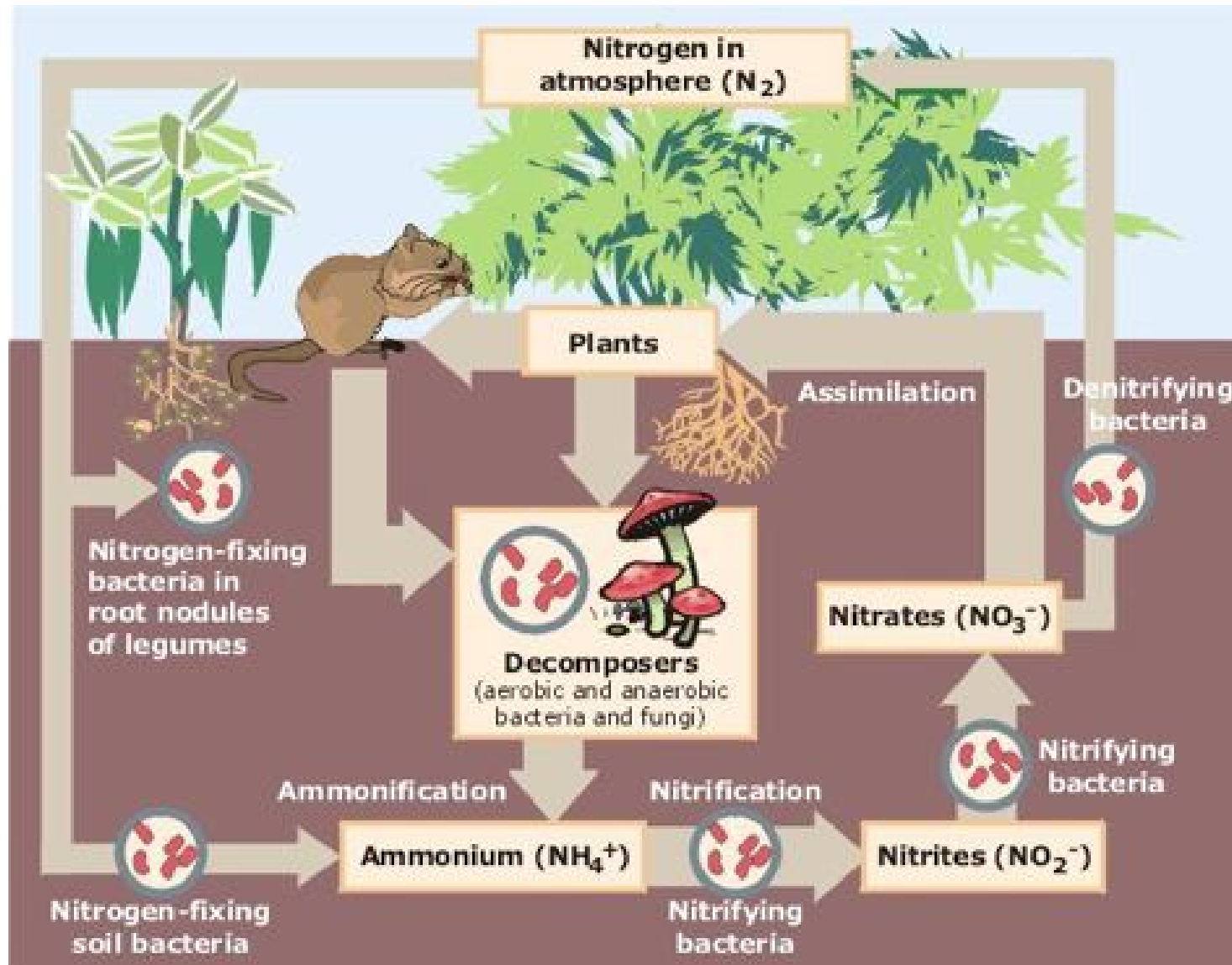


Oxalacetato



Aspartato





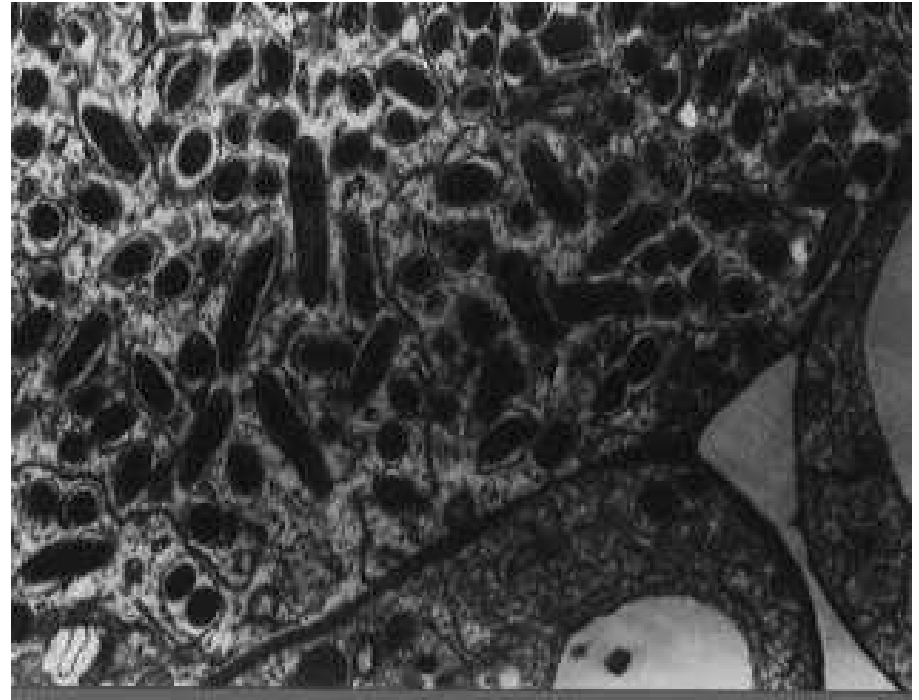
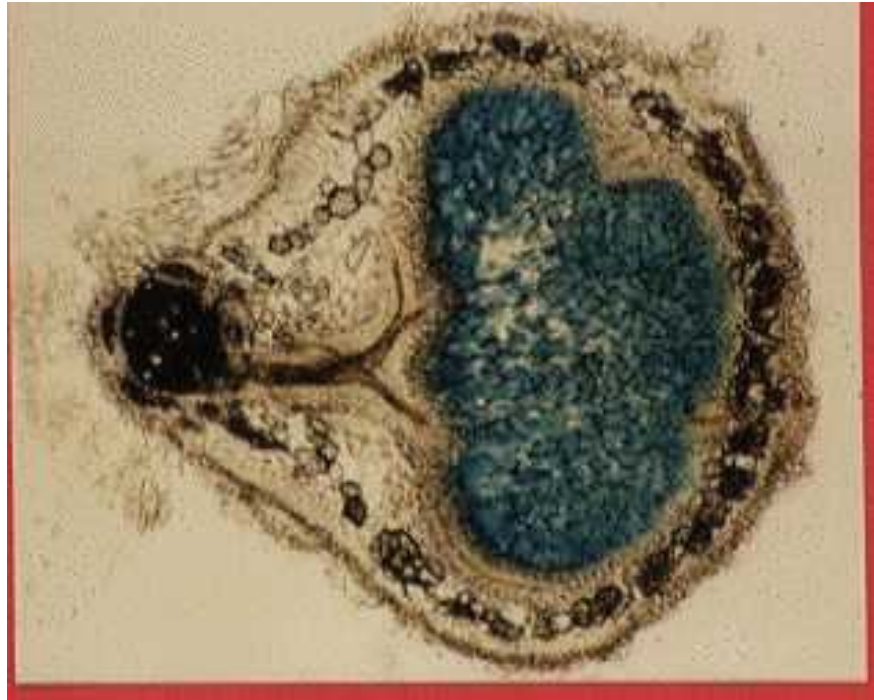
*Soja*

