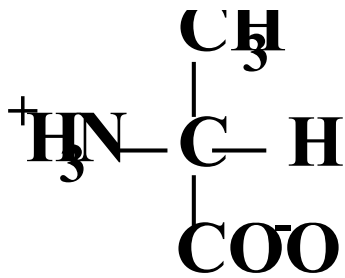
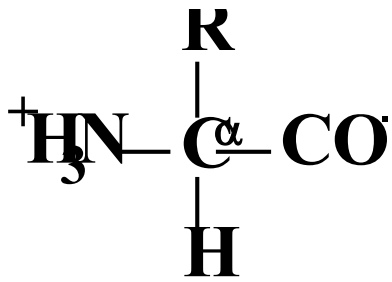
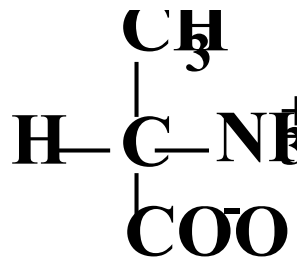


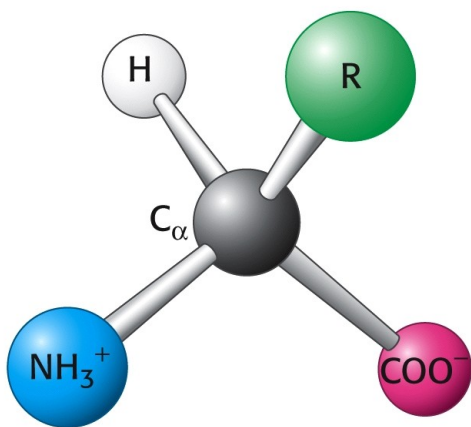
AMINOKYSELINY



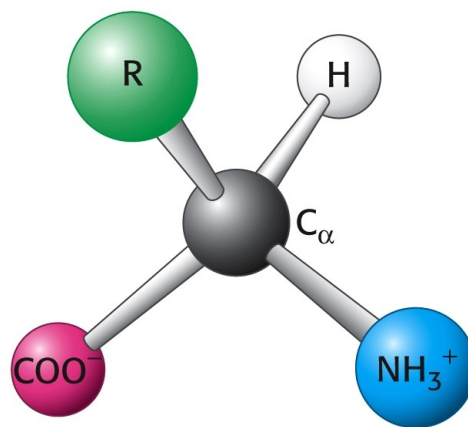
L -alanin



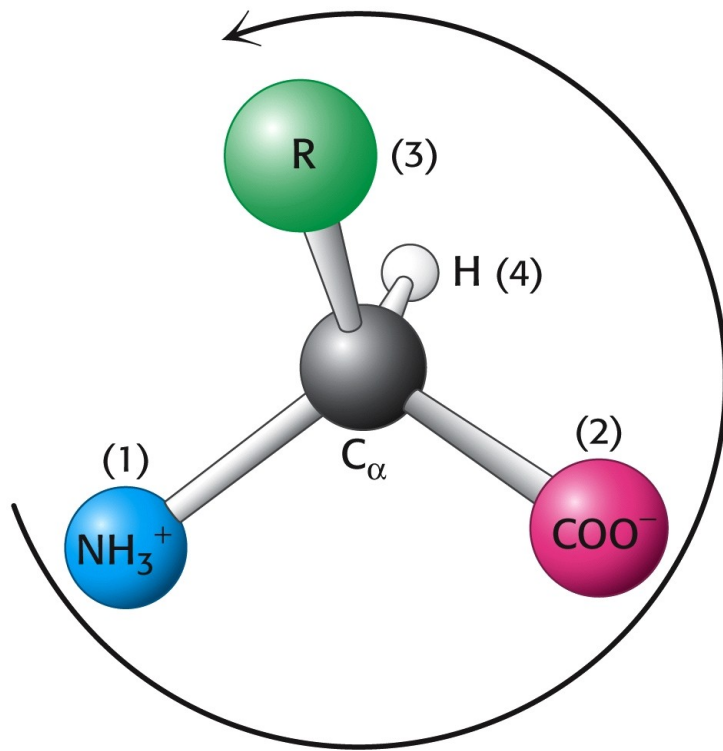
D-alani



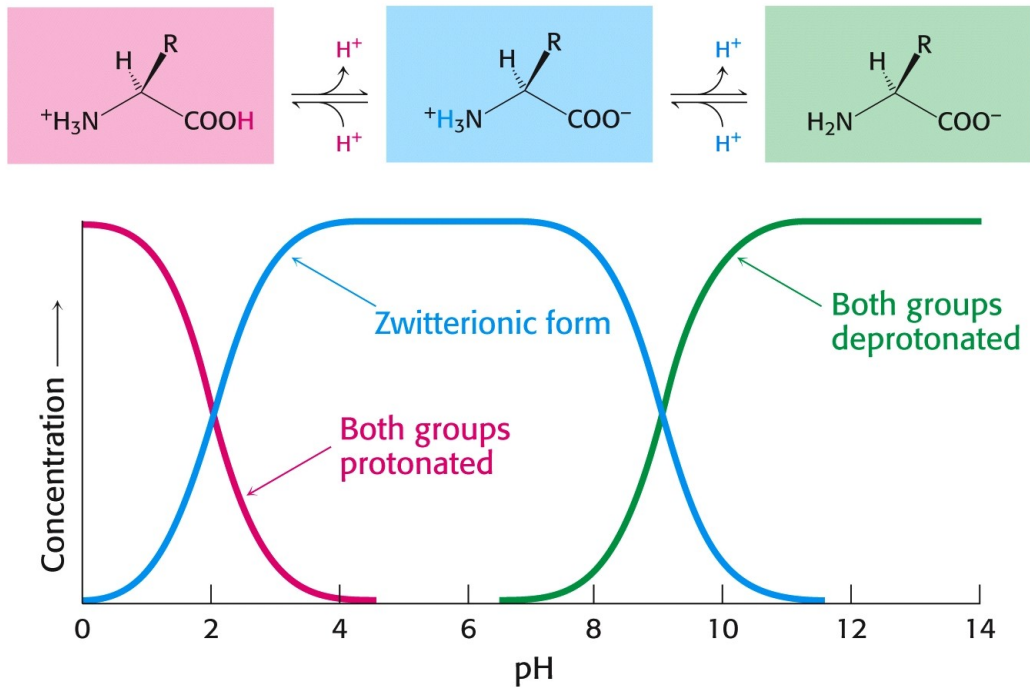
L isomer



D isomer



ACIDOBAZICKÉ VLASTNOSTI



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

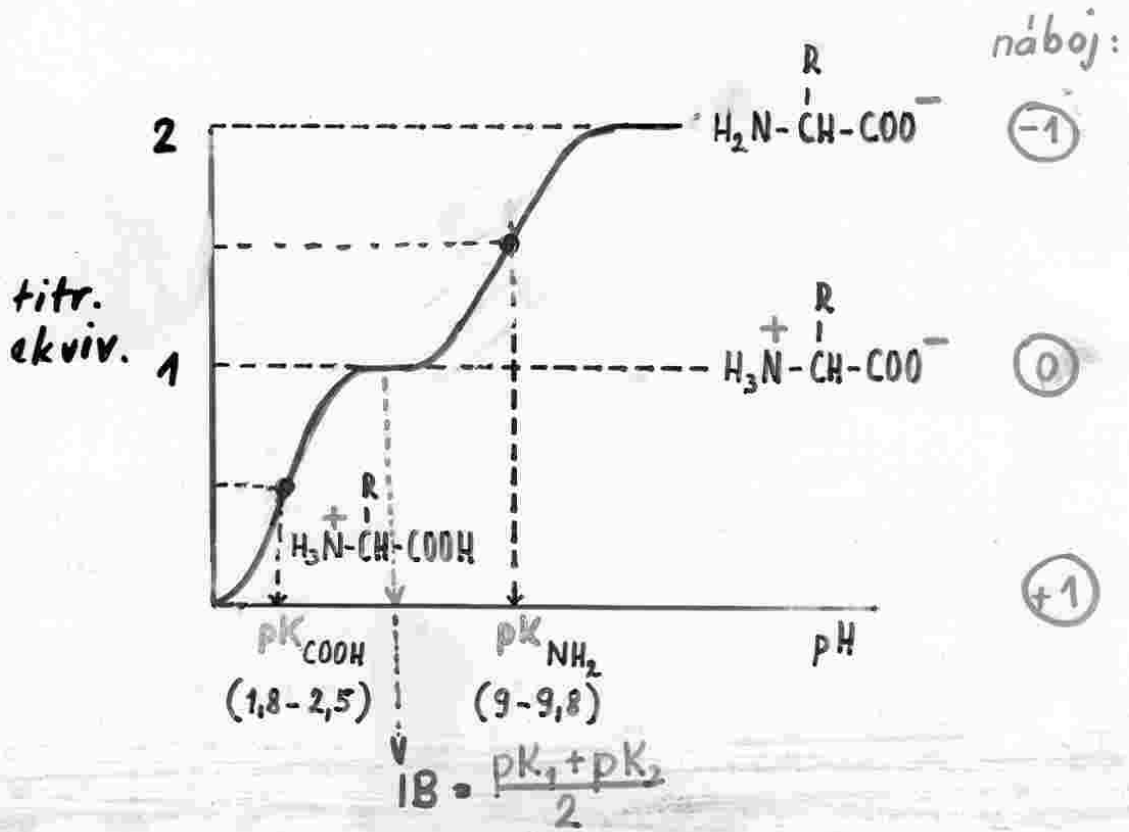
Tabulka pK

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

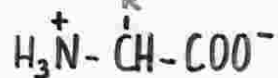
