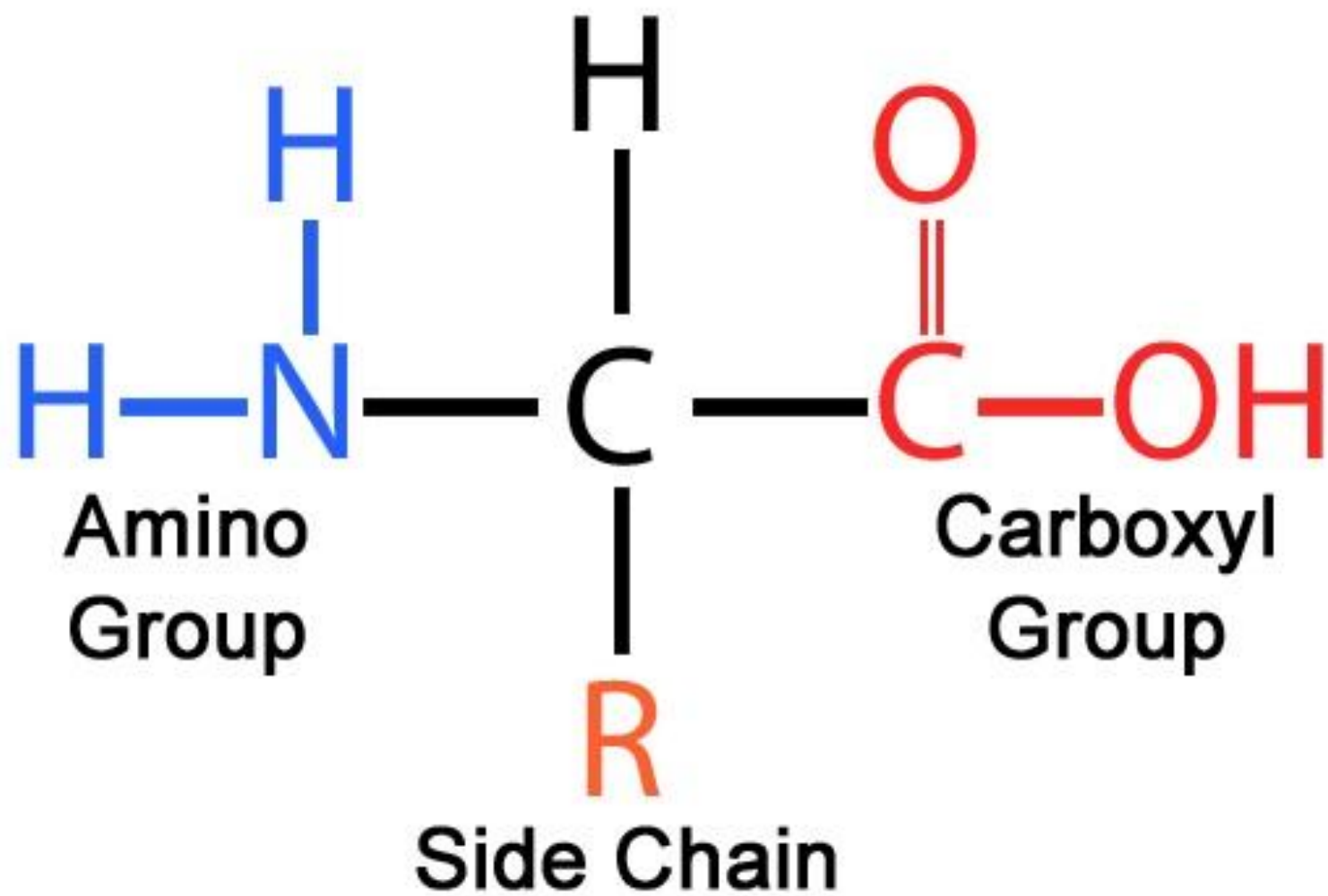
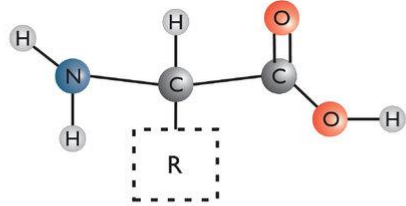


پروتئین





Nonpolar			Polar		
Glycine (G)	Alanine (A)	Proline (P)	Serine (S)	Threonine (T)	
Valine (V)	Leucine (L)	Isoleucine (I)	Glutamine (Q)	Asparagine (N)	
Sulfur containing			Aromatic		
Cysteine (C)	Methionine (M)		Phenylalanine (F)	Tyrosine (Y)	Tryptophan (W)
Positively charged*			Negatively charged*		
Histidine (H)	Lysine (L)	Arginine (R)	Aspartic acid (D)	Glutamic acid (E)	

Essential

Histidine

Isoleucine

Leucine

Lysine

Methionine

Phenylalanine

Threonine

Tryptophan

Valine

Conditionally Non-Essential

Arginine

Cystine

Glutamine

Glycine

Proline

Tyrosine

Non-Essential

Alanine

Asparagine

Aspartate

Glutamate

Serine

انواع اسید های آمینه

TABLE 4.1 The 21 Proteinogenic Amino Acids

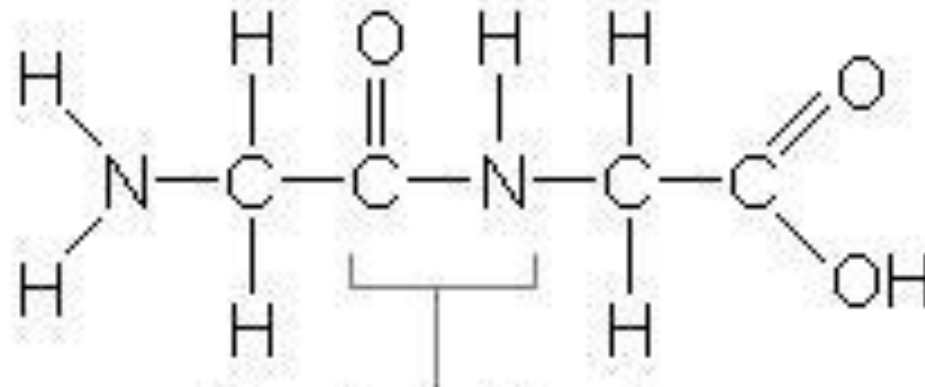
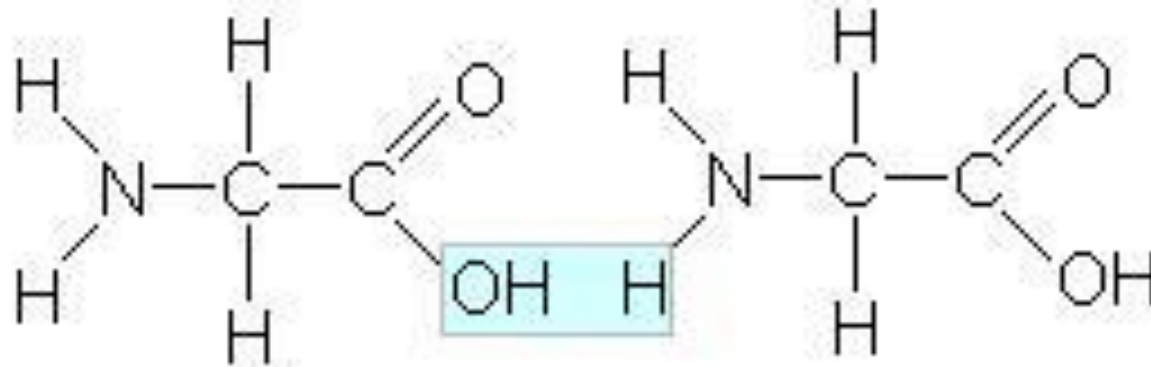
Essential (9)	Conditionally essential (7)	Nonessential (5)
Histidine (H)	Arginine (R)	Alanine (A)
Isoleucine (I)	Cysteine (C)	Aspartic acid (D)
Leucine (L)	Glutamine (Q)	Asparagine (N)
Lysine (K)	Glycine (G)	Glutamic acid (E)
Methionine (M)	Proline (P)	Selenocysteine (U)
Phenylalanine (F)	Serine (S)	
Threonine (T)	Tyrosine (Y)	
Tryptophan (W)		
Valine (V)		