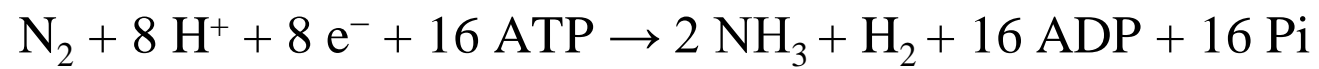
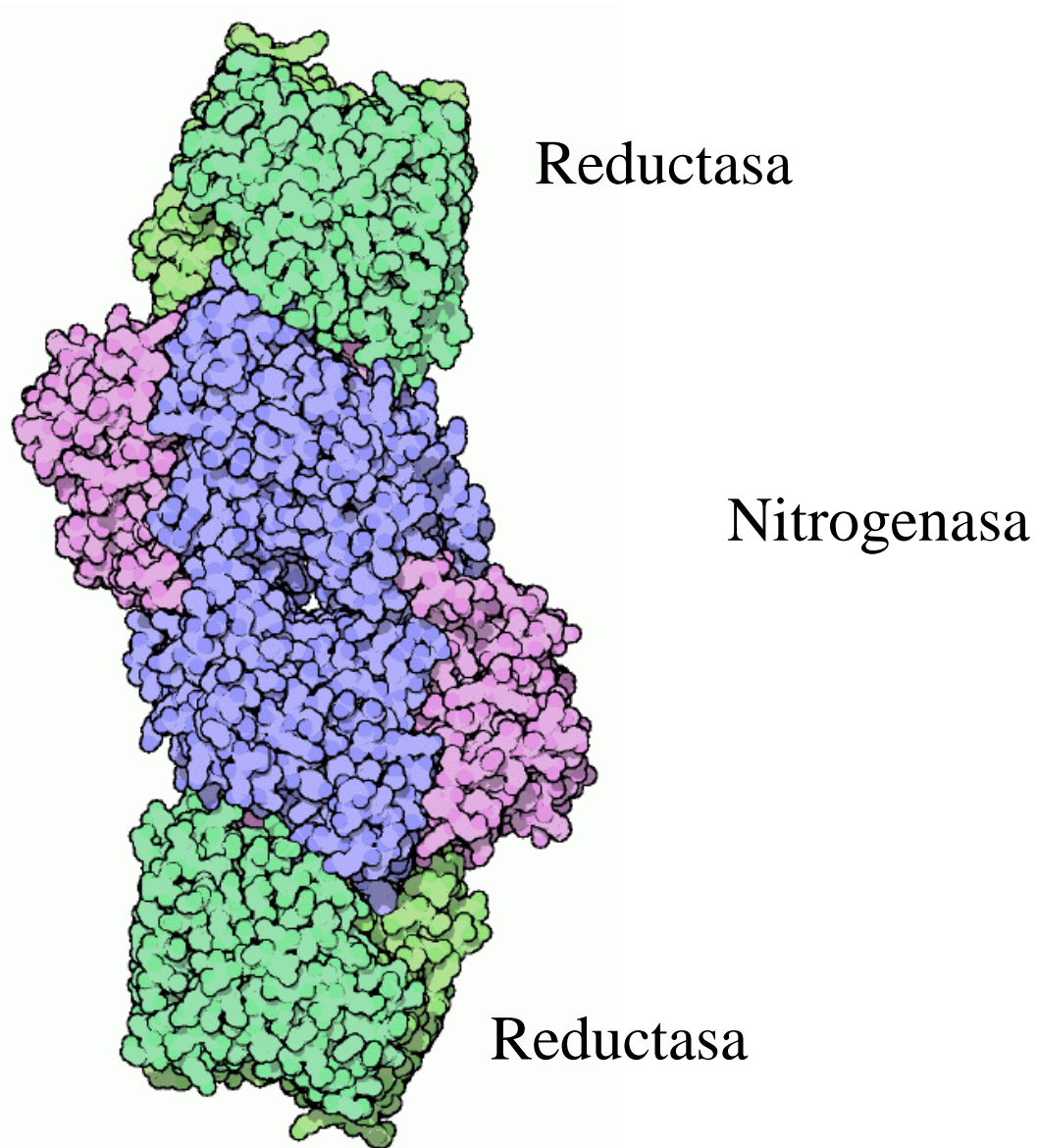


*Aeschynomene afraspera*









## Essential amino acids

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"Standard" list	For weight gain in protein-starved adult rats	For positive nitrogen balance in adult humans
Phenylalanine	Phenylalanine	Phenylalanine
Valine	Valine	Valine
Threonine	Threonine	Threonine
Tryptophan	Tryptophan	Tryptophan
Isoleucine	Isoleucine	Isoleucine
Methionine	Methionine	Methionine
Histidine	Histidine	
Arginine		
Leucine	Leucine	Leucine
Lysine	Lysine	Lysine

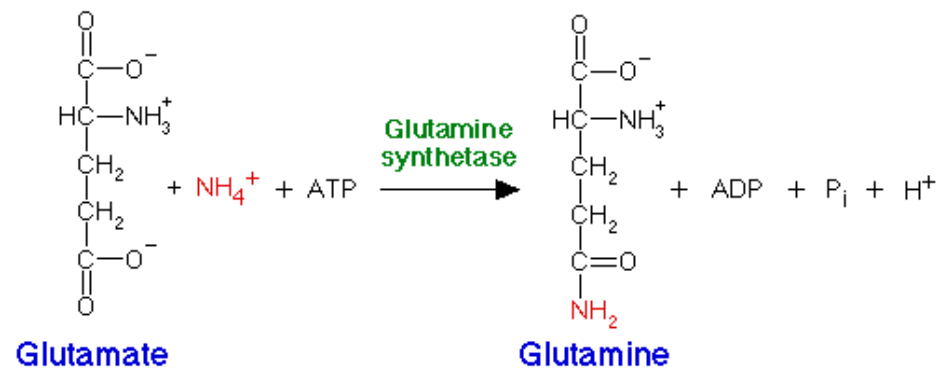
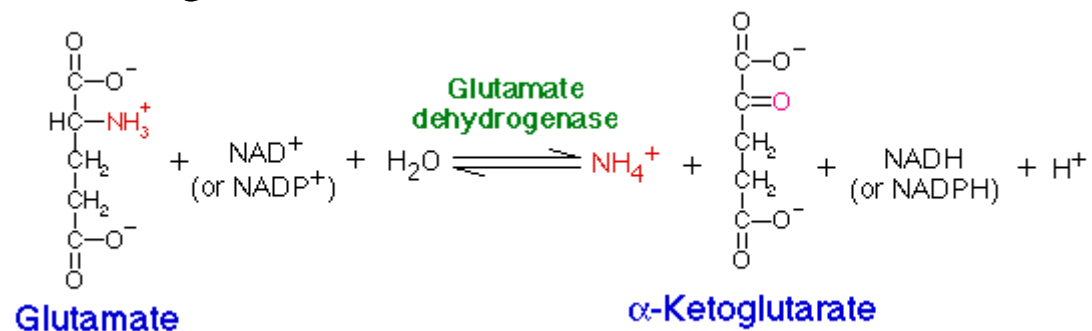
G. I. Zubay, *Biochemistry*, 1998, Wm. C. Brown, N.Y.

## Origin of nonessential amino acids

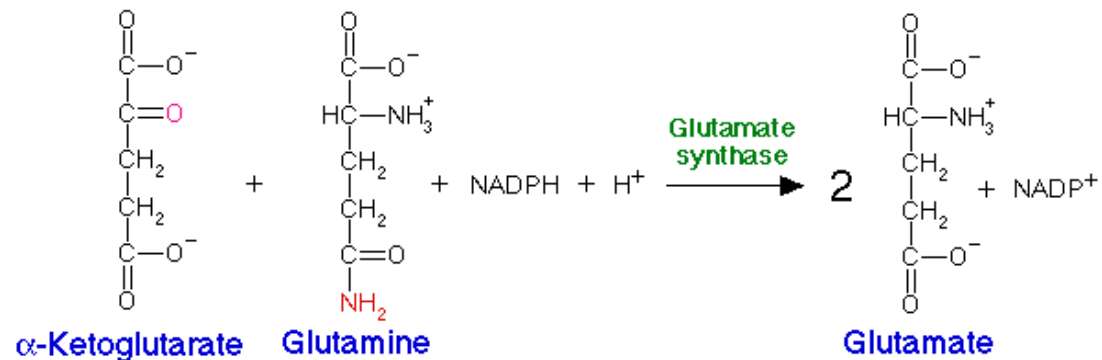
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<b>Alanine</b>	<b>from pyruvate</b>
<b>Aspartic acid</b>	<b>from citric acid cycle intermediates</b>
<b>Asparagine</b>	
<b>Arginine</b>	
<b>Glutamic acid</b>	
<b>Glutamine</b>	
<b>Proline</b>	
<b>Serine</b>	<b>from 3-phosphoglycerate</b>
<b>Glycine</b>	<b>from serine</b>
<b>Cysteine</b>	<b>from serine (Sulfur from methionine)</b>
<b>Tyrosine</b>	<b>from phenylalanine</b>

