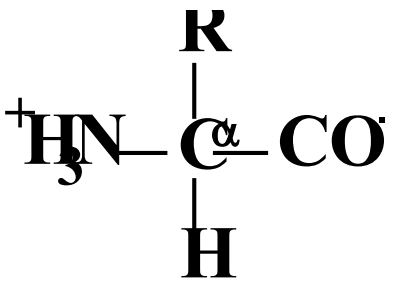
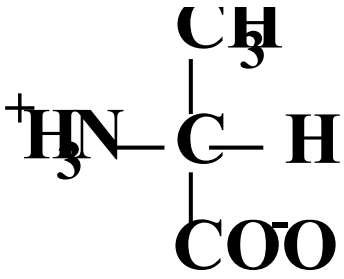
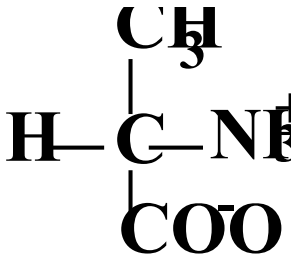
3. Aminokyseliny

Základní struktura aminokyselin

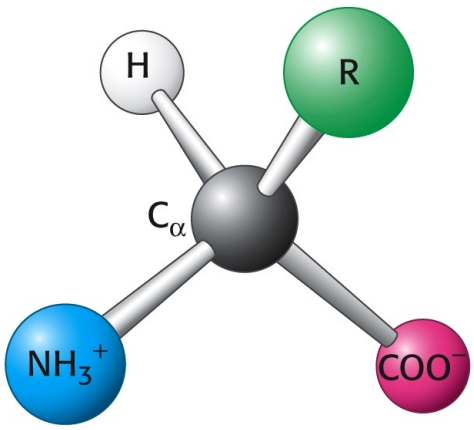




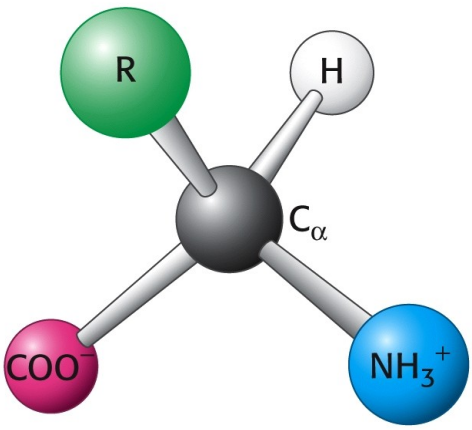
L -alanin



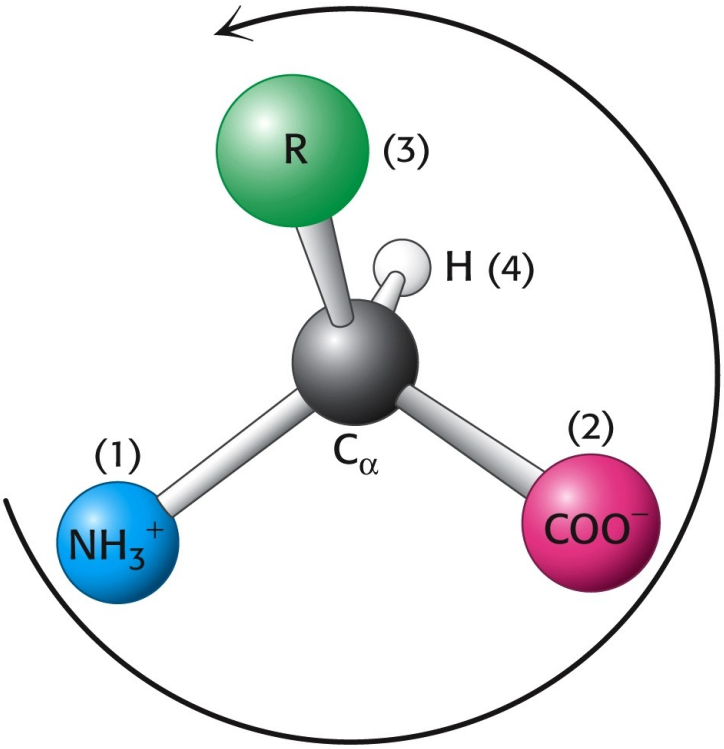
D-alani



L isomer



D isomer



Absolutní konfigurace

