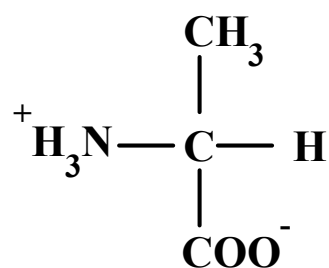
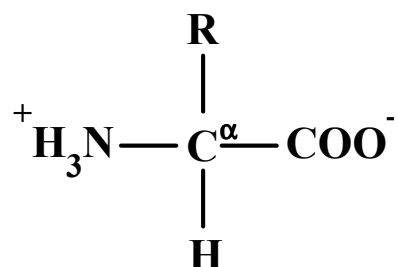
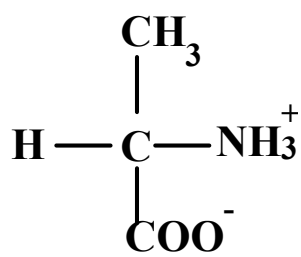


3. Aminokyseliny

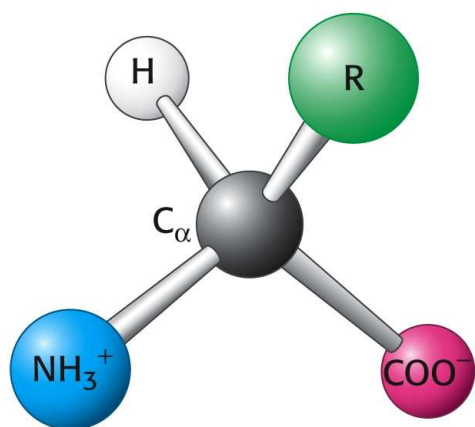
Základní struktura aminokyselin



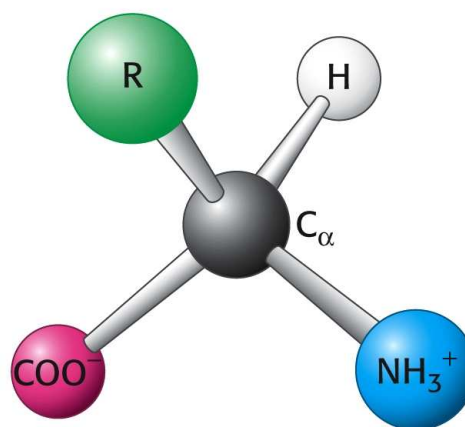
L -alanin



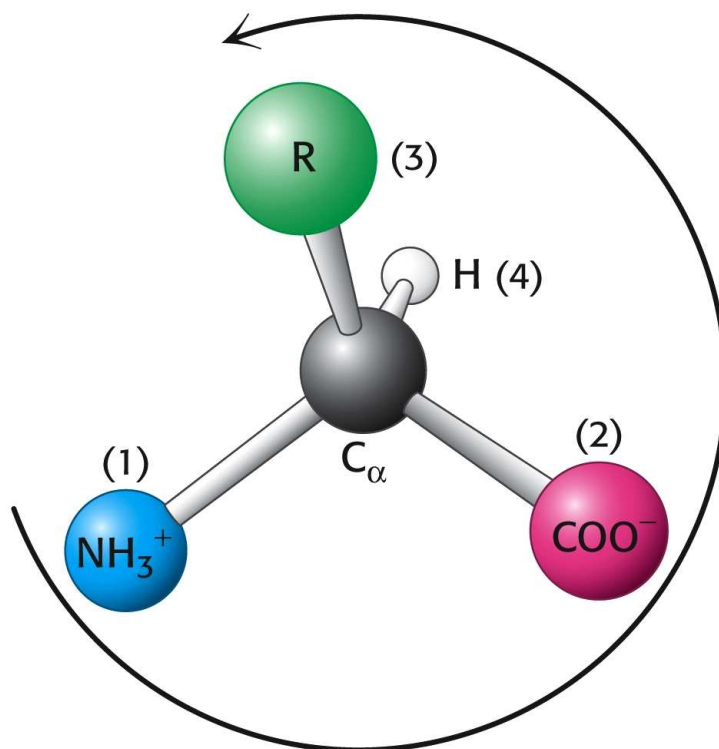
D-alanin



L isomer



D isomer



Absolutní konfigurace

Gly (G) není chirální

Cys (C) je v absolutní konfiguraci R

Ile (I) a Thr (T) mají dvě chirální centra.