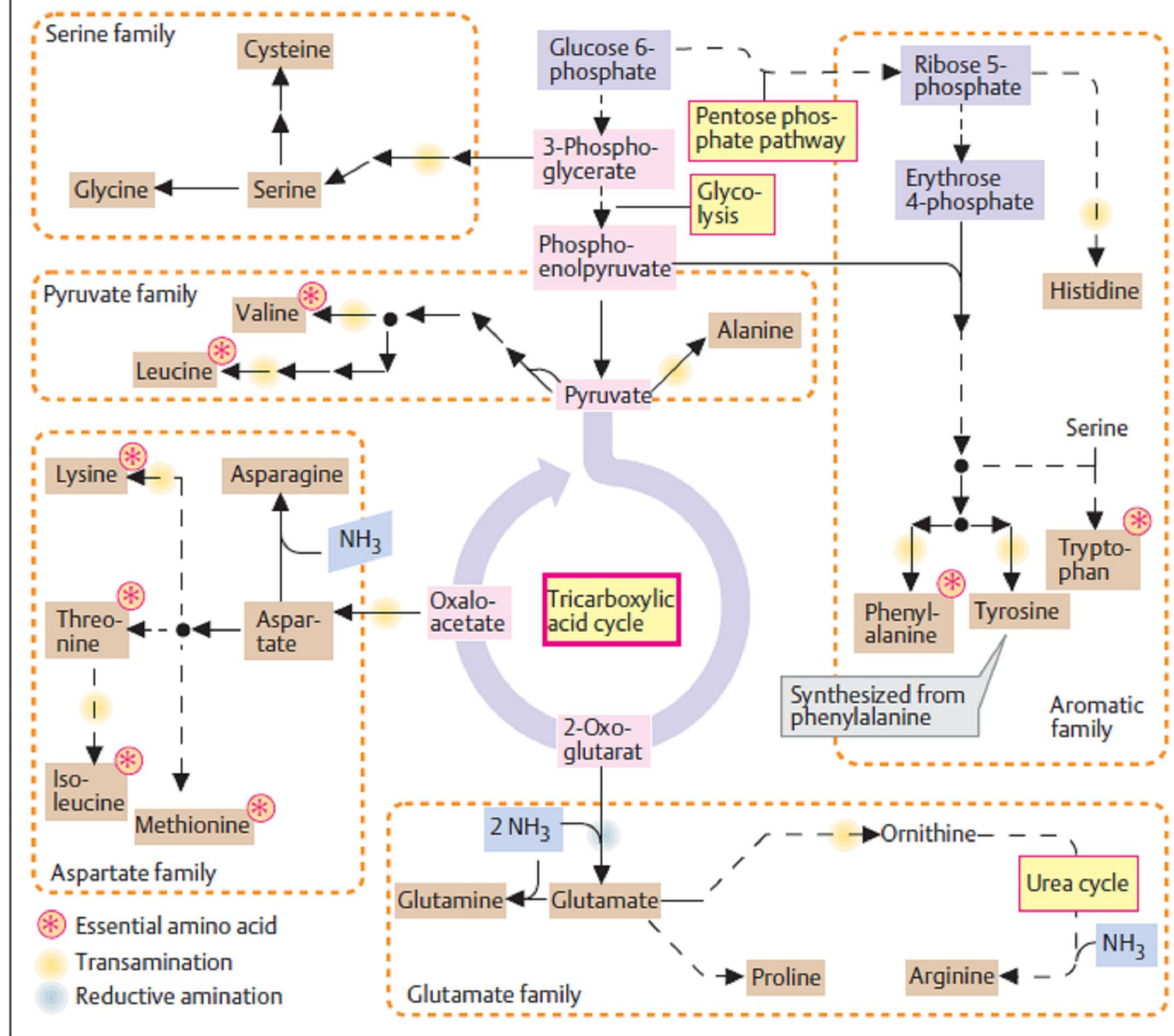
En todos los organismos

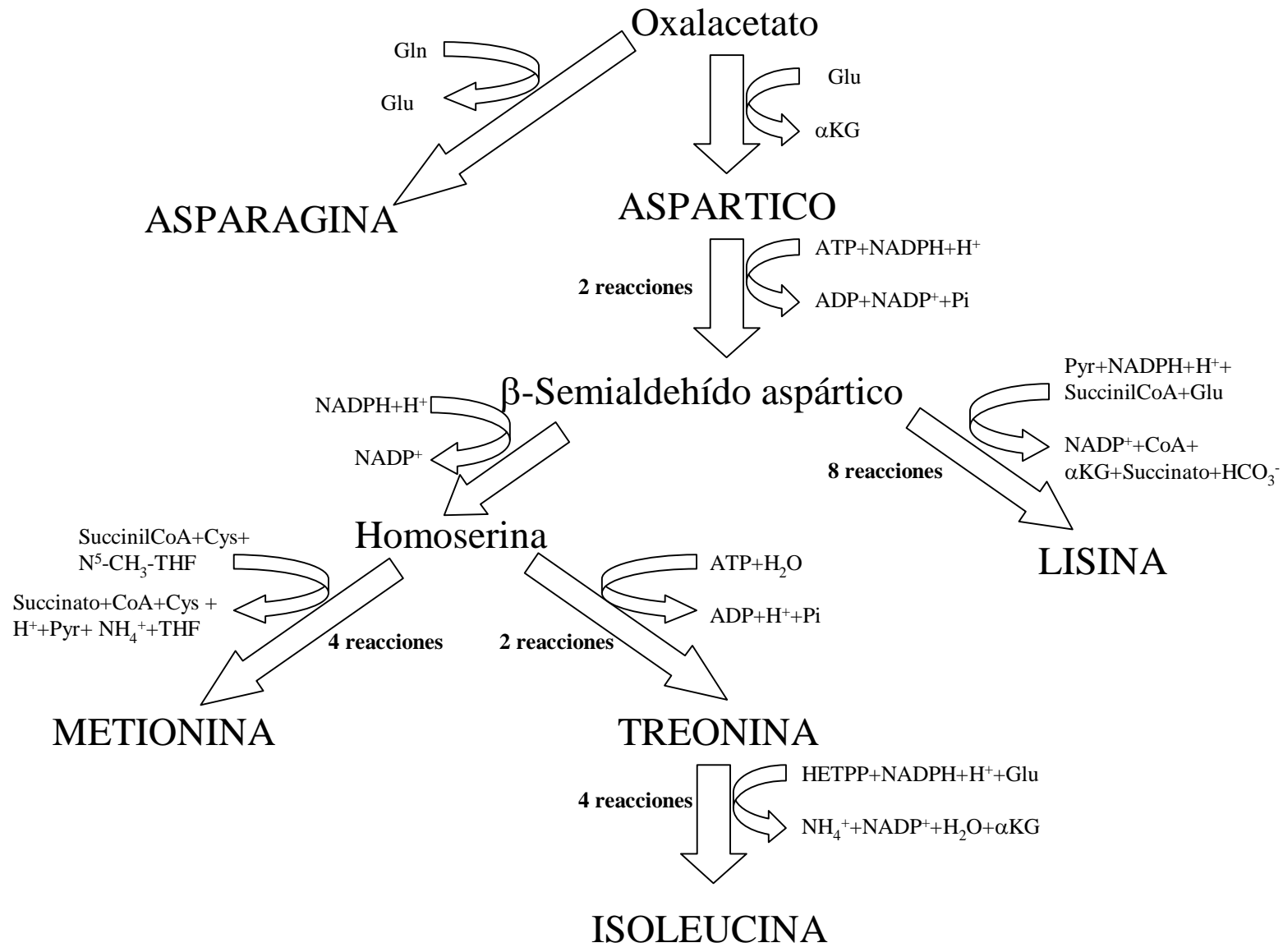


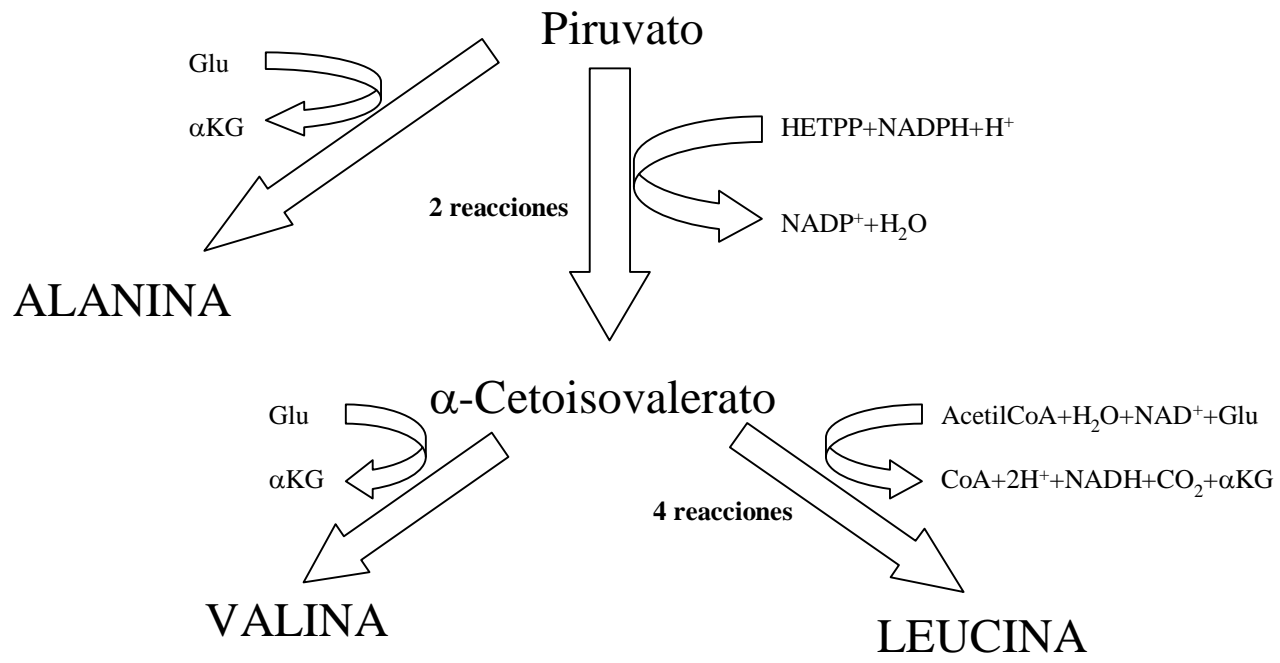
En la mayoría de los procariontes



## B. Amino acid biosynthesis: overview

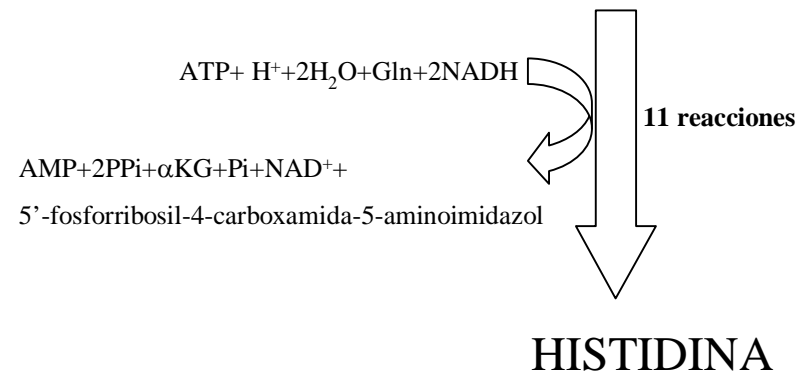


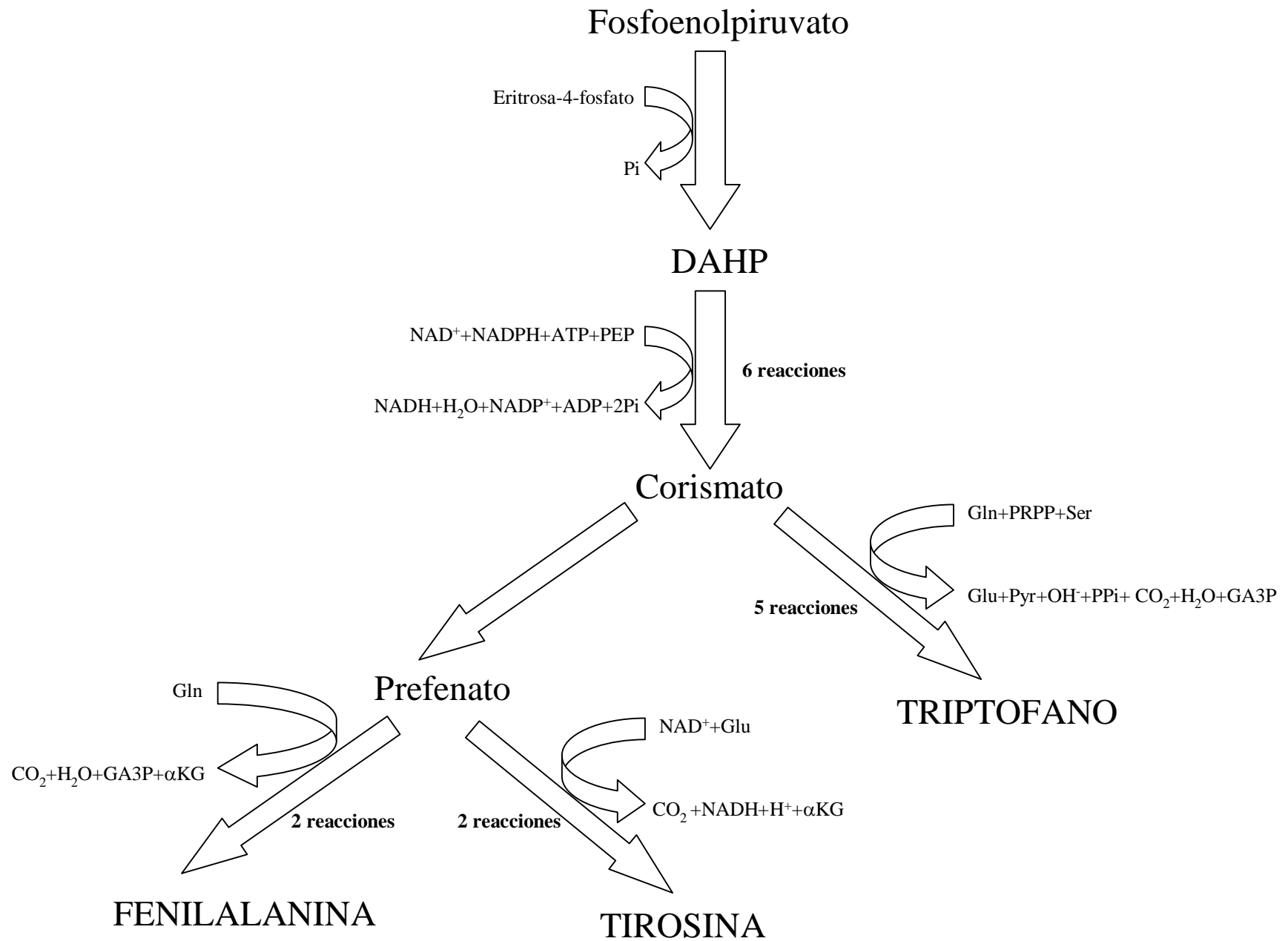