Gly (G) není chirální

Cys (C) je v absolutní konfiguraci *R*

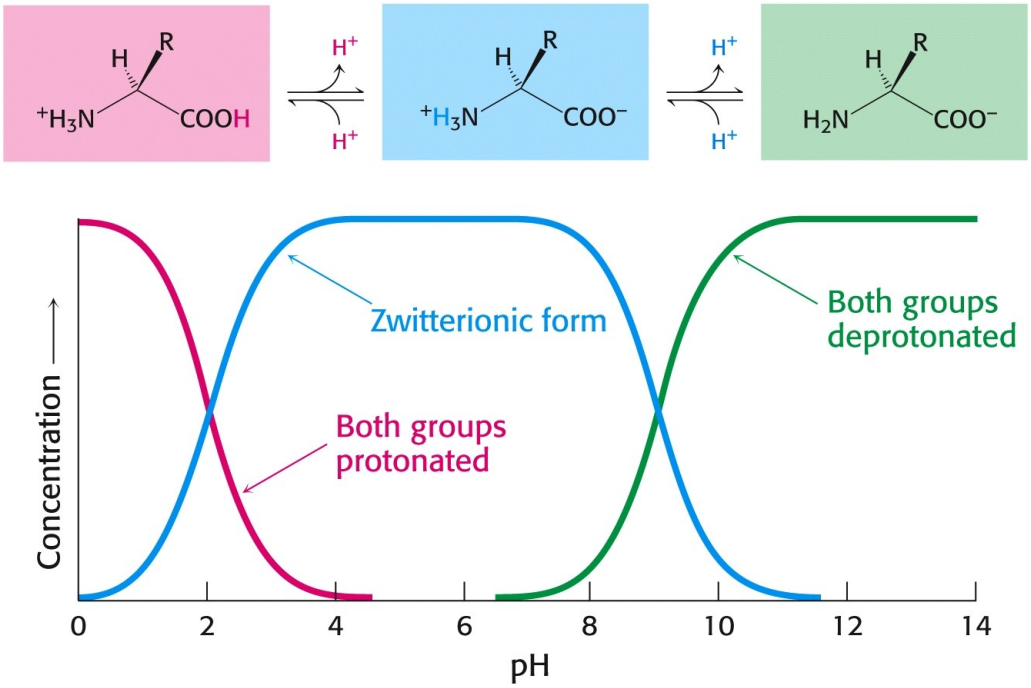
Ile (I) a Thr (T) mají dvě chirální centra.

L-Ile (2*S*,3*S*) …., existuji dva enantiomery diastereoizomerní k alloisoleucinu (*2R*,3*S*)

L-Thr (2*S*,3*R*)…, existují dva enenatiomery, které jsou diastereoizomerní k allothreoninu (2*R*,3*R*).

Všechny ostatní L-aminokyseliny jsou *S* !!