L-Ile ($2S,3S$) ..., existují dva enantiomery diastereoizomerní k alloisoleucinu ($2R,3S$)

L-Thr ($2S,3R$)..., existují dva enantiomery, které jsou diastereoizomerní k allothreoninu ($2R,3R$).

Všechny ostatní L-aminokyseliny jsou S !!

ACIDOBAZICKÉ VLASTNOSTI

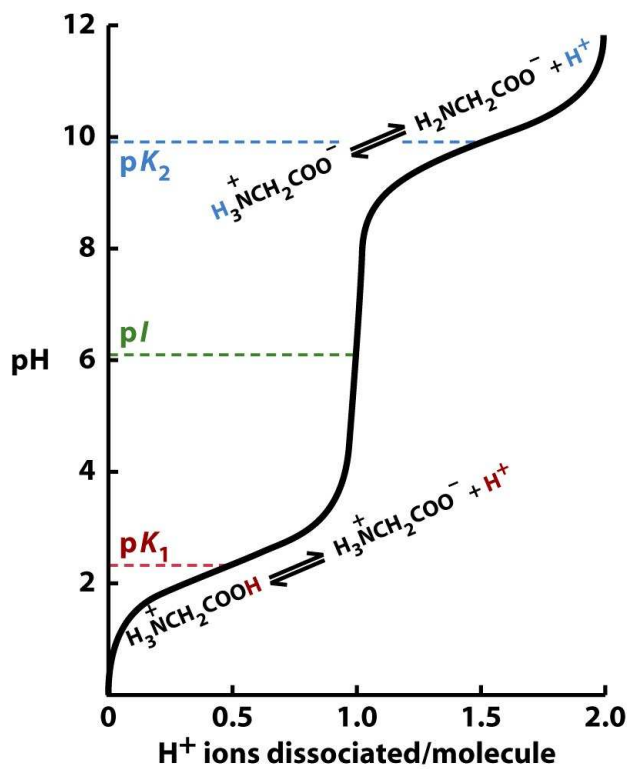
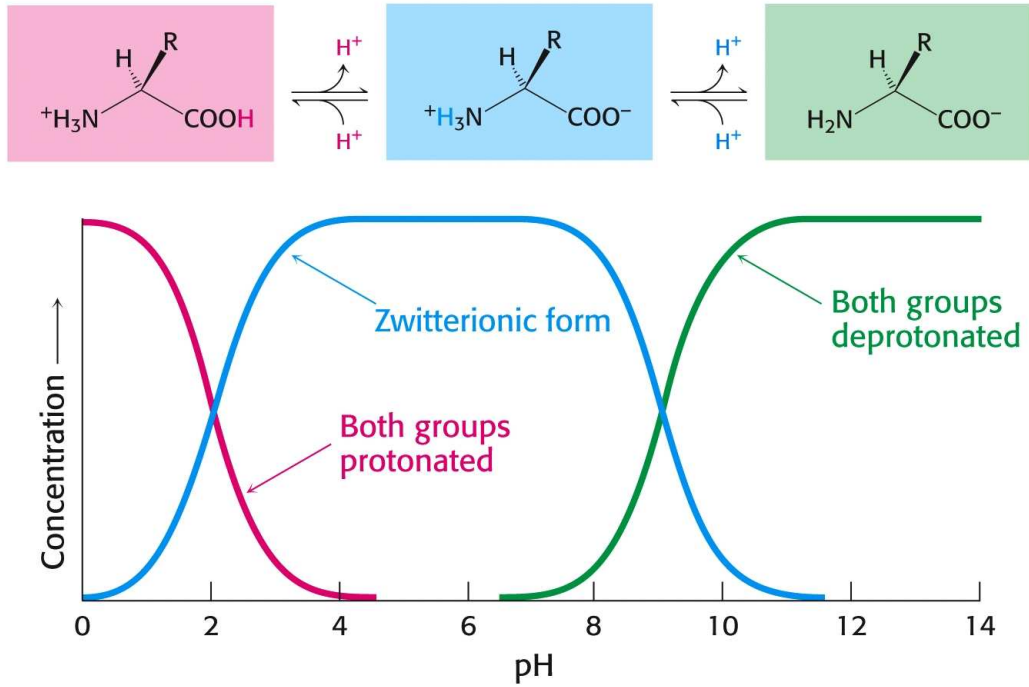