TABLE 3.1 Typical pK_a values of ionizable groups in proteins


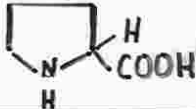
Group	Acid	\rightleftharpoons	Base	Typical pK_a^*
Terminal α -carboxyl group		\rightleftharpoons		3.1
Aspartic acid Glutamic acid		\rightleftharpoons		4.1
Histidine		\rightleftharpoons		6.0
Terminal α -amino group		\rightleftharpoons		8.0
Cysteine		\rightleftharpoons		8.3
Tyrosine		\rightleftharpoons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




a) aminokys. s nepolárním R ve vzorci:




Název	Zkratka	R
1. GLYCIN	Gly G	- H
2. ALANIN	Ala A	- CH ₃
3. VALIN	Val V	- CH < $\begin{matrix} \text{CH}_3 \\ \text{CH}_3 \end{matrix}$
4. LEUCIN	Leu L	- CH ₂ -CH < $\begin{matrix} \text{CH}_3 \\ \text{CH}_3 \end{matrix}$
5. ISOLEUCIN	Ile I	- CH-CH ₂ -CH ₃ CH ₃
6. FENYLALANIN	Phe F	- CH ₂ - 
7. PROLIN	Pro P	

b) s polární skupinou v R :

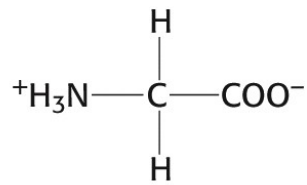
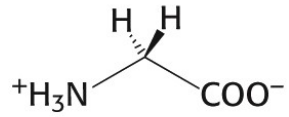
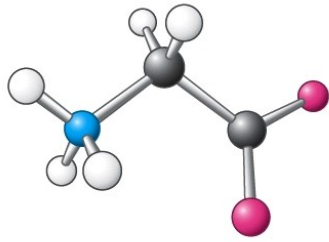
1. SERIN	Ser	S	-CH ₂ OH
2. THREONIN	Thr	T	-CH(OH)-CH ₃
3. TYROSIN	Tyr	Y	-CH ₂ -<⊖>-OH
4. CYSTEIN	Cys (SH)	C	-CH ₂ SH
5. METHIONIN	Met	M	-CH ₂ -CH ₂ -S-CH ₃
6. ASPARAGIN	Asn	N	-CH ₂ -CONH ₂