TABLE 4.2 Examples of Common Nonproteinogenic Amino Acid Supplement Ingredients

Beta-alanine
Carnosine*
Citrulline
D-aspartic acid

اسیدهای آمینه ضروری، غیر ضروری، نیمه ضروری و اسید های آمینه غیر پروتئینی

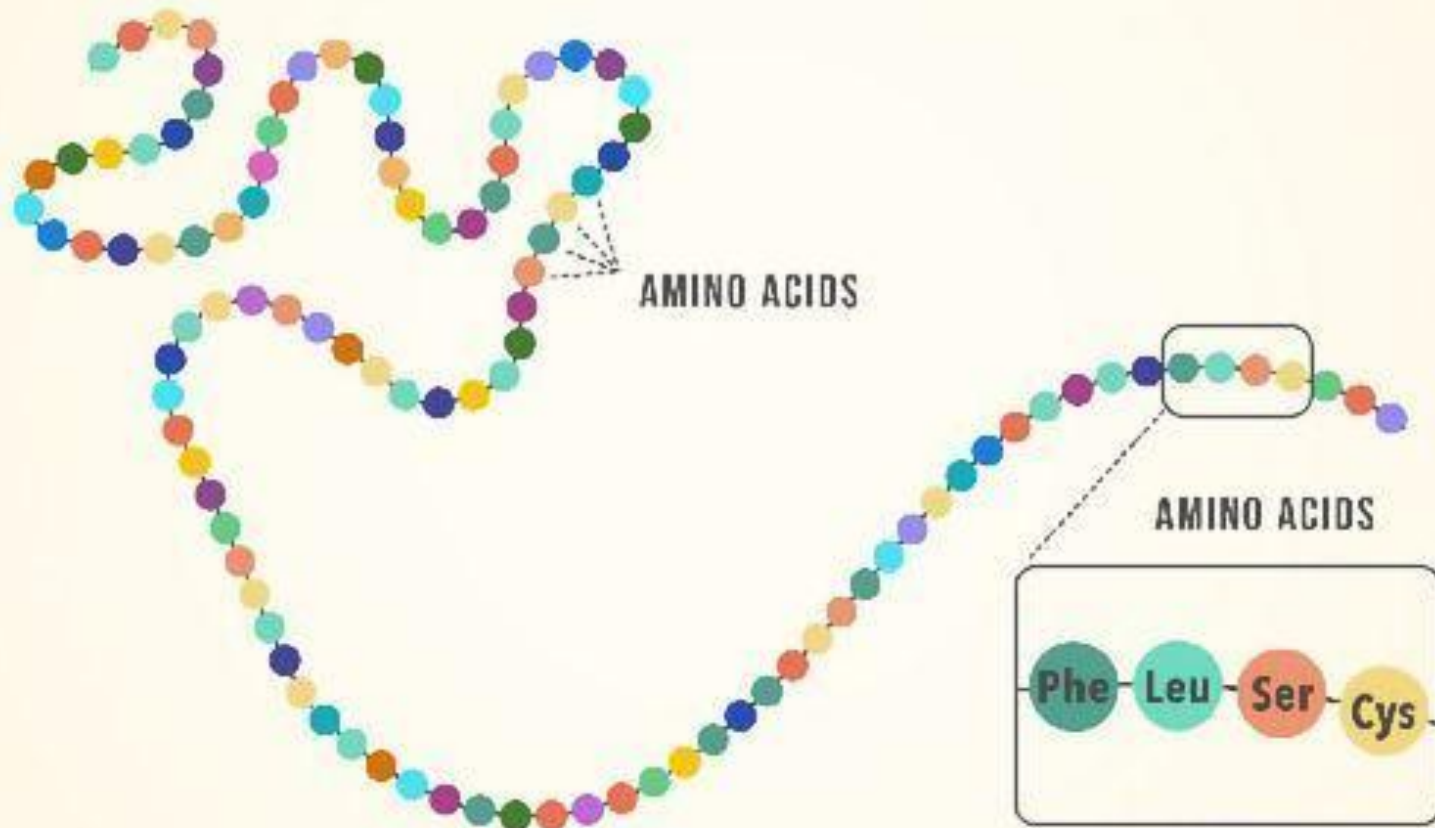
پیوند پتیدی



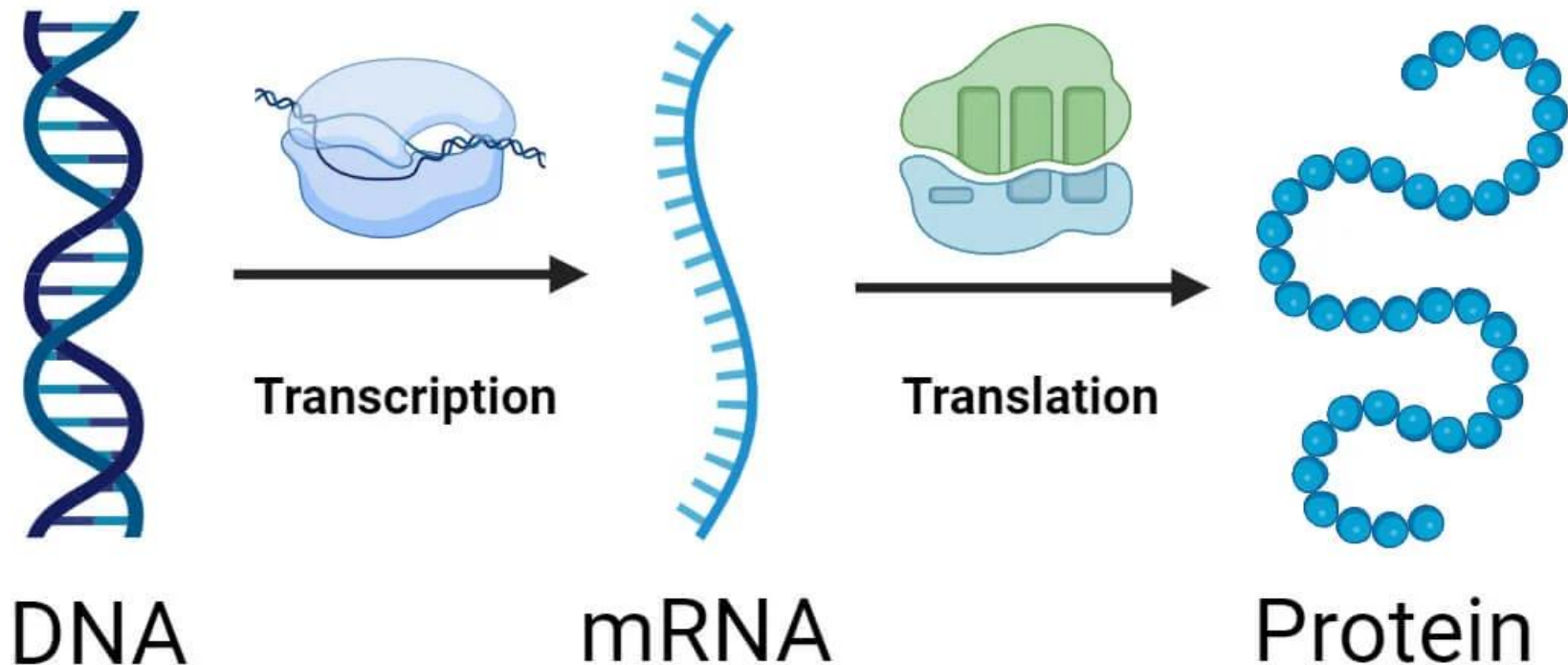
Peptide Bond

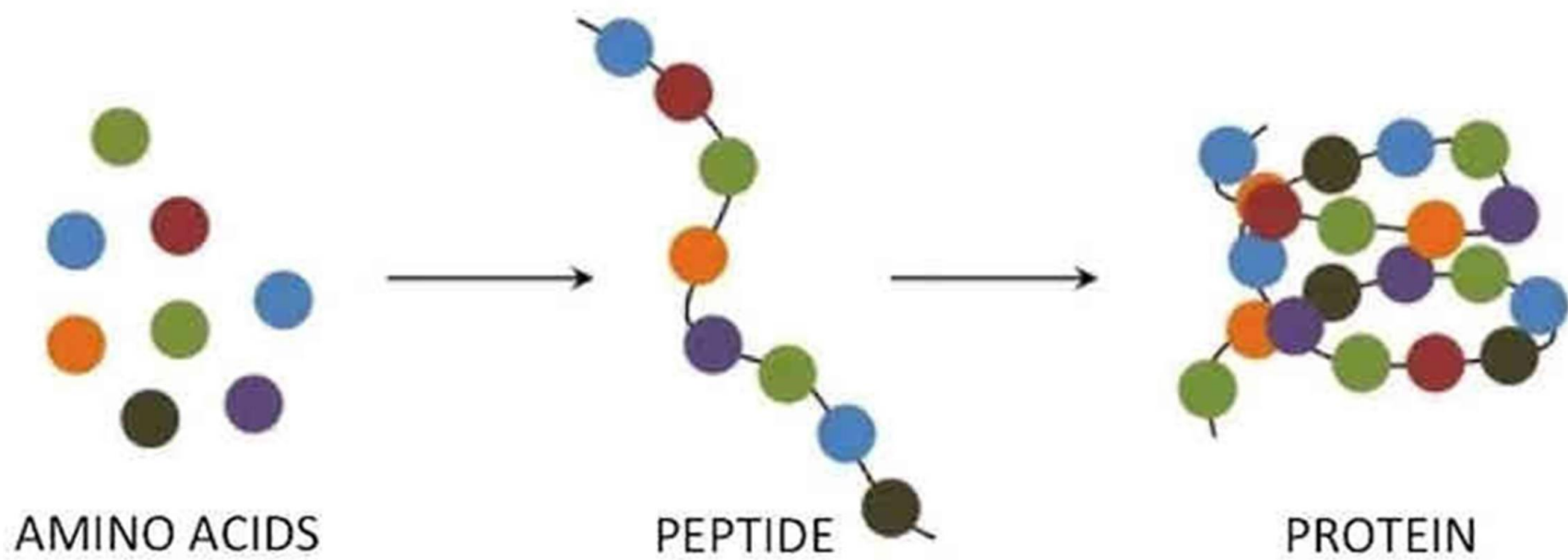
A molecule of water is removed from two glycine amino acids to form a peptide bond.