Figure 4-8 Fundamentals of Biochemistry, 2/e
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Izoelektrický bod $pI = \frac{pK_{COOH} + pK_{NH_2}}{2}$

Tabulka pK

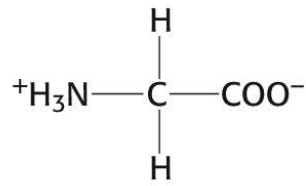
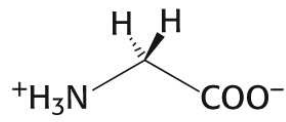
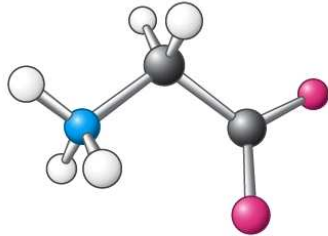
Skupina	pK	Skupina	pK	Skupina	pK
α COOH	1.8 - 2.5	β COOH	3.9	γ COOH	4.1
α NH ₂	9 - 10	ϵ NH ₂	10.8	guanidin	12.5
imidazol	6.0	SH	8.3	OH	10.1

TABLE 3.1 Typical pK_a values of ionizable groups in proteins

Group	Acid	\rightleftharpoons	Base	Typical pK_a^*
Terminal α -carboxyl group		\rightleftharpoons		3.1
Aspartic acid Glutamic acid		\rightleftharpoons		4.1
Histidine		\rightleftharpoons		6.0
Terminal α -amino group		\rightleftharpoons		8.0
Cysteine		\rightleftharpoons		8.3
Tyrosine		\rightleftharpoons		10.9
Lysine		\rightleftharpoons		10.8
Arginine		\rightleftharpoons		12.5

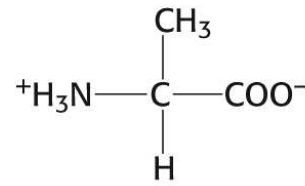
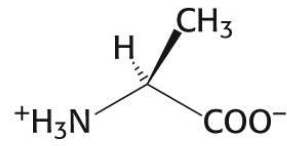
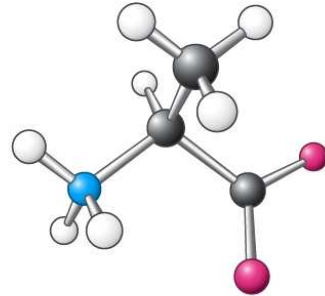
* pK_a values depend on temperature, ionic strength, and the microenvironment of the ionizable group.

Glycine
(Gly, G)



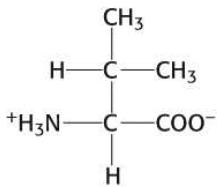
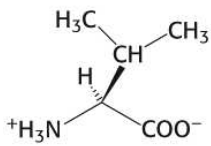
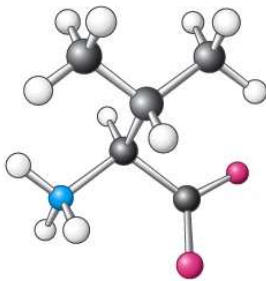
Glycine
(Gly, G)