7. GLUTAMIN	Gln	Q	-CH ₂ -CH ₂ -CONH ₂
8. TRYPTOFAN	Try	W	-CH ₂ - 

c) s ionisovanou skupinou v R :

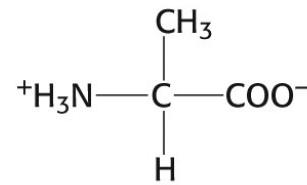
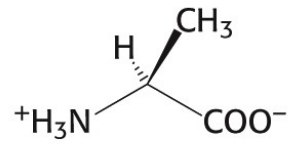
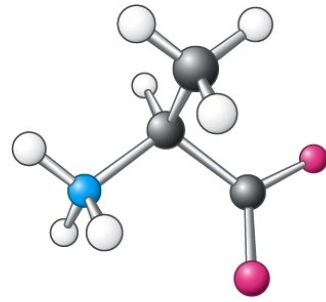
1. KYS. ASPARAGOVA'	Asp	D	-CH ₂ COOH
2. KYS. GLUTAMOVA'	Glu	E	-CH ₂ CH ₂ COOH _{NH}
3. ARGININ	Arg	R	-CH ₂ CH ₂ CH ₂ -NH-C(=NH)-NH ₂
4. LYSIN	Lys	K	-CH ₂ CH ₂ CH ₂ CH ₂ -NH ₂
5. HISTIDIN	His	H	-CH ₂ - 

Glycine
(Gly, G)



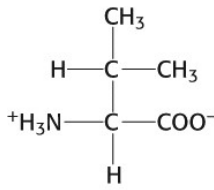
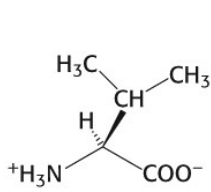
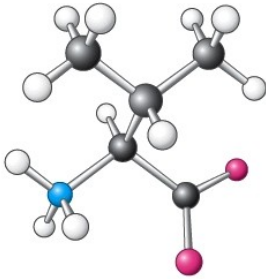
Glycine
(Gly, G)

Alanine
(Ala, A)



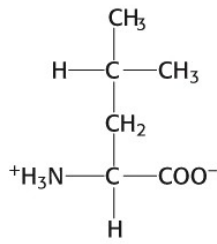
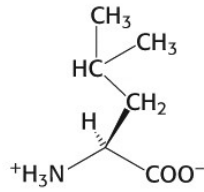
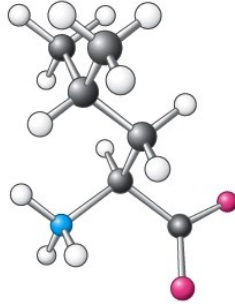
Alanine
(Ala, A)

**Valine
(Val, V)**



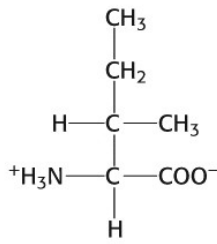
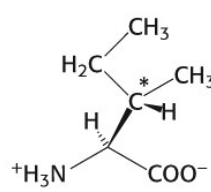
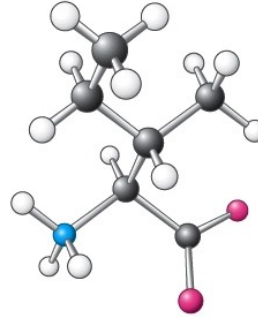
**Valine
(Val, V)**