ACIDOBAZICKÉ VLASTNOSTI



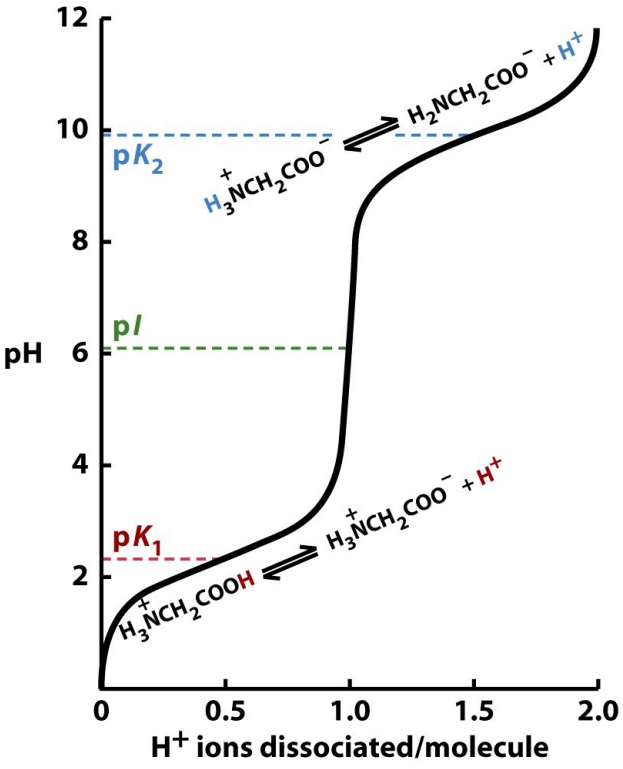


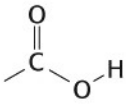
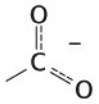
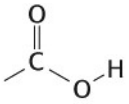
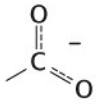
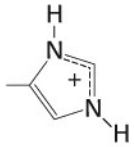
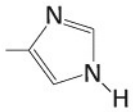
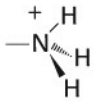
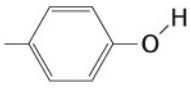
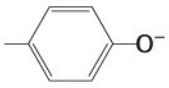
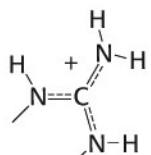
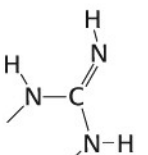
Figure 4-8 Fundamentals of Biochemistry, 2/e

Izoelektrický bod $$pI = \frac{pK_{COOH} + pK_{NH_2}}{2}$$

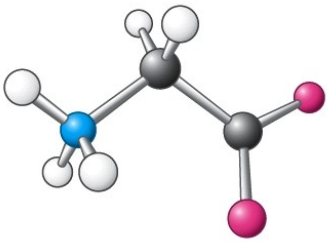
Tabulka pK

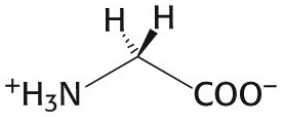
Skupina	pK	Skupina	pK	Skupina	pK
α COOH	1.8 - 2.5	**β COOH**	3.9	**γ COOH**	4.1
α NH_2	9 - 10	**ε NH_2**	10.8	**guanidin**	12.5
imidazol	6.0	**SH**	8.3	**OH**	10.1

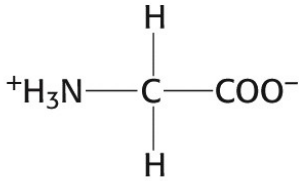
TABLE 3.1 **Typical pK_a values of ionizable groups in proteins**

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

Glycine
(Gly, G)

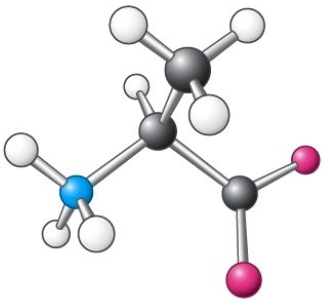


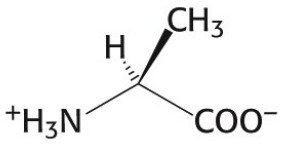


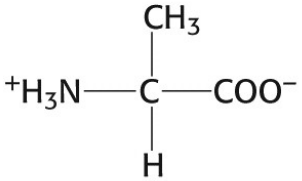


Glycine
(Gly, G)

Alanine
(Ala, A)

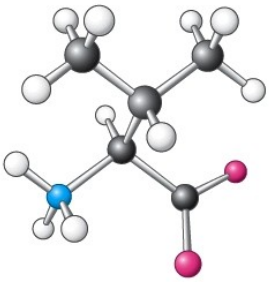


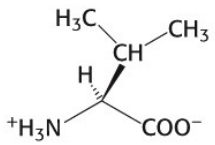


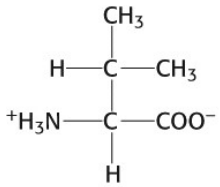


Alanine
(Ala, A)

Valine (Val, V)

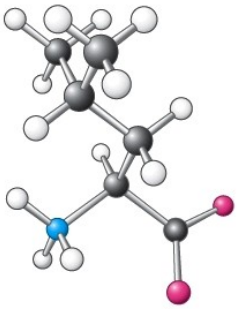


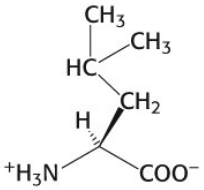


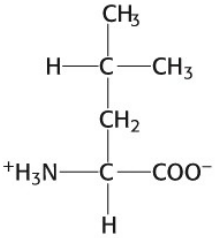


Valine (Val, V)