Alanine
(Ala, A)



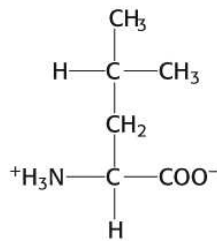
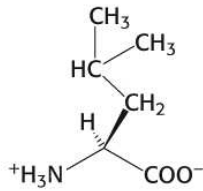
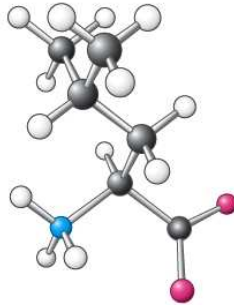
Alanine
(Ala, A)

**Valine
(Val, V)**



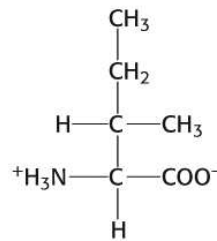
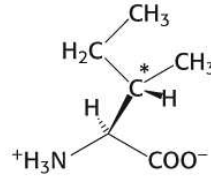
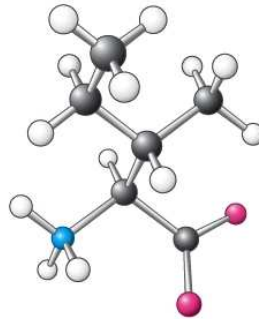
**Valine
(Val, V)**

**Leucine
(Leu, L)**



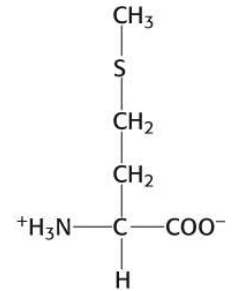
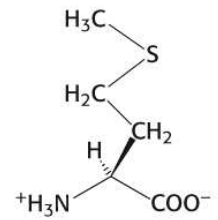
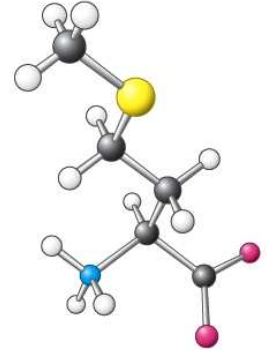
**Leucine
(Leu, L)**

**Isoleucine
(Ile, I)**

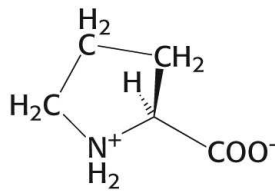
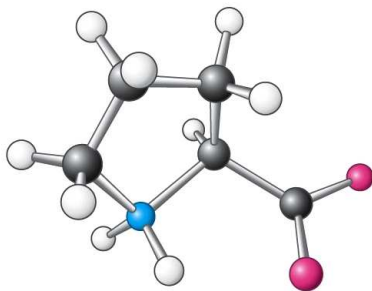


**Isoleucine
(Ile, I)**

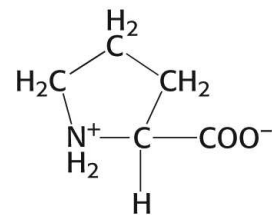
**Methionine
(Met, M)**



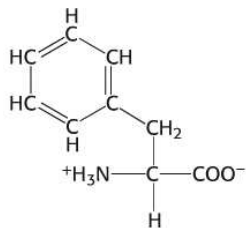
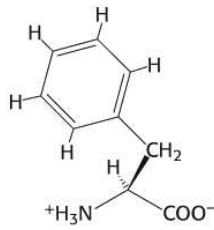
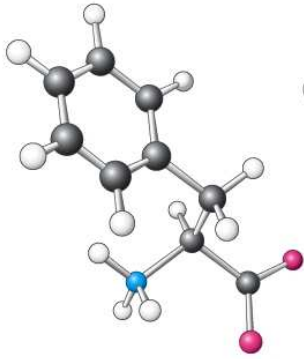
**Methionine
(Met, M)**