**Leucine
(Leu, L)**



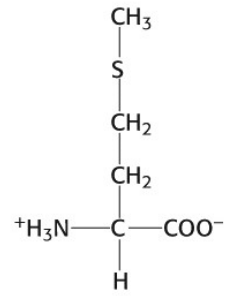
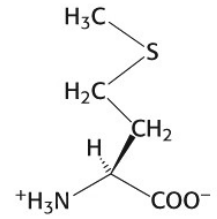
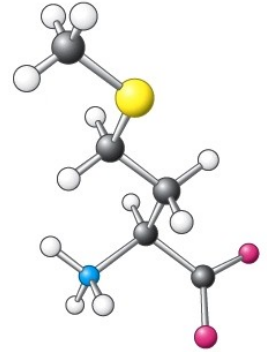
**Leucine
(Leu, L)**

**Isoleucine
(Ile, I)**

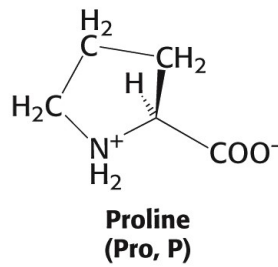
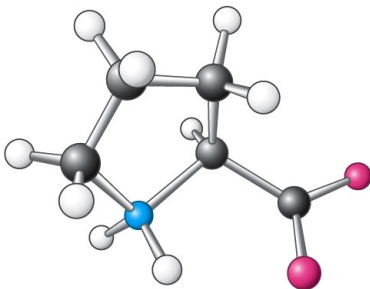


**Isoleucine
(Ile, I)**

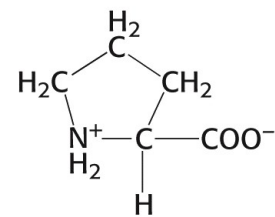
**Methionine
(Met, M)**



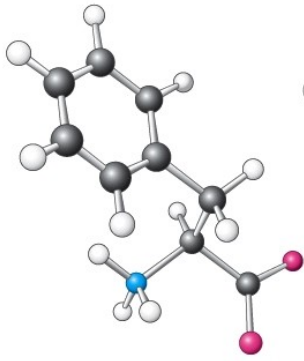
**Methionine
(Met, M)**



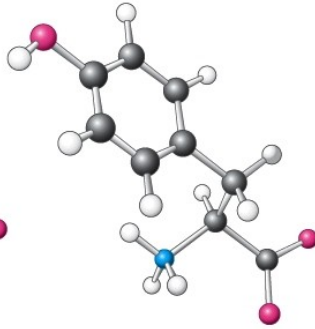
**Proline
(Pro, P)**



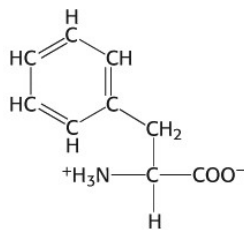
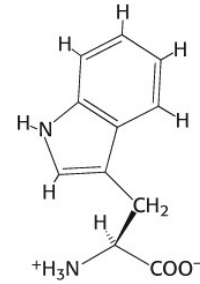
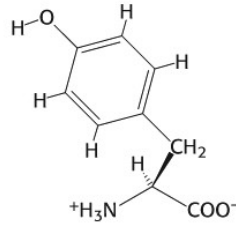
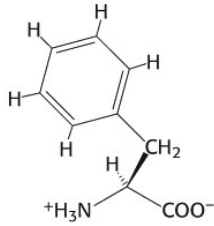
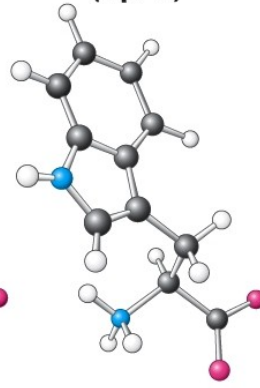
**Phenylalanine
(Phe, F)**