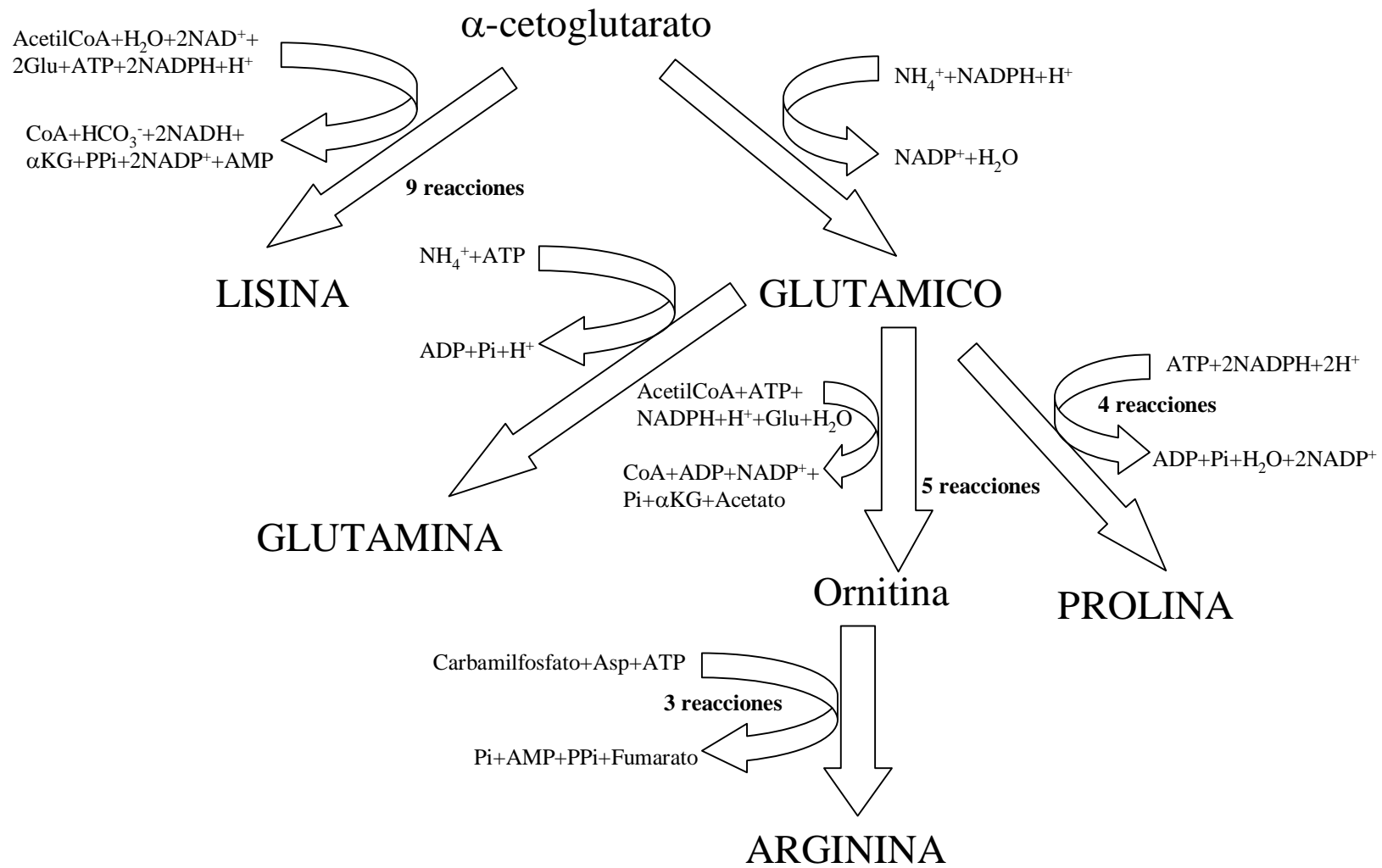




Ribosa-5-fosfato







3-Fosfo-D-glicerato

$\text{NAD}^+ + \text{Glu} + \text{H}_2\text{O}$

$\text{NADH} + \text{H}^+ + \alpha\text{KG} + \text{Pi}$

3 reacciones

SERINA

THF

$\text{NADH} + \text{H}^+ + \alpha\text{KG} + \text{Pi}$

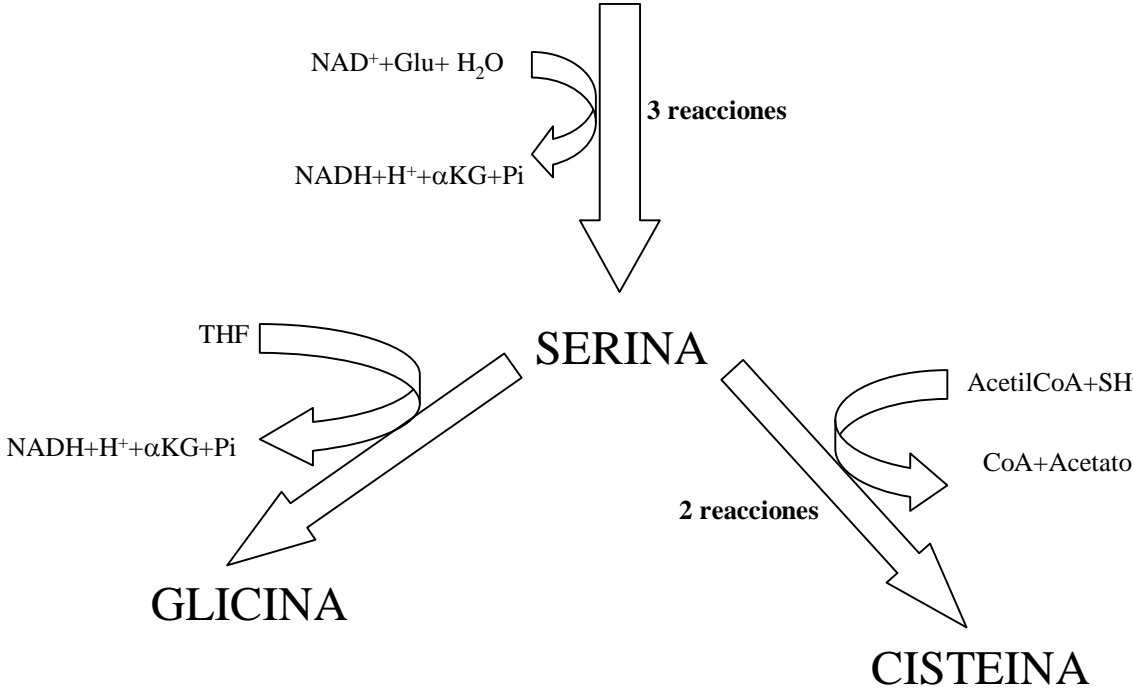
GLICINA

AcetilCoA+SH