**Proline
(Pro, P)**

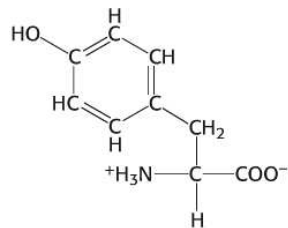
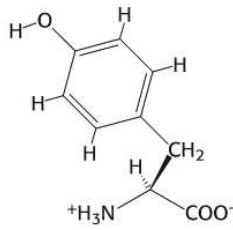
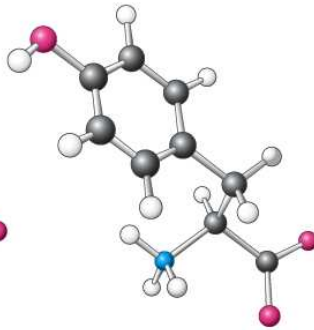


**Phenylalanine
(Phe, F)**



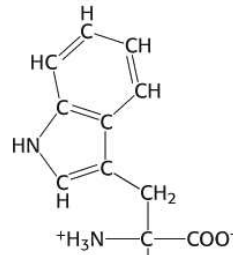
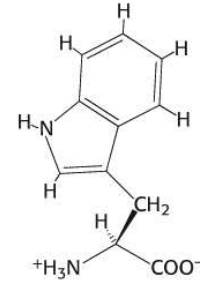
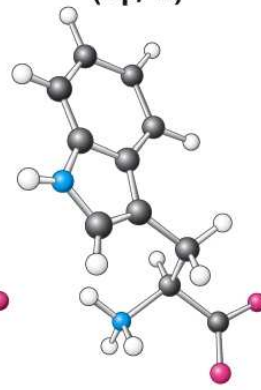
**Phenylalanine
(Phe, F)**

**Tyrosine
(Tyr, Y)**



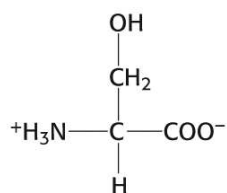
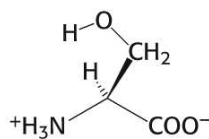
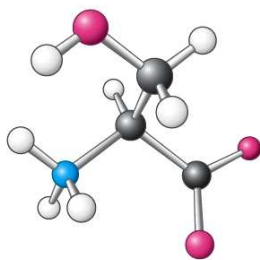
**Tyrosine
(Tyr, Y)**

**Tryptophan
(Trp, W)**



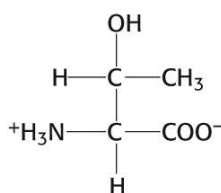
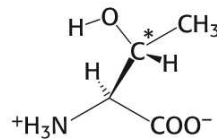
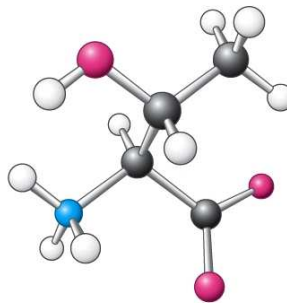
**Tryptophan
(Trp, W)**

**Serine
(Ser, S)**

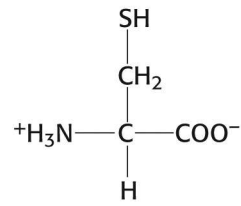
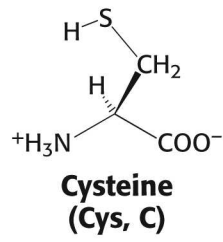
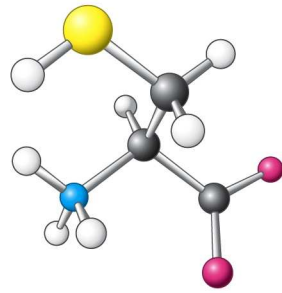