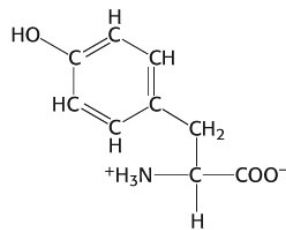
**Tyrosine
(Tyr, Y)**



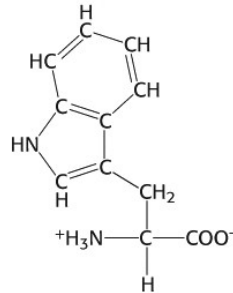
**Tryptophan
(Trp, W)**



**Phenylalanine
(Phe, F)**

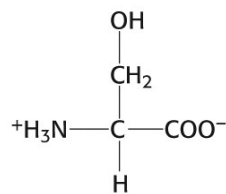
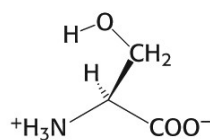
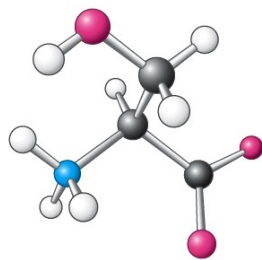


**Tyrosine
(Tyr, Y)**



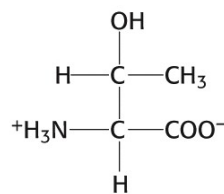
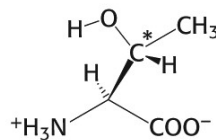
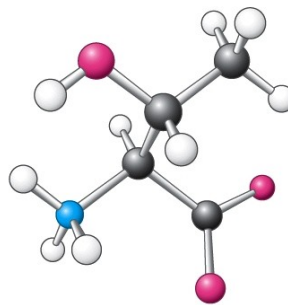
**Tryptophan
(Trp, W)**

**Serine
(Ser, S)**

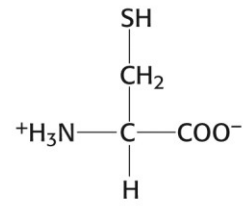
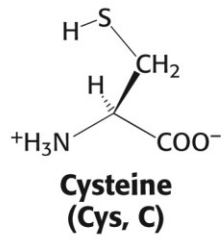
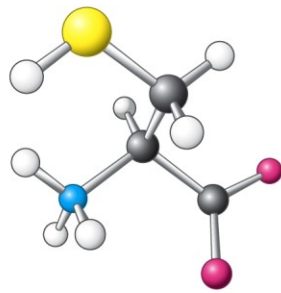


**Serine
(Ser, S)**

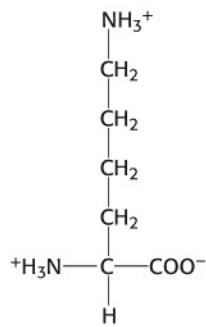
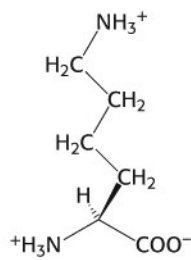
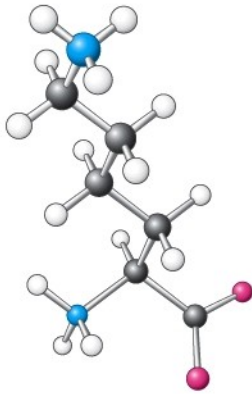
**Threonine
(Thr, T)**



**Threonine
(Thr, T)**

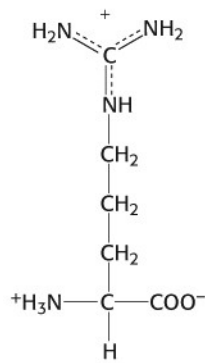
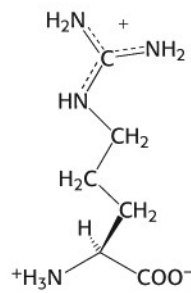
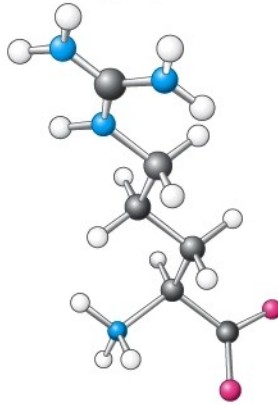


Lysine
(Lys, K)