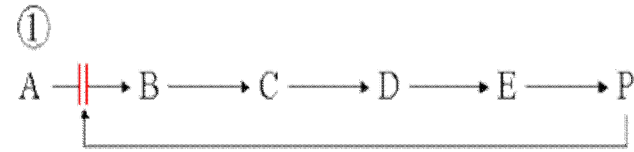
CoA+Acetato

2 reacciones

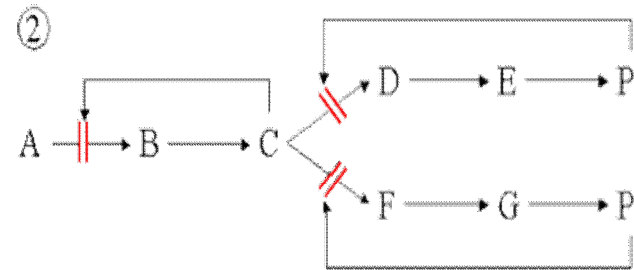
CISTEINA



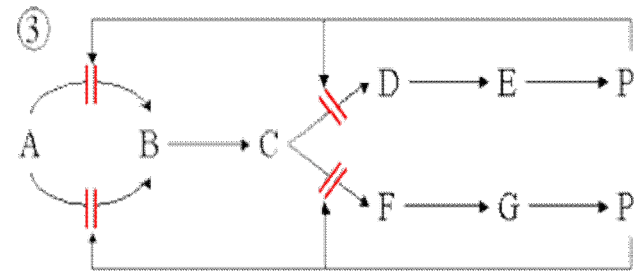
Retroinhibición



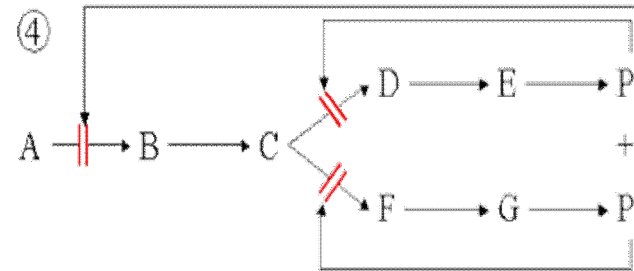
Retroinhibición secuencial



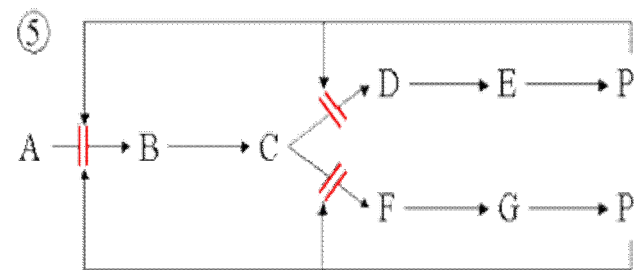
Retroinhibición diferencial de enzimas múltiples