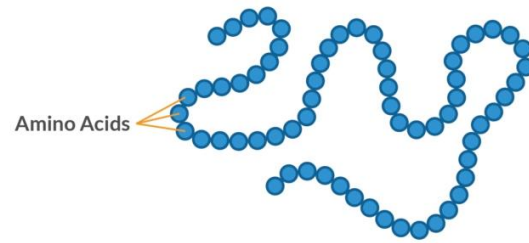
POLYPEPTIDE CHAIN



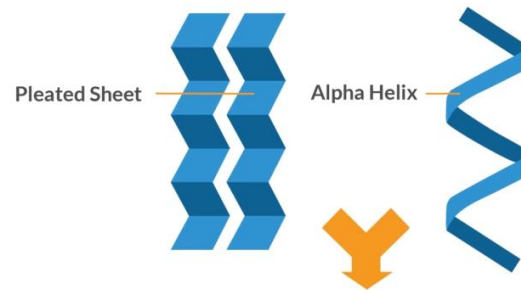
Gene Expression



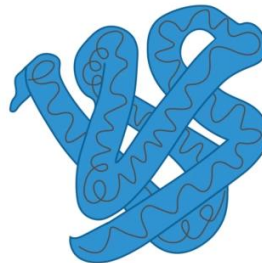




Primary Protein Structure



Secondary Protein Structure

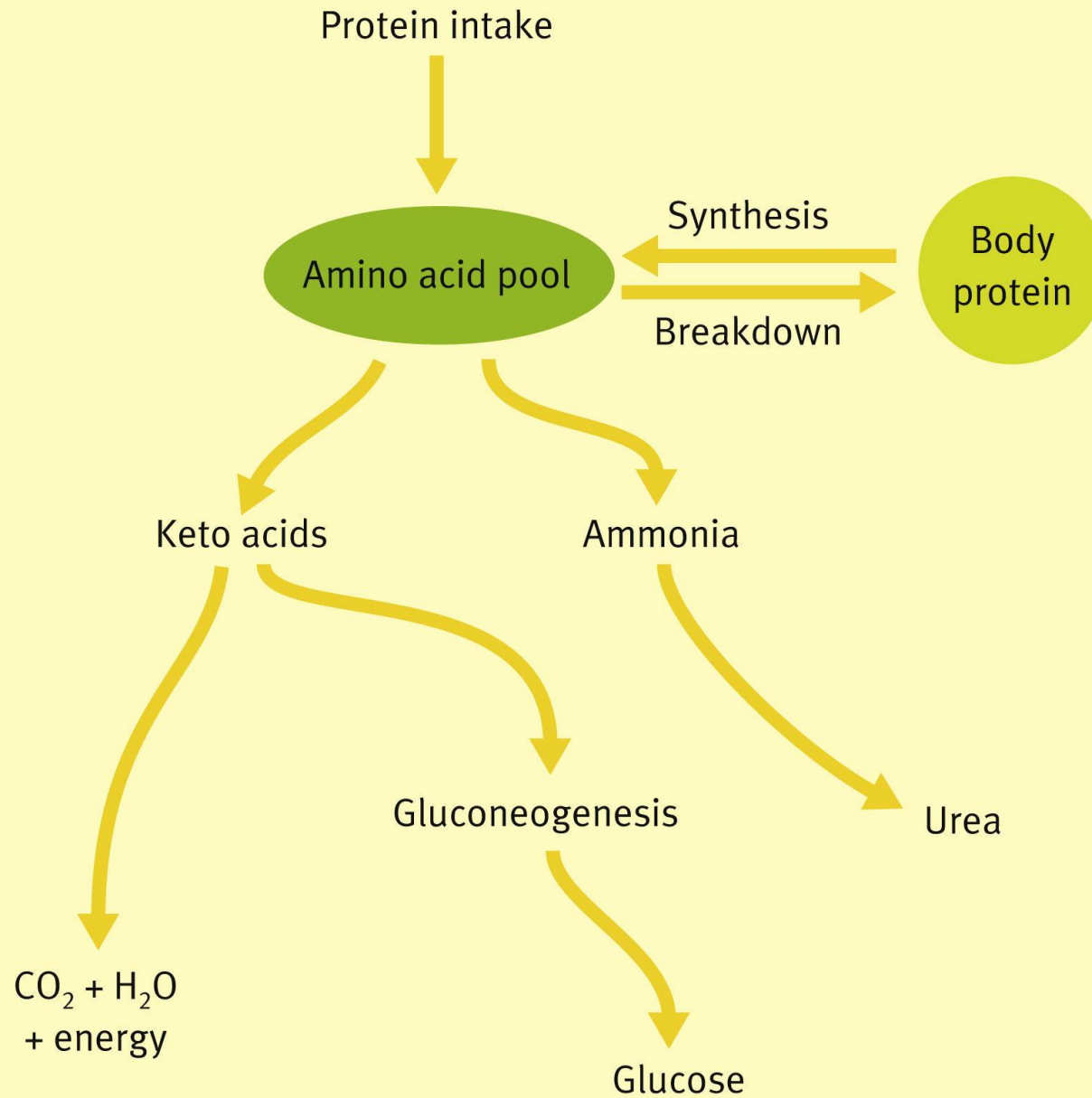


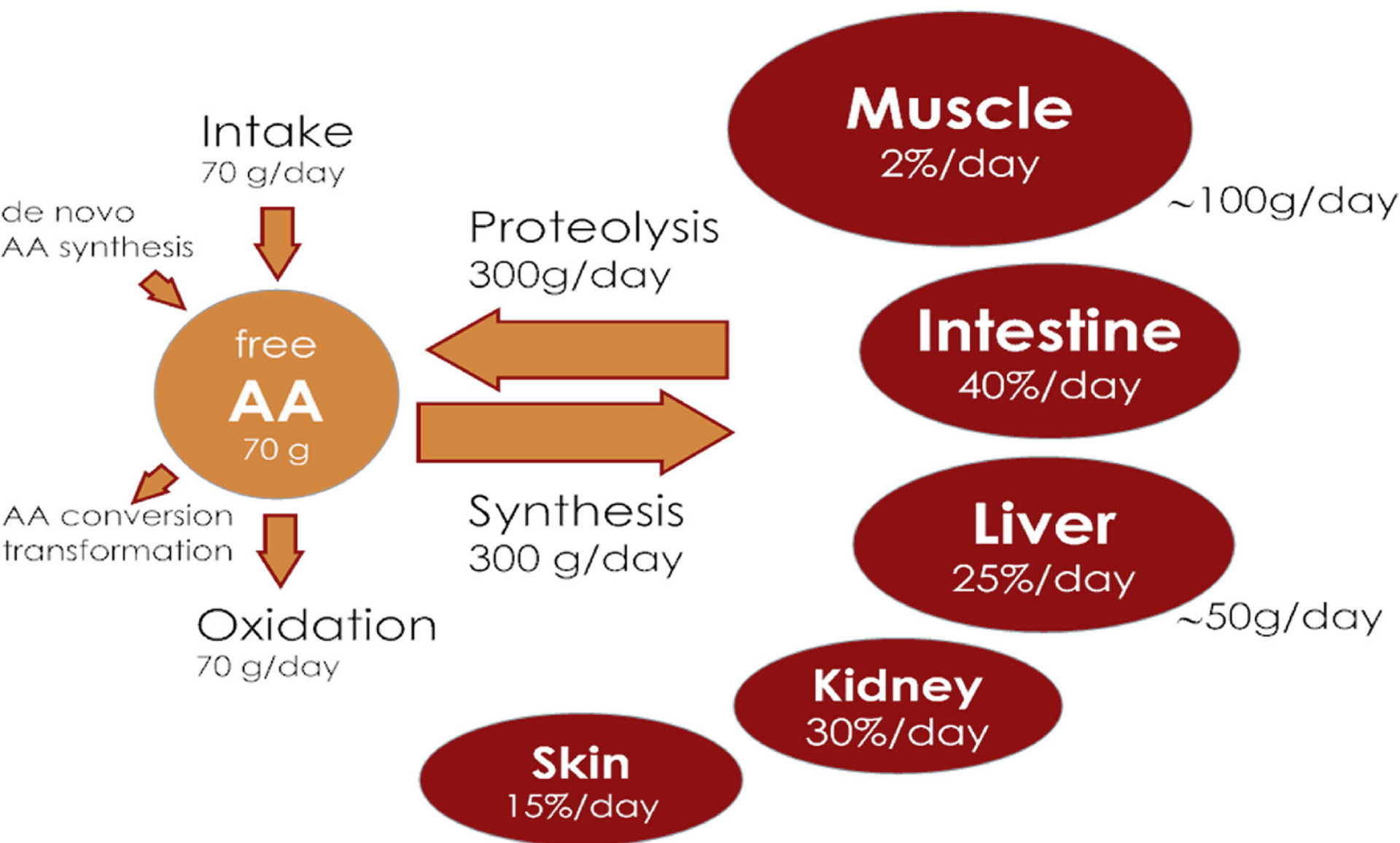
Tertiary Protein Structure



Quaternary Protein Structure

Protein metabolism

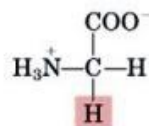




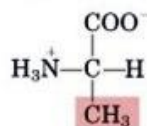
سوخت پروتئین

Twenty standard Amino Acids

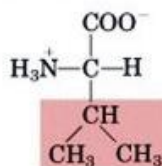
Nonpolar, aliphatic R groups



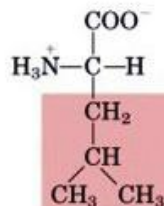
Glycine



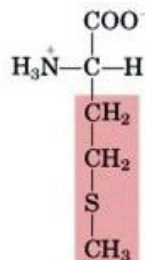
Alanine