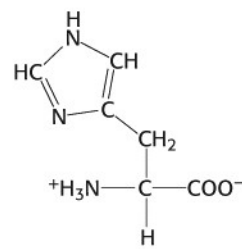
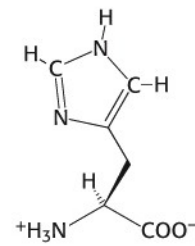
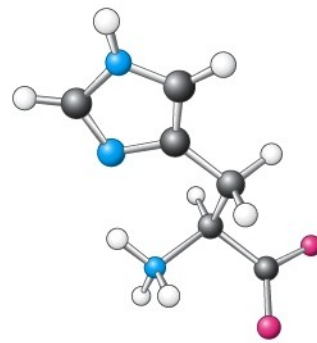
Lysine
(Lys, K)

Arginine
(Arg, R)



Arginine
(Arg, R)

Histidine
(His, H)



Histidine
(His, H)

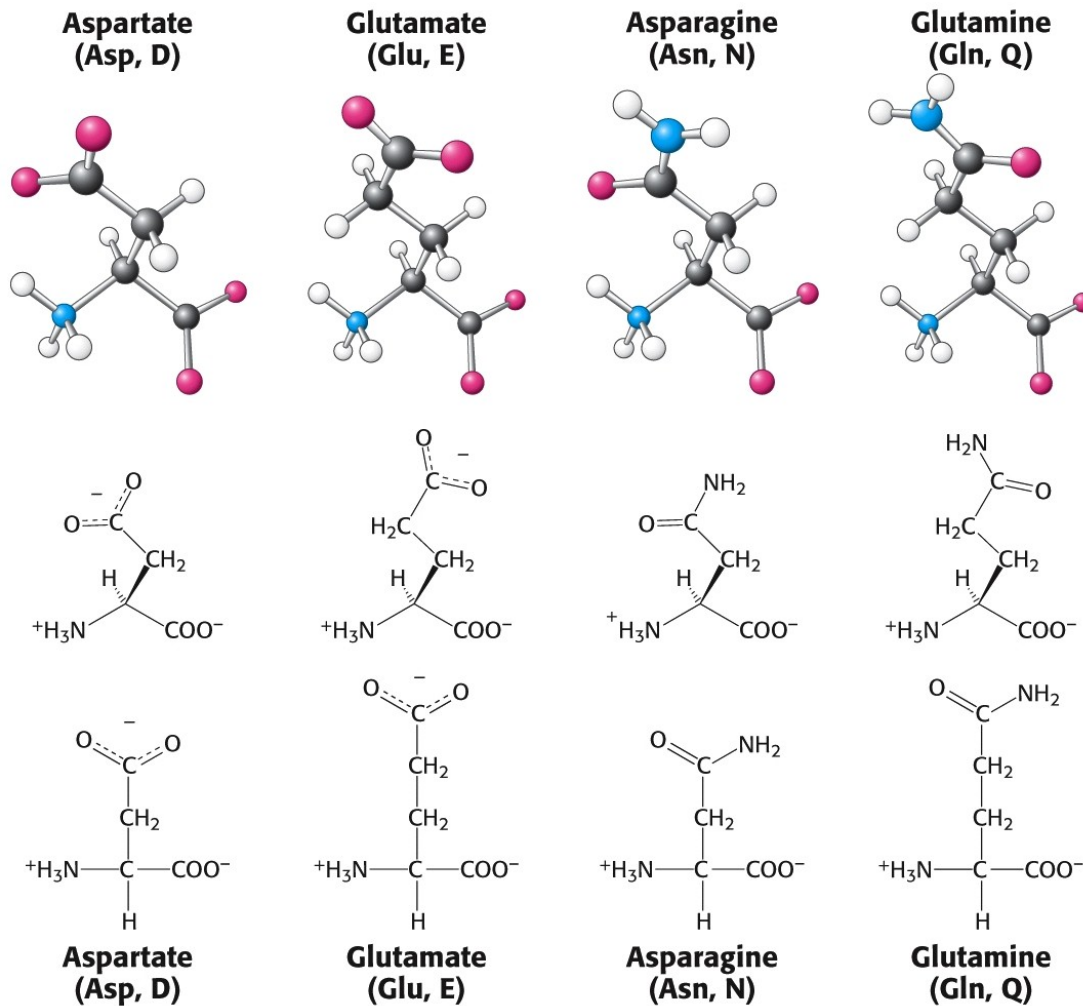


TABLE 3.2 Abbreviations for amino acids

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

β alanin

ornitin a citrulin

γ aminomáselná

antibiotika - azaserin, cykloserin, chloramfenikol

nervové mediátory - DOPA, dopamin, adrenalin

hormony - thyroxin, trijodthyronin



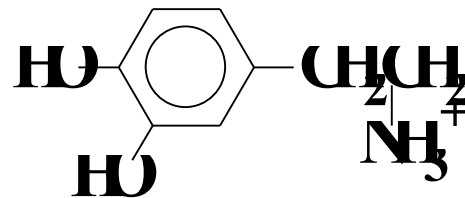
βalanin



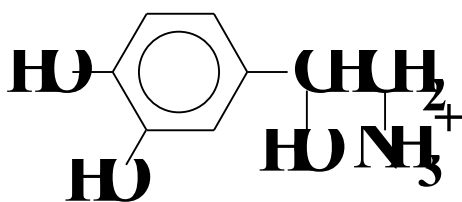