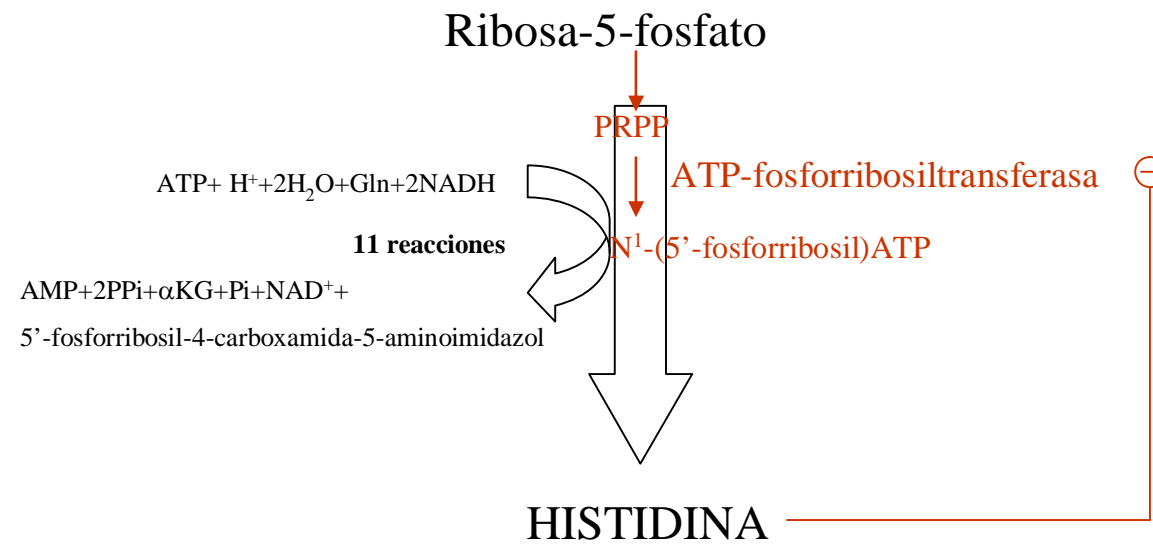
Retroinhibición concertada



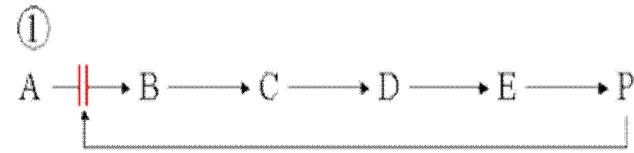
Retroinhibición acumulativa



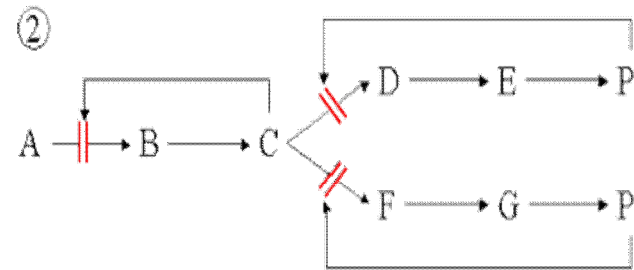
*Escherichia coli*



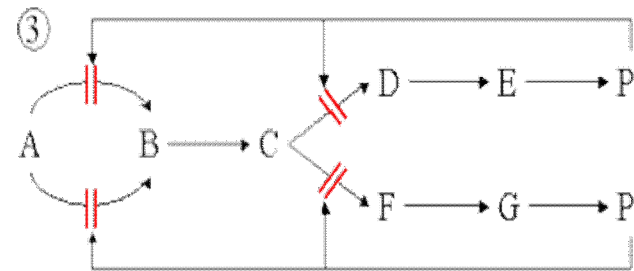
Retroinhibición



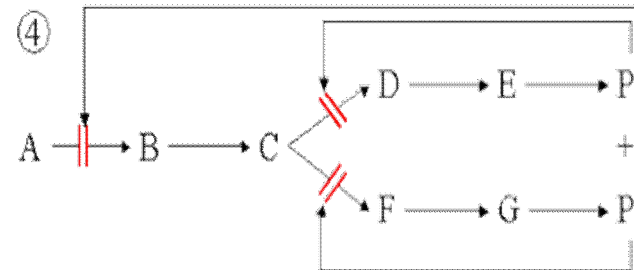
Retroinhibición secuencial



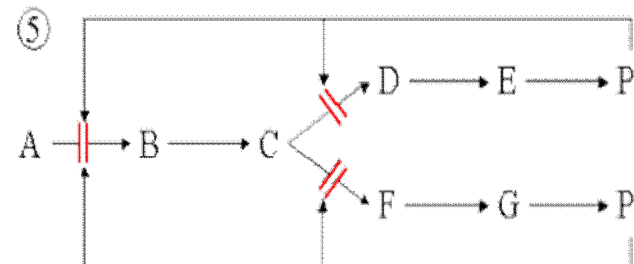
Retroinhibición diferencial de enzimas múltiples