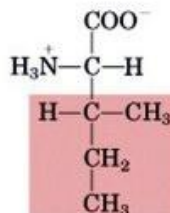
Valine



Leucine

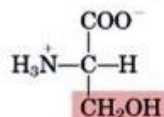


Methionine

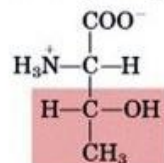


Isoleucine

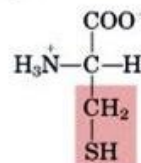
Polar, uncharged R groups



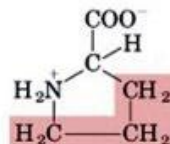
Serine



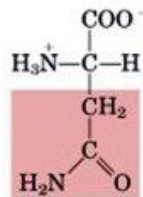
Threonine



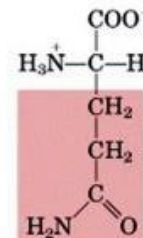
Cysteine



Proline

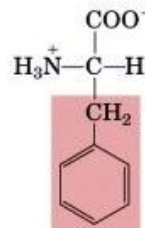


Asparagine

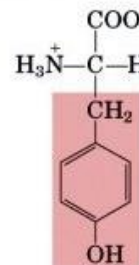


Glutamine

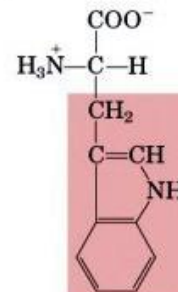
Aromatic R groups



Phenylalanine

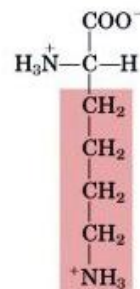


Tyrosine

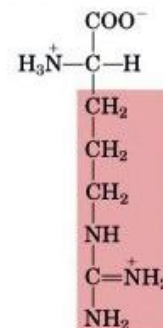


Tryptophan