Leucine (Leu, L)

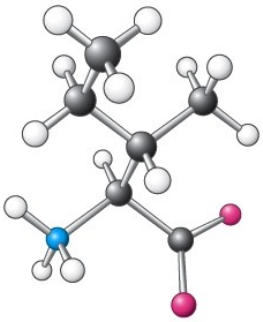


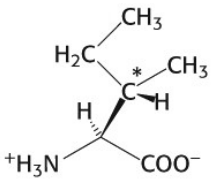


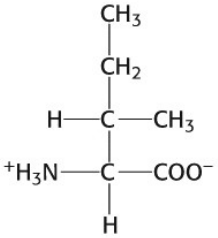


Leucine (Leu, L)

Isoleucine (Ile, I)

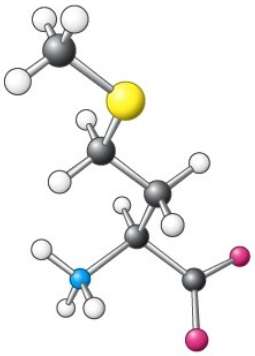


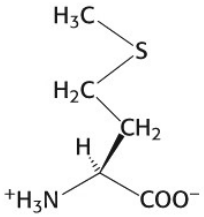


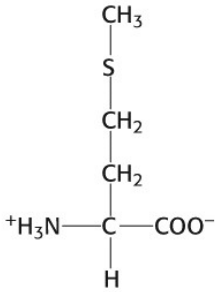


Isoleucine (Ile, I)

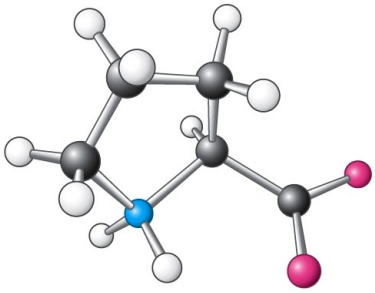
Methionine (Met, M)

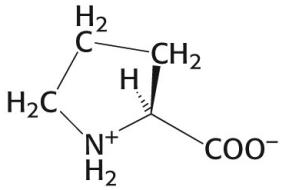




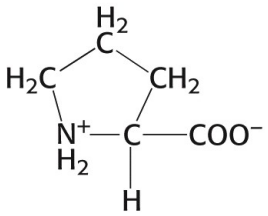


Methionine (Met, M)





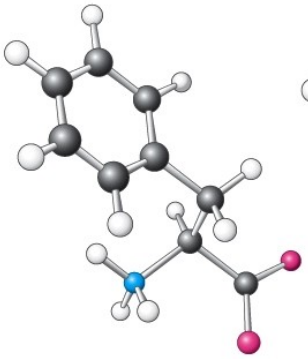
Proline

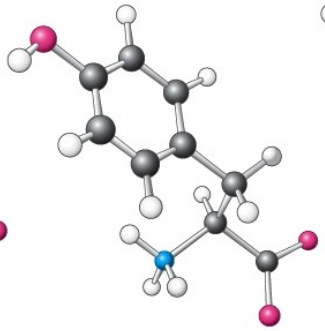


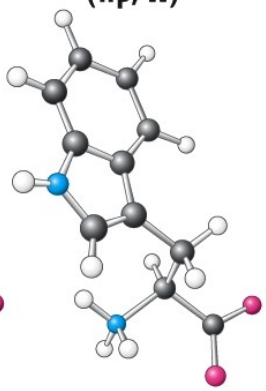
Phenylalanine (Phe, F)

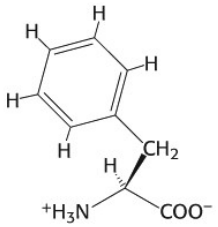
Tyrosine (Tyr, Y)

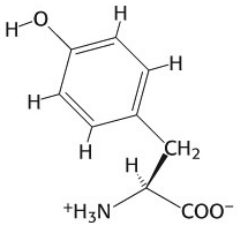
Tryptophan (Trp, W)