**Serine
(Ser, S)**

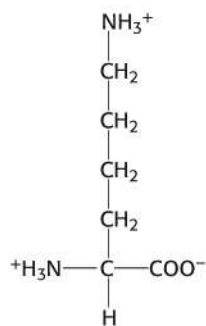
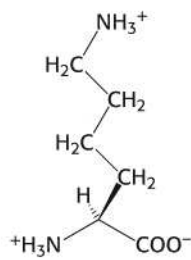
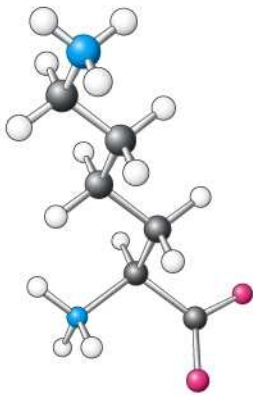
**Threonine
(Thr, T)**



**Threonine
(Thr, T)**

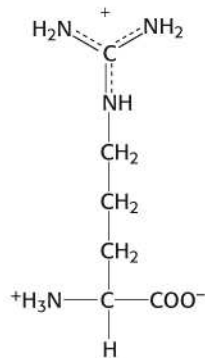
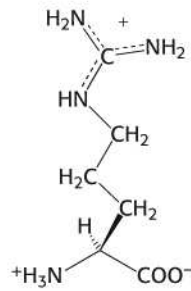
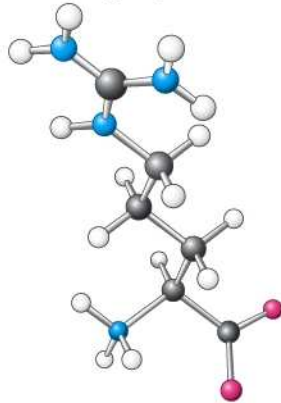


Lysine
(Lys, K)



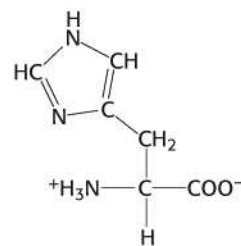
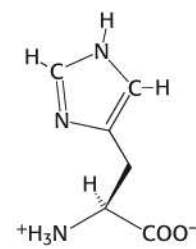
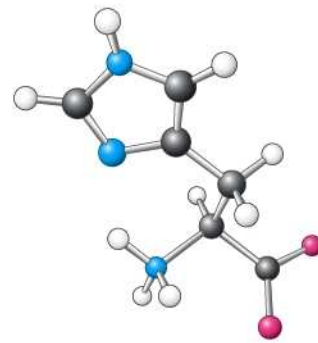
Lysine
(Lys, K)

Arginine
(Arg, R)



Arginine
(Arg, R)

Histidine
(His, H)



Histidine
(His, H)