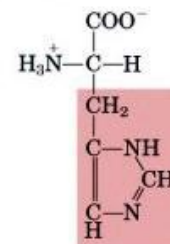
Positively charged R groups



Lysine

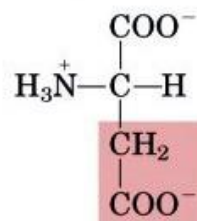


Arginine

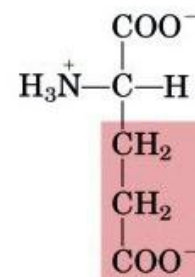


Histidine

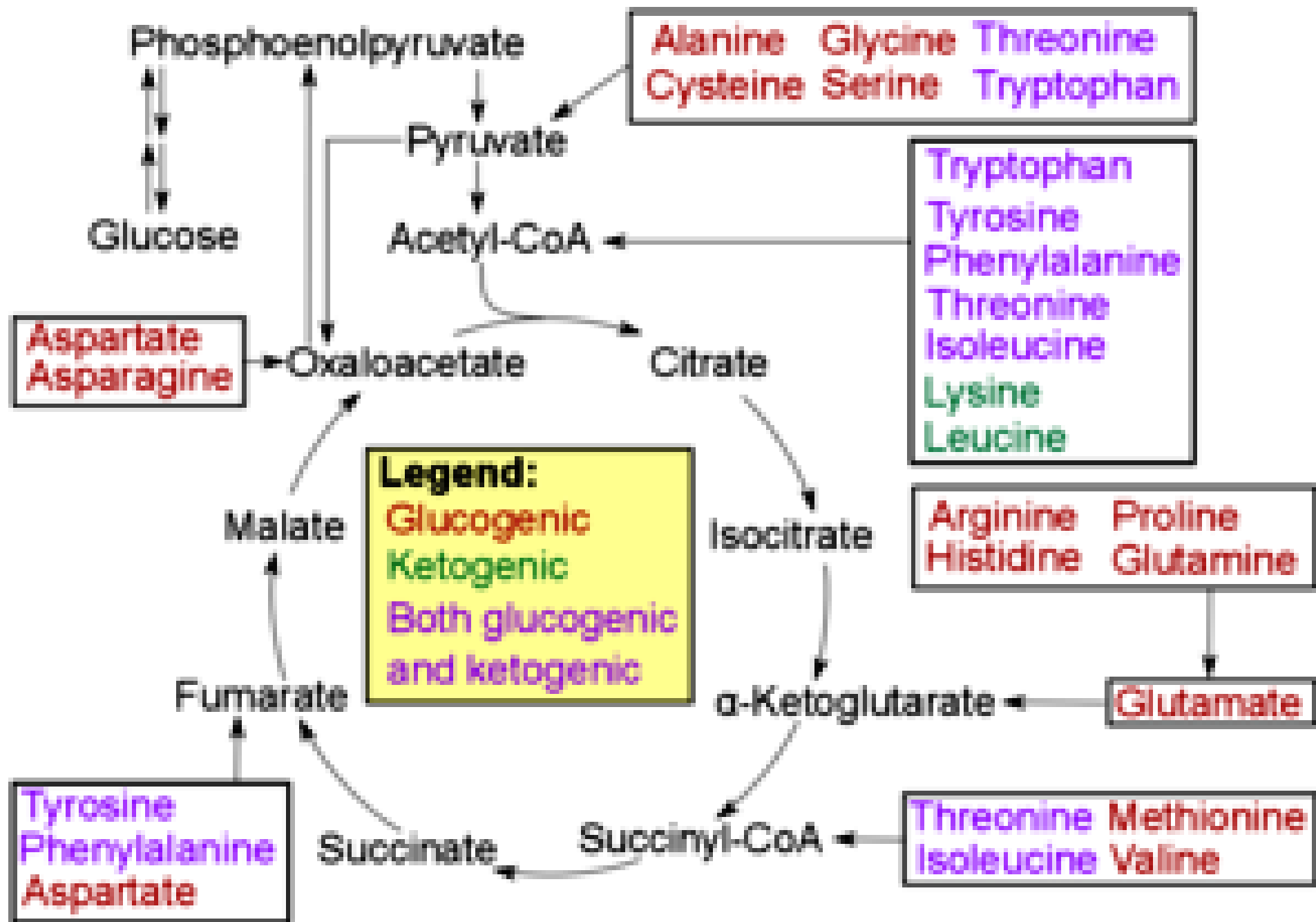
Negatively charged R groups



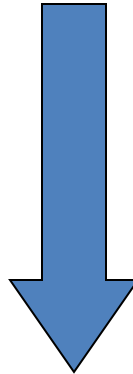
Aspartate



Glutamate



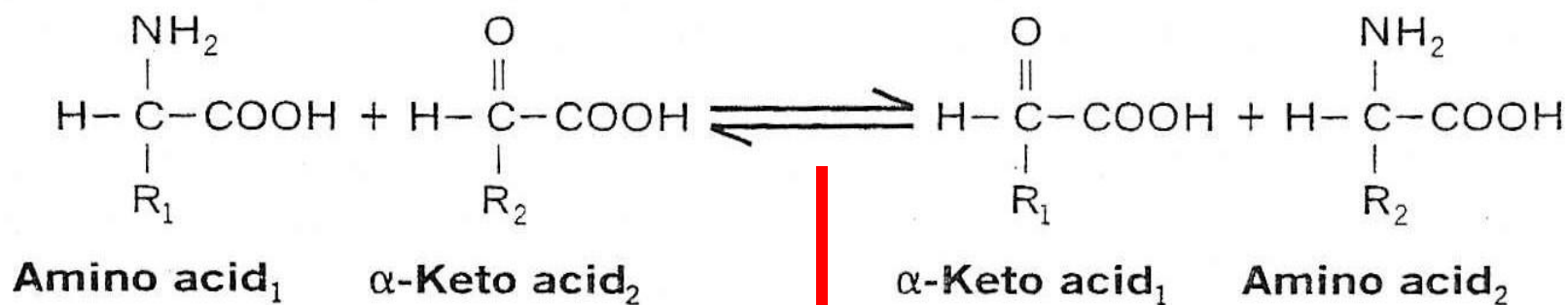
کاتابولیسم اسید های آمینه



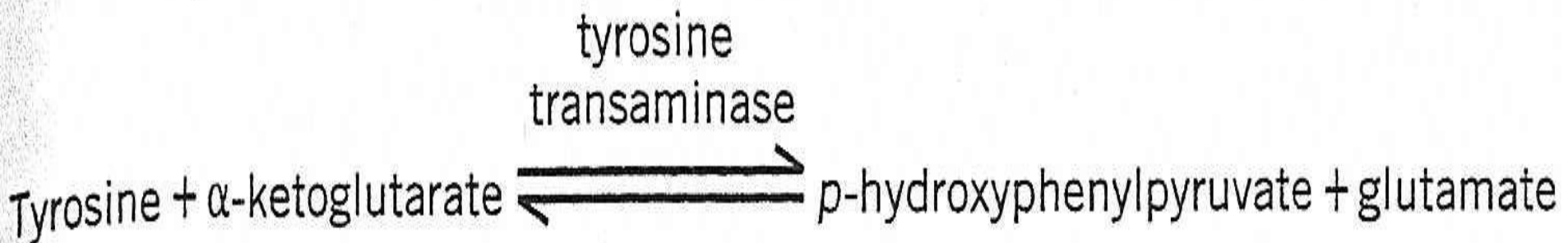
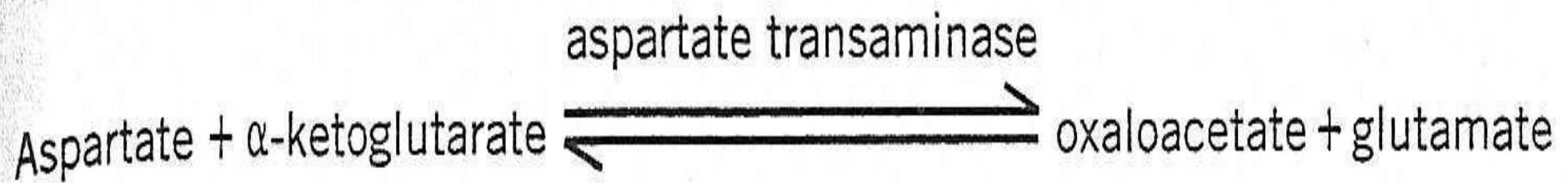
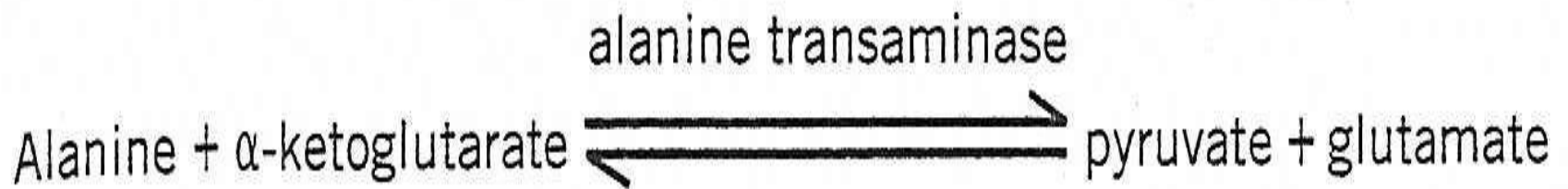
- 1) Transamination
- 2) Deamination
- 3) Disposal of Ammonia

Transamination

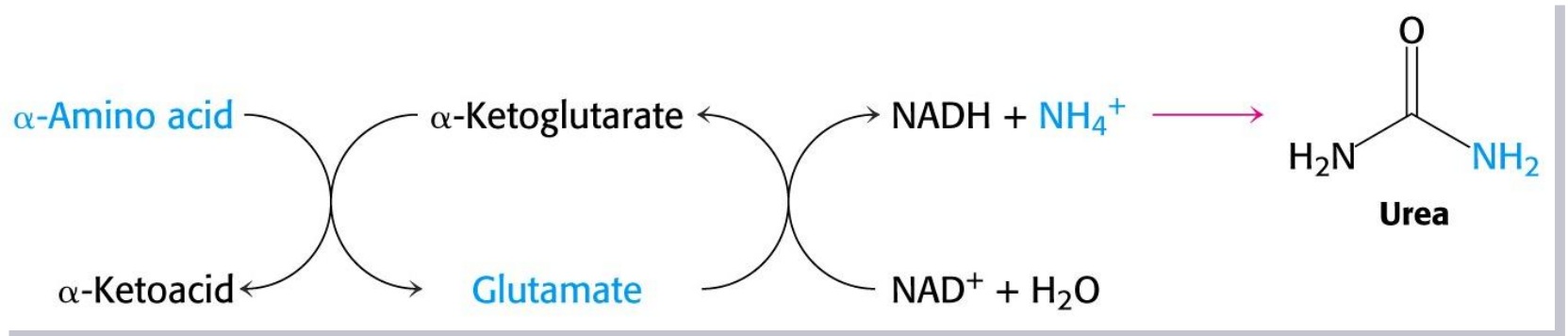
انتقال گروه آمین اسیدهای آمینه به آلفا کتو اسیدها