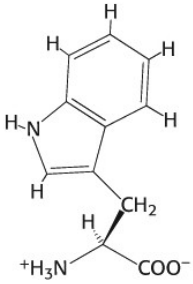


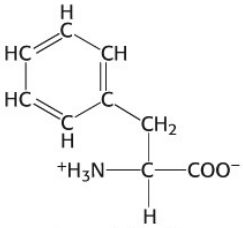


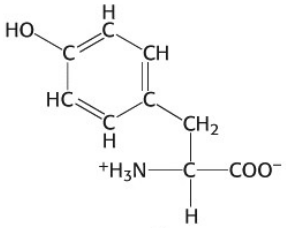


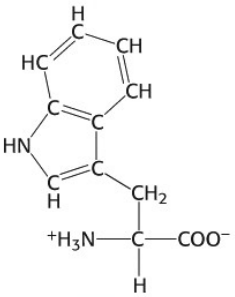










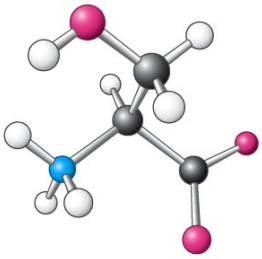


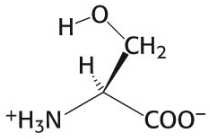
Phenylalanine (Phe, F)

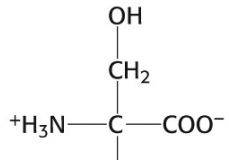
Tyrosine (Tyr, Y)

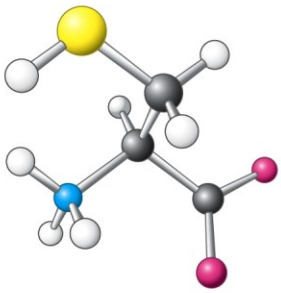
Tryptophan (Trp, W)

Serine
(Ser, S)

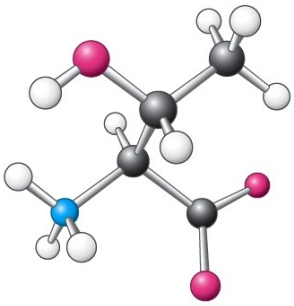


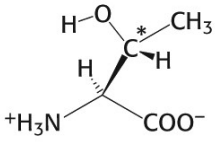


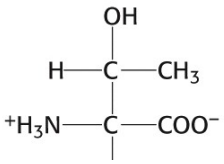


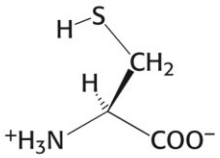


Threonine
(Thr, T)

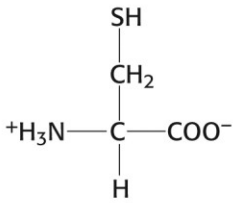




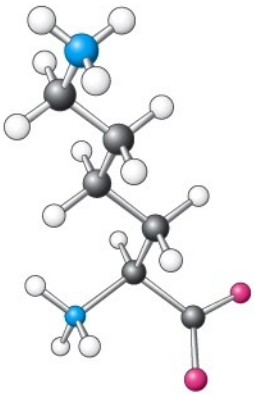


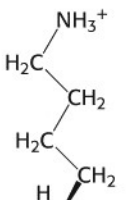


Cysteine
(Cys, C)

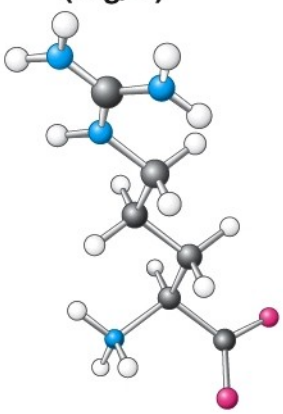


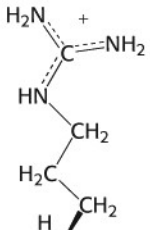
Lysine
(Lys, K)



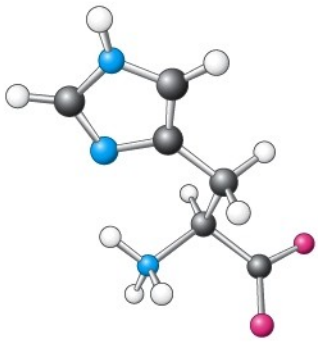


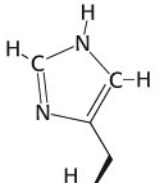
Arginine
(Arg, R)