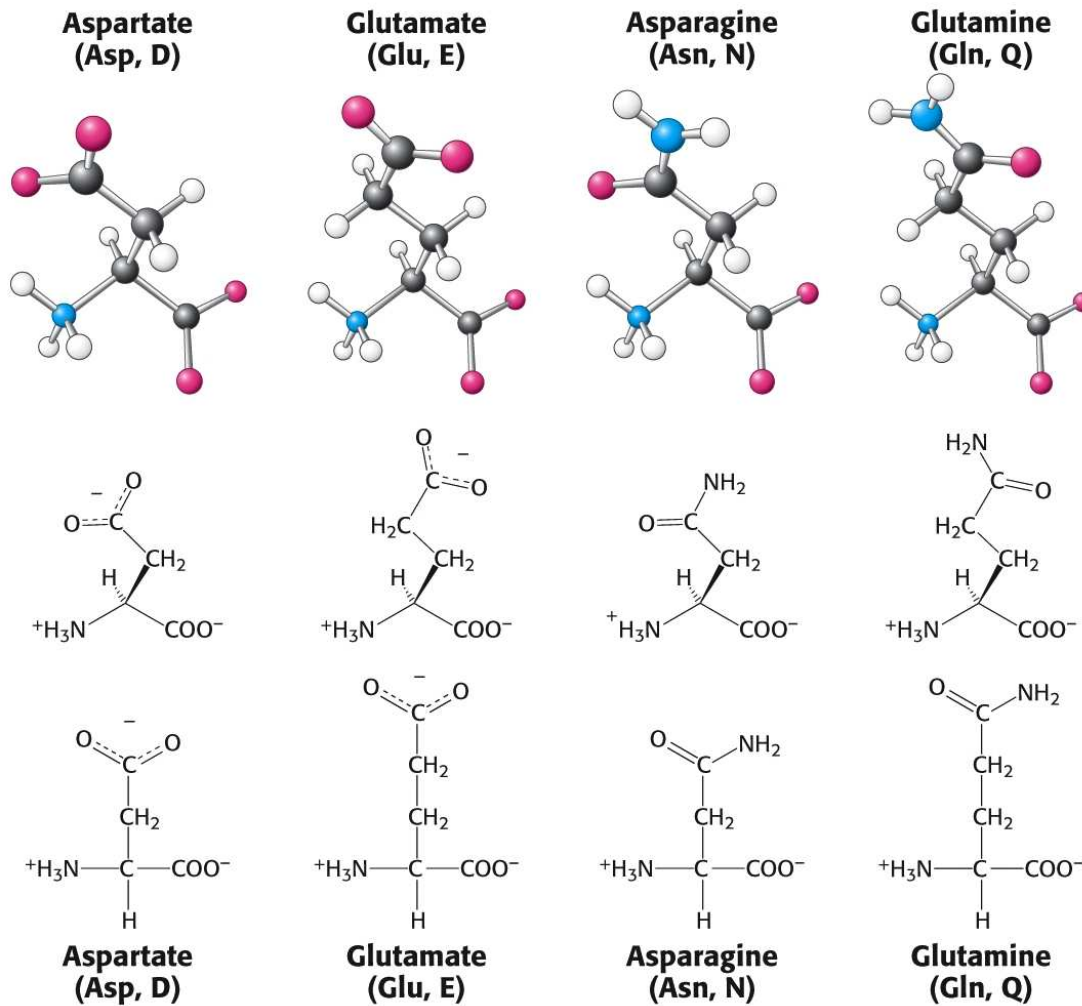
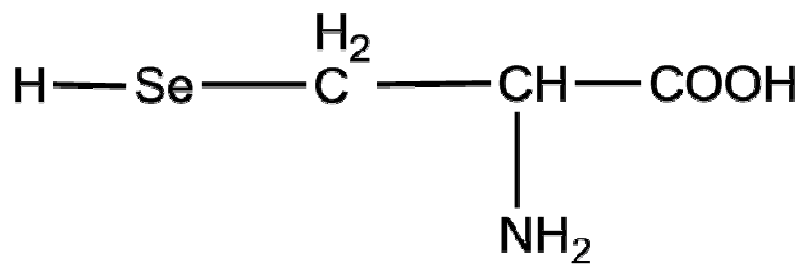