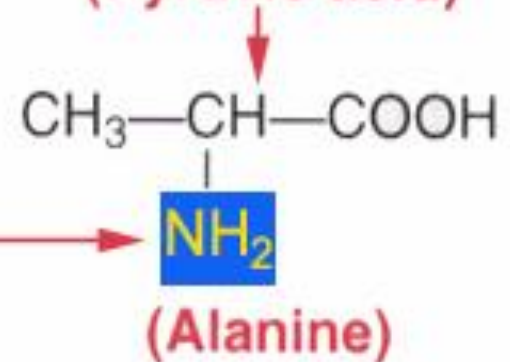
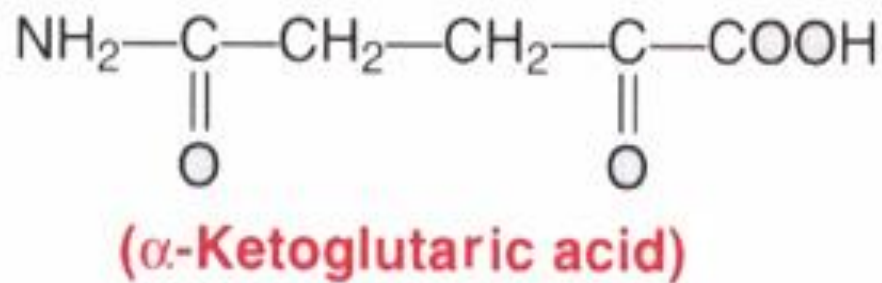
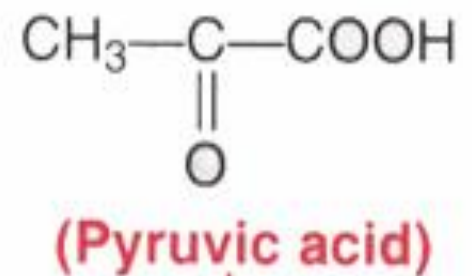
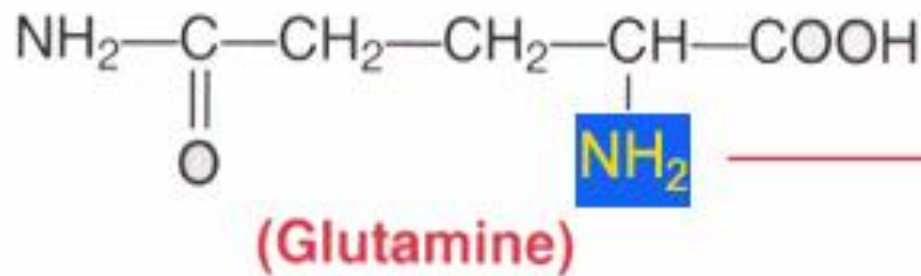
ترانس آمیناز



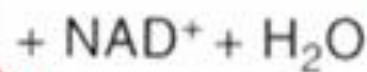
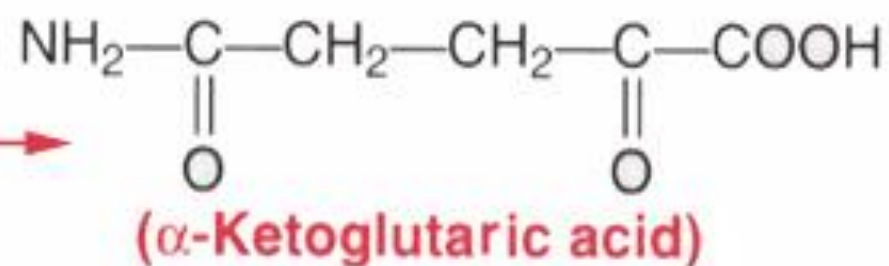
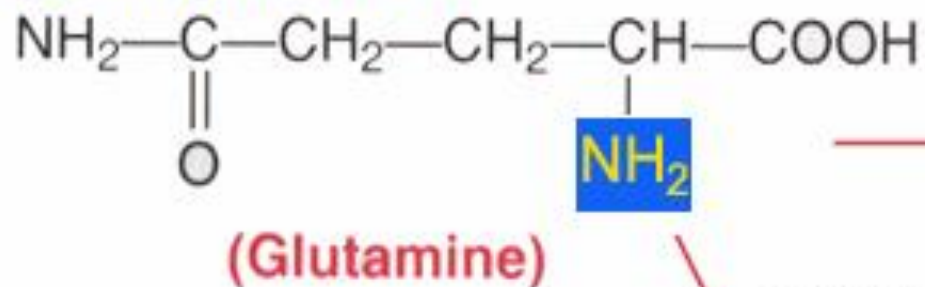
Deamination (oxidative)