Histidine
(His, H)





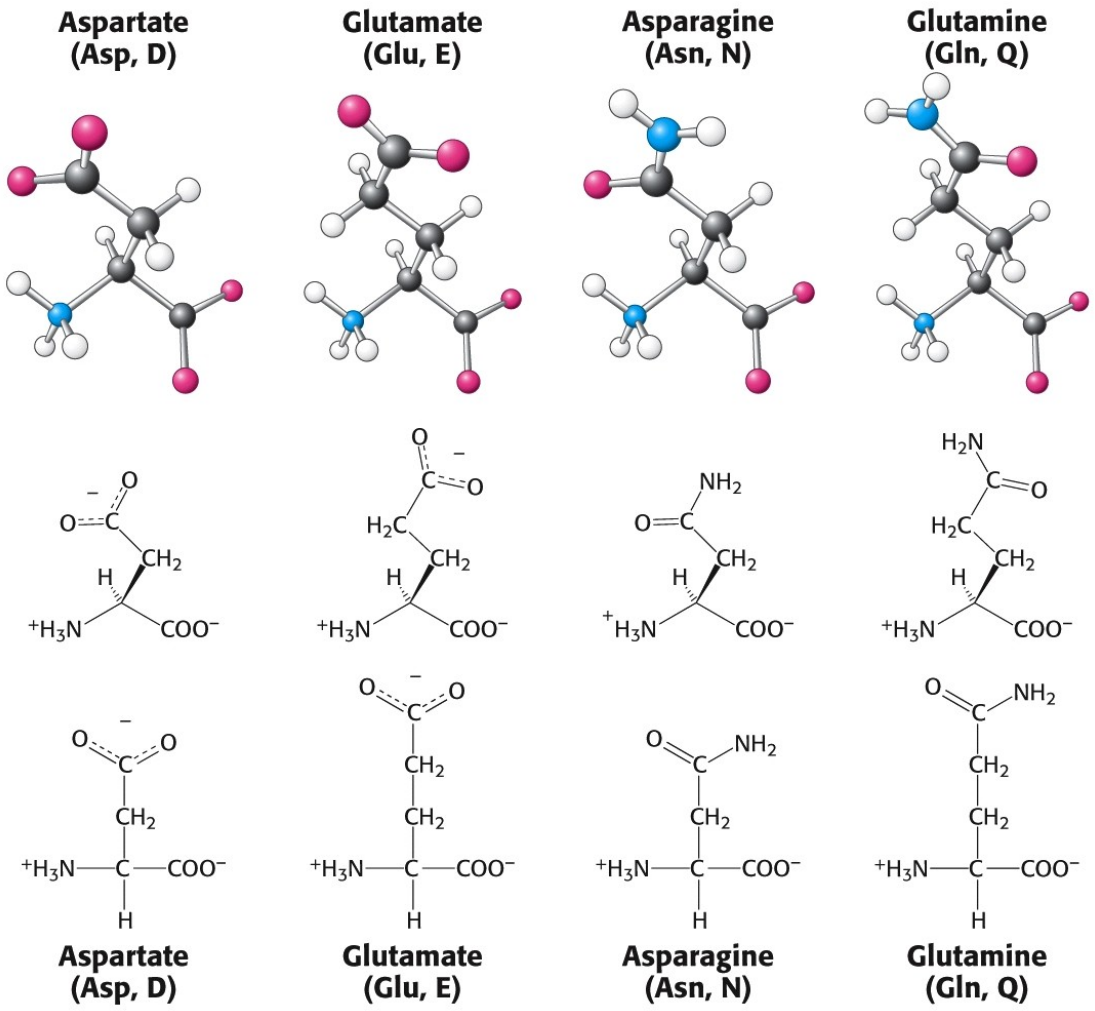
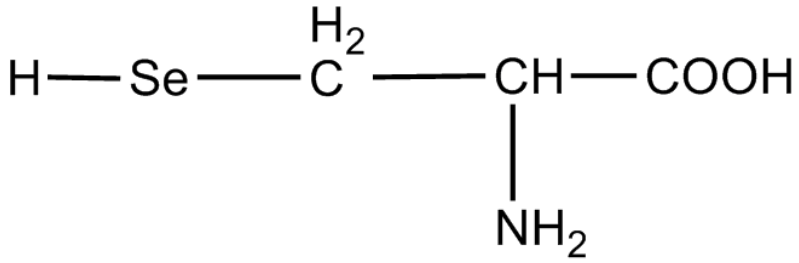