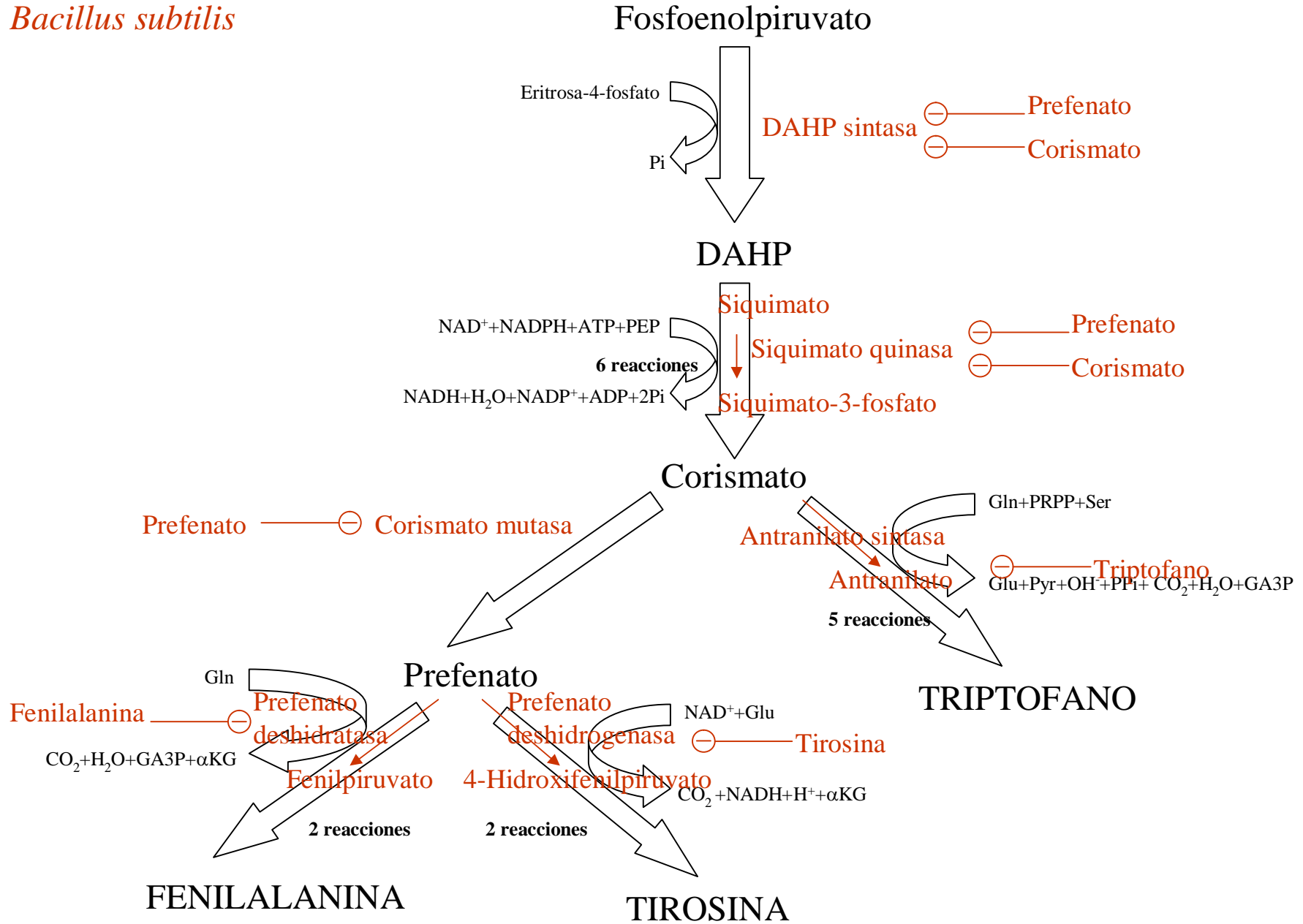
Retroinhibición concertada



Retroinhibición acumulativa

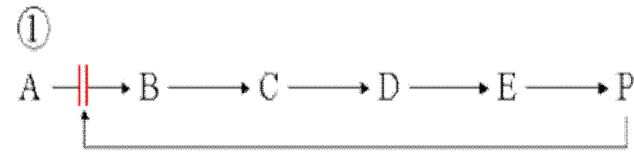


*Bacillus subtilis*

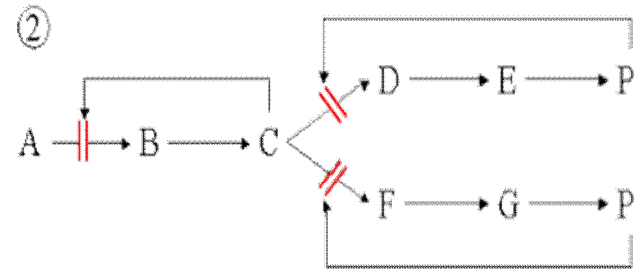




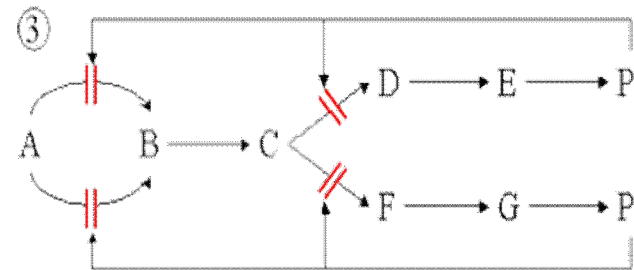
Retroinhibición



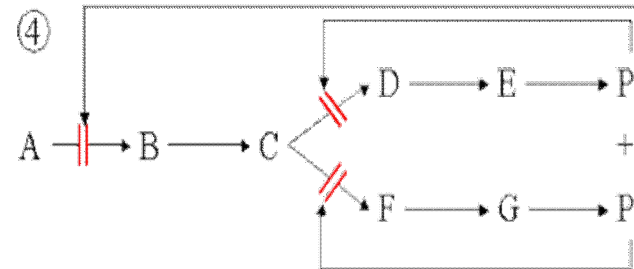
Retroinhibición secuencial



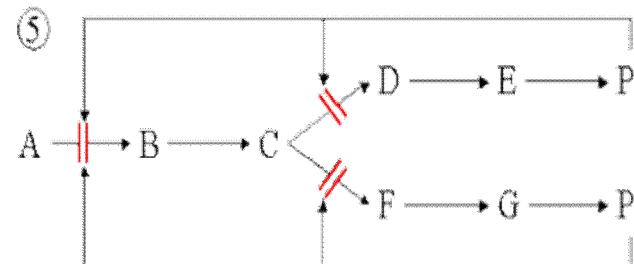
Retroinhibición diferencial de enzimas múltiples