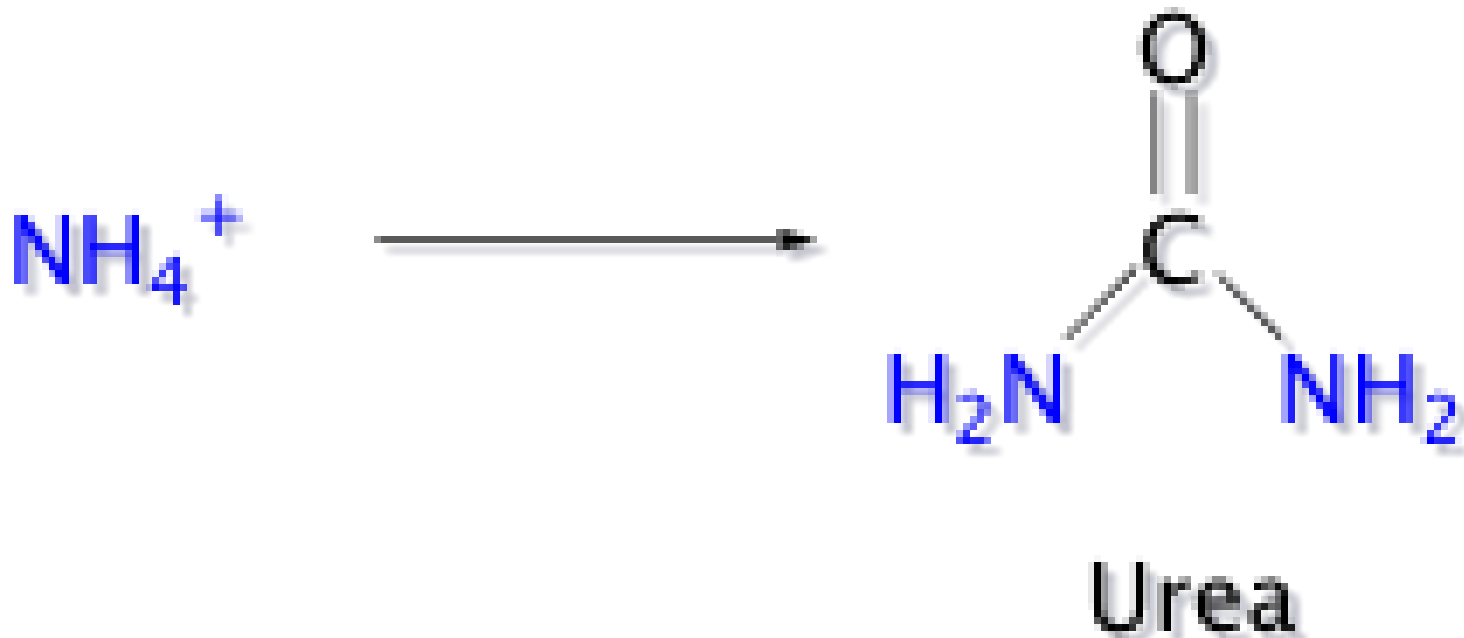
Transamination



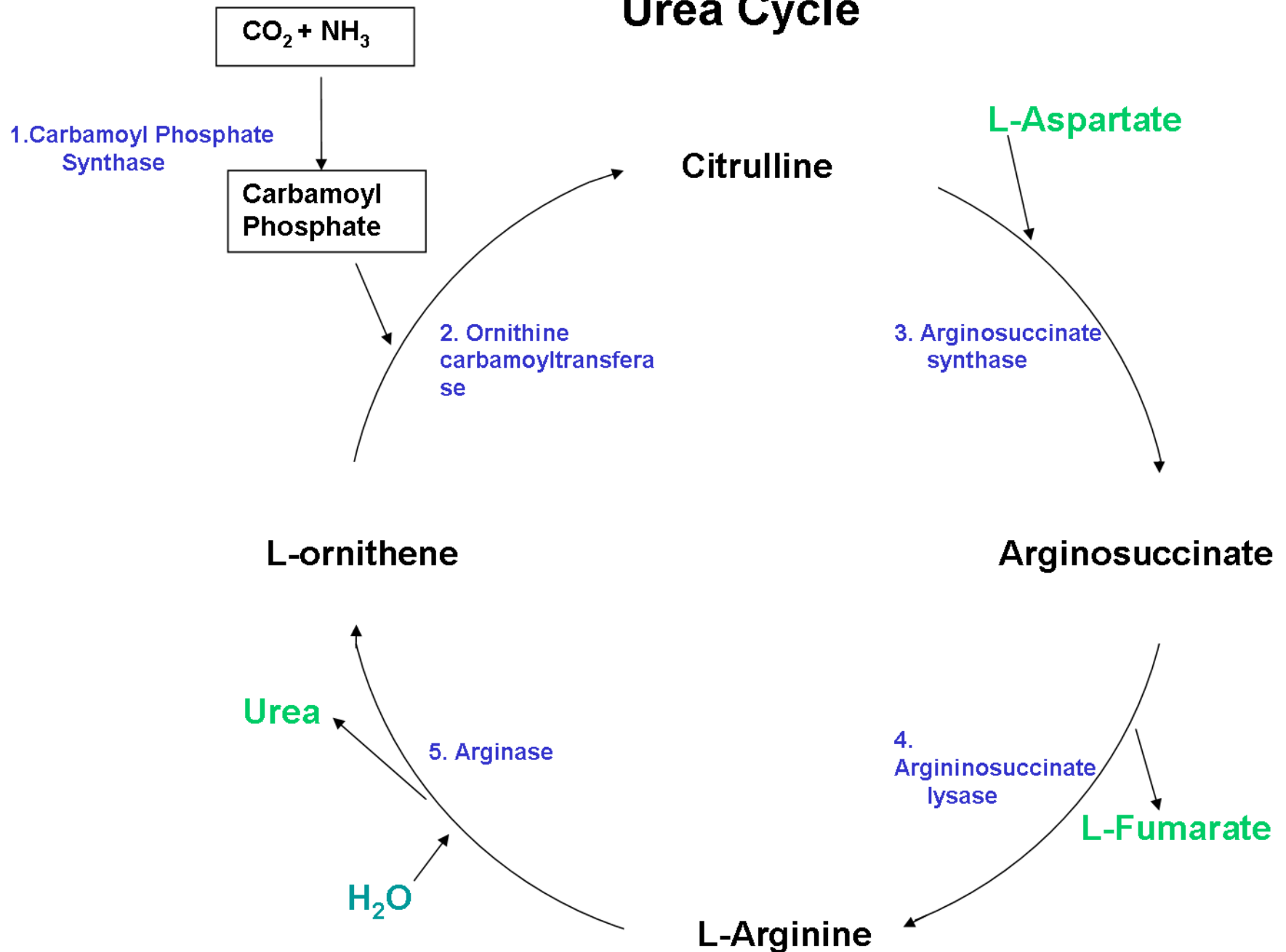