Aspartate
(Asp, D)
Glutamate
(Glu, E)
Asparagine
(Asn, N)
Glutamine
(Gln, Q)
Aspartate
(Asp, D)
Glutamate
(Glu, E)
Asparagine
(Asn, N)
Glutamine
(Gln, Q)

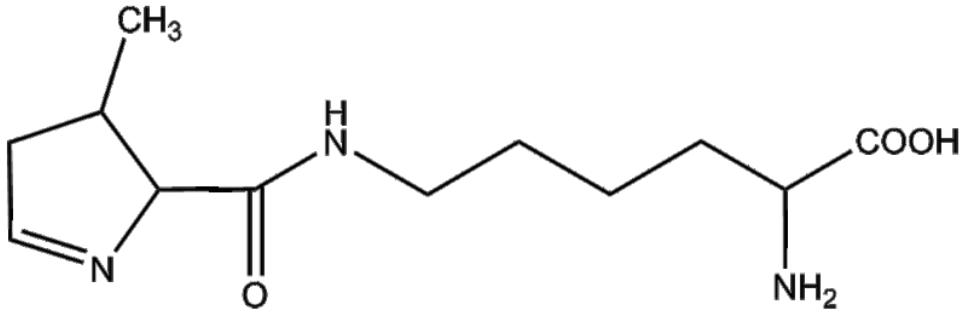
TABLE 3.2 Abbreviations for amino acids

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			
Leucine	Leu	L	Glutamine or glutamic acid	Glx	Z
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



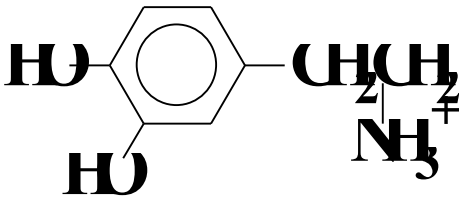
Pyrolyzin

β alanin
ornitin a citrulin
γ aminomáselná
antibiotika - azaserin, cykloserin, chloramfenikol
nervové mediátory - DOPA, dopamin, adrenalin
hormony - thyroxin, trijodthyronin

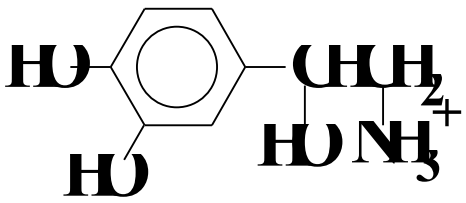
β-alanin

γ-aminomáselná kyselina

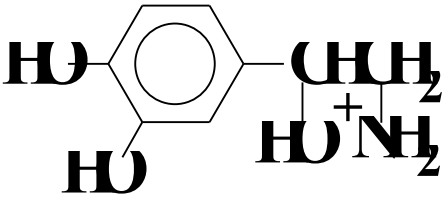
L-DOPA



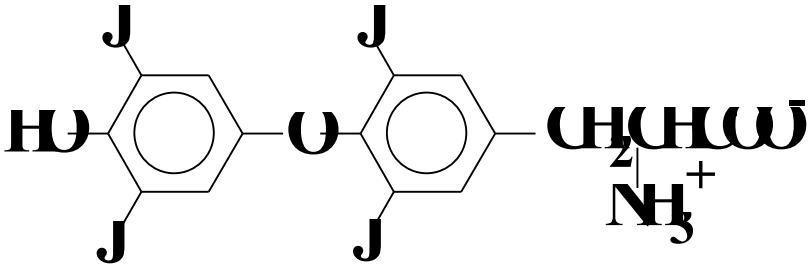
dopamin



noradrenalin



adrenalin



tyroxin
(3,5,3',5'-tetrajodthyronin)