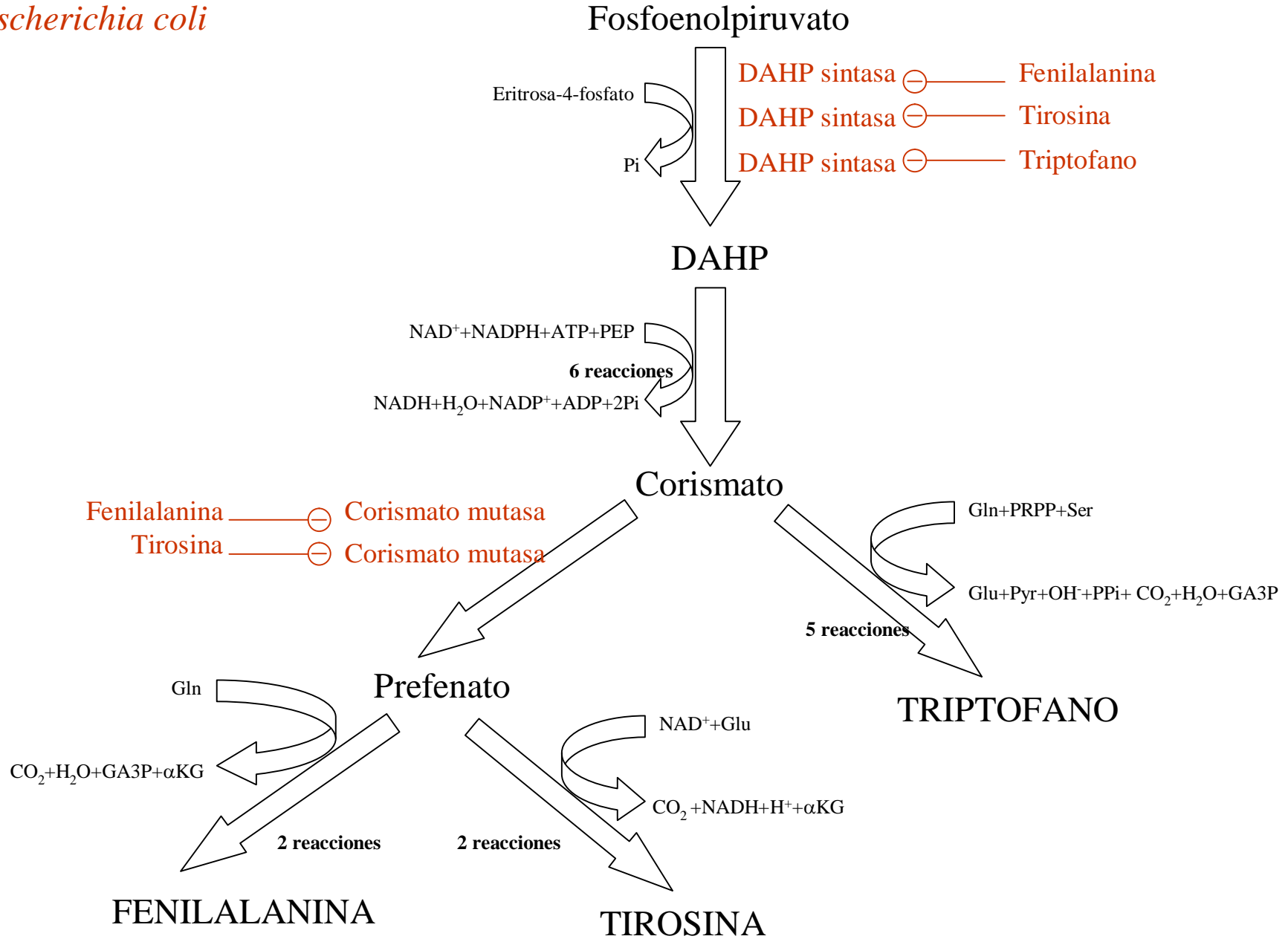
Retroinhibición concertada



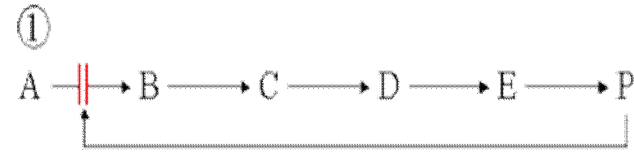
Retroinhibición acumulativa



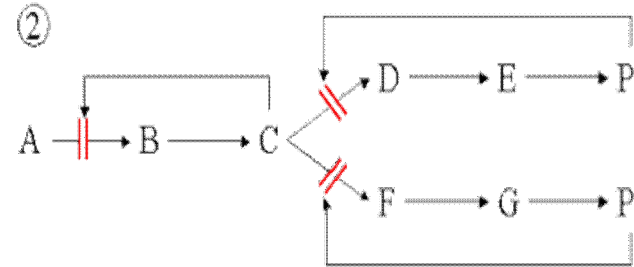
*Escherichia coli*



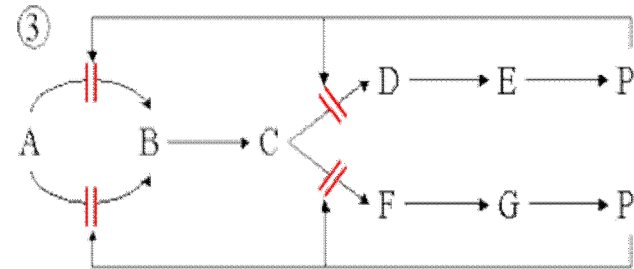
Retroinhibición



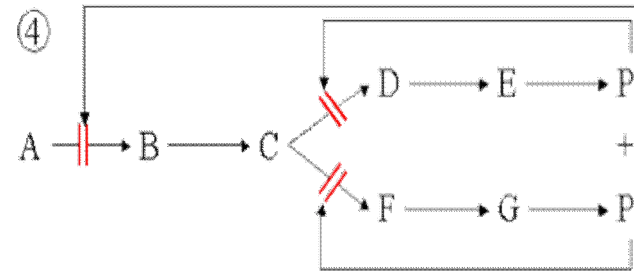
Retroinhibición secuencial



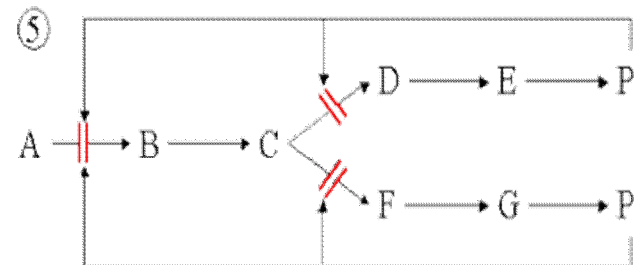
Retroinhibición diferencial de enzimas múltiples

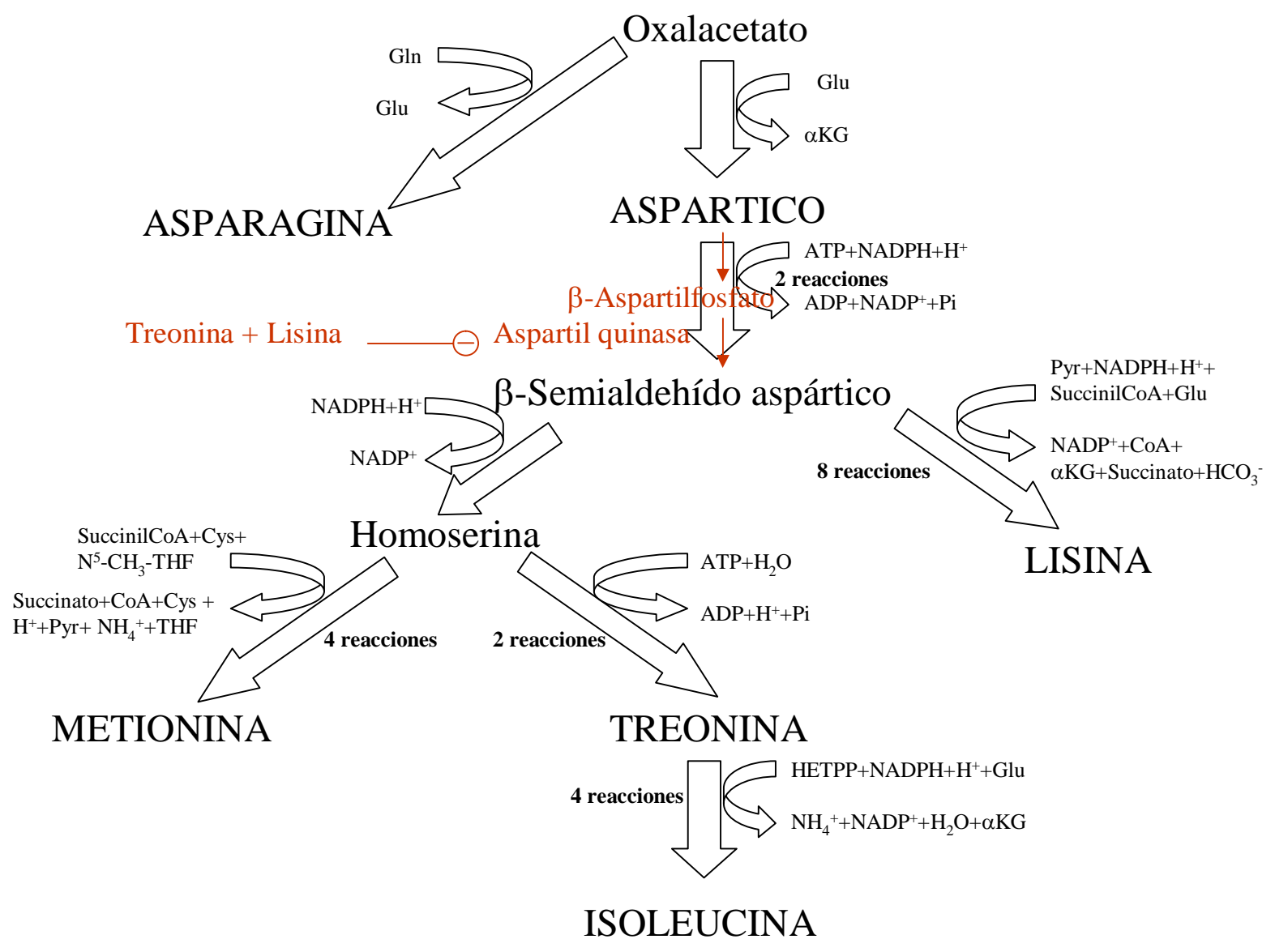


Retroinhibición concertada

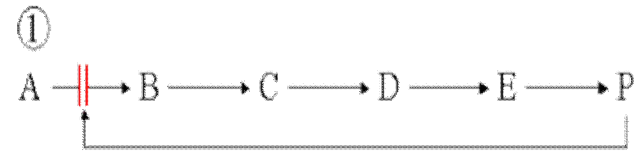


Retroinhibición acumulativa

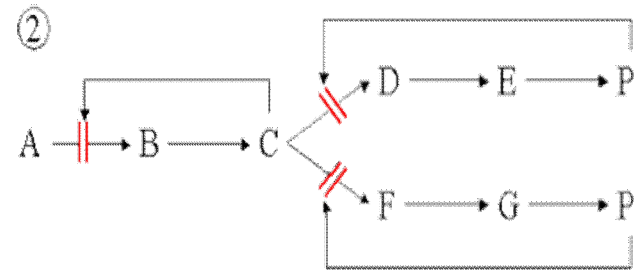




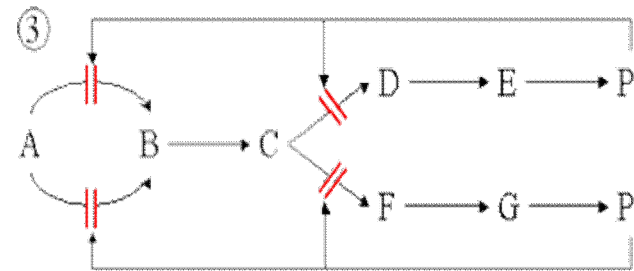
Retroinhibición



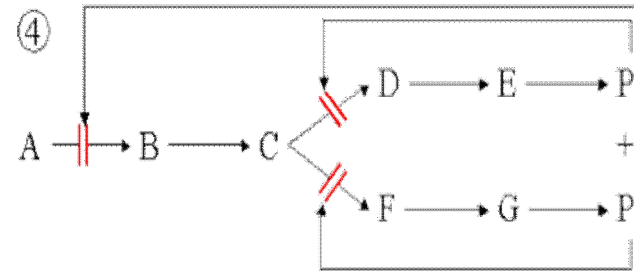
Retroinhibición secuencial



Retroinhibición diferencial de enzimas múltiples



Retroinhibición concertada



Retroinhibición acumulativa