Deamination

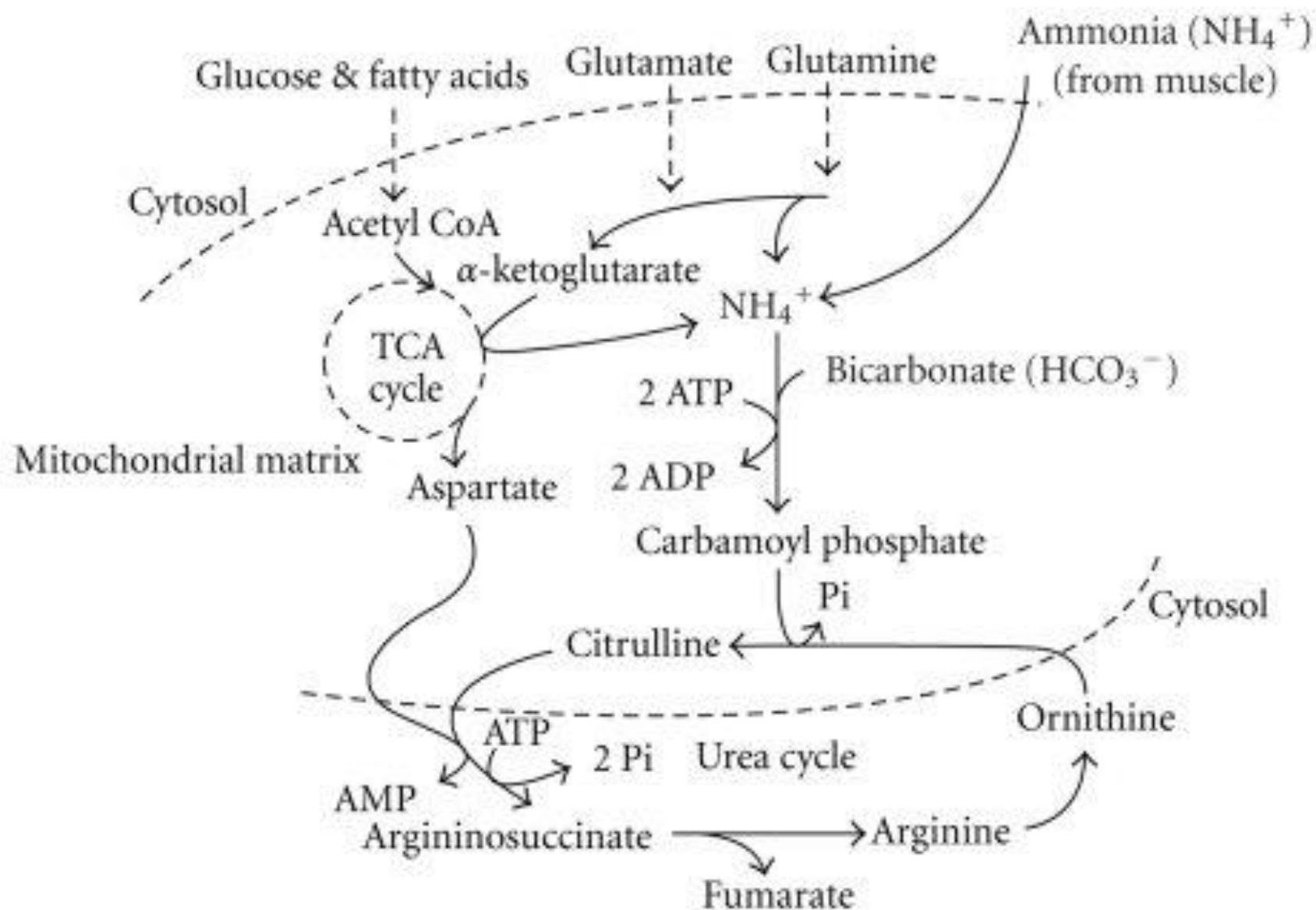


Ammonium Ion



Urea Cycle





چرخه گلوکز – آلانین