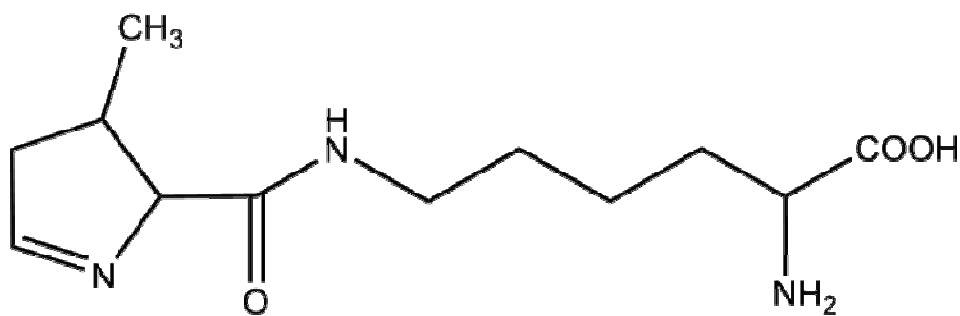
TABLE 3.2 Abbreviations for amino acids

Amino acid	Three-letter abbreviation	One-letter abbreviation	Amino acid	Three-letter abbreviation	One-letter abbreviation
Alanine	Ala	A	Methionine	Met	M
Arginine	Arg	R	Phenylalanine	Phe	F
Asparagine	Asn	N	Proline	Pro	P
Aspartic Acid	Asp	D	Serine	Ser	S
Cysteine	Cys	C	Threonine	Thr	T
Glutamine	Gln	Q	Tryptophan	Trp	W
Glutamic Acid	Glu	E	Tyrosine	Tyr	Y
Glycine	Gly	G	Valine	Val	V
Histidine	His	H	Asparagine or aspartic acid	Asx	B
Isoleucine	Ile	I	Glutamine or glutamic acid	Glx	Z
Leucine	Leu	L			
Lysine	Lys	K			

AMK	Symboly		AMK	Symboly	
glycin	Gly	G	methionin	Met	M
alanin	Ala	A	glutamová k.	Glu	E
valin	Val	V	asparagin	Asn	N
leucin	Leu	L	glutamin	Gln	Q
izoleucin	Ile	I	lysin	Lys	K
serin	Ser	S	arginin	Arg	R
threonin	Thr	T	tyrosin	Tyr	Y
cystein	Cys	C	fenylalanin	Phe	F
histidin	His	H	tryptofan	Trp	W
prolin	Pro	P	asparagová k.	Asp	D



Selenocystein



Pyrolyzin

Hydropatie aminokyselin

TABLE 3.1 Hydrophathy scale for amino acid residues

Amino acid	Free-energy change for transfer (kJ mol⁻¹)
Isoleucine	3.1
Phenylalanine	2.5
Valine	2.3
Leucine	2.2
Methionine	1.1
Tryptophan	1.5 ^b
Alanine	1.0
Glycine	0.67
Cysteine	0.17
Tyrosine	0.08
Proline	-0.29
Threonine	-0.75
Serine	-1.1
Histidine	-1.7
Glutamate	-2.6
Asparagine	-2.7
Glutamine	-2.9
Aspartate	-3.0
Lysine	-4.6
Arginine	-7.5

Volné aminokyseliny a deriváty

β alanin

ornitin a citrulin

γ aminomáselná

antibiotika - azaserin, cykloserin, chloramfenikol

nervové mediátory - DOPA, dopamin, adrenalin

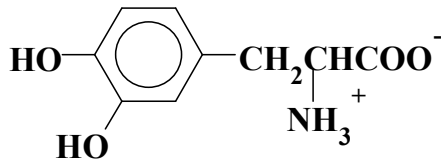
hormony - thyroxin, trijodthyronin



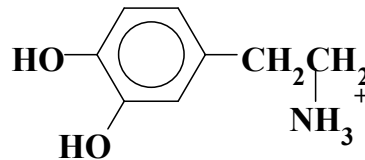
β alanin



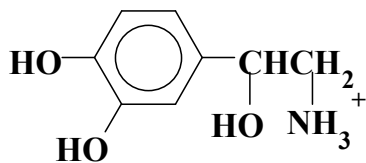
γ aminomáselná kyselina



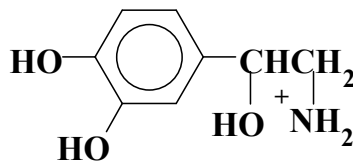
DOPA



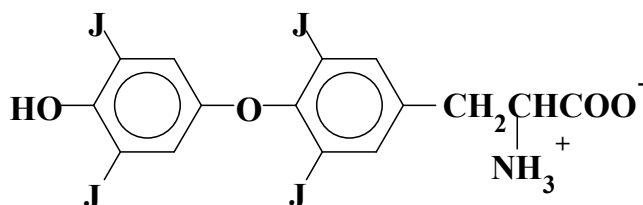
dopamin



noradrenalin



adrenalin



tyroxin

(3,5,3',5'-tetrjodthyronin)