γaminomáselná kyselina



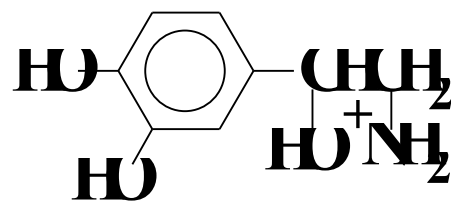
DOPA



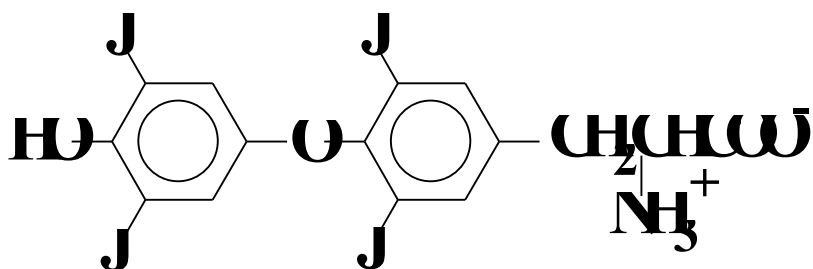
dopamin



noradrenalin



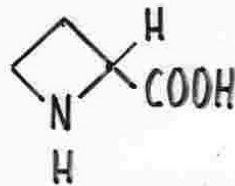
adrenalin



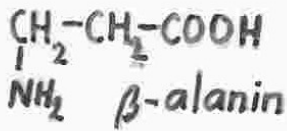
tyrosin
(3,5,3',5'-tetrajodthyronin)



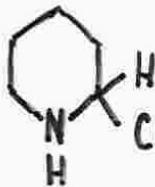
k. aminocyklopropyl-
karboxylová



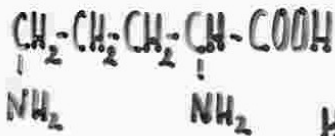
k. azetidinkarboxylová



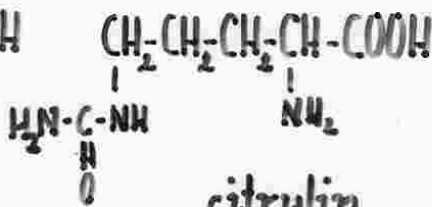
β -alanin



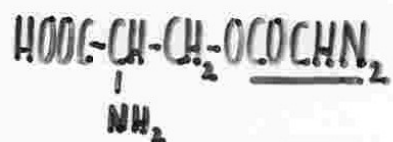
k. pipakolinová



ornithin

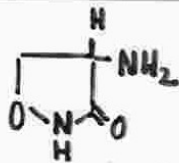


citrulin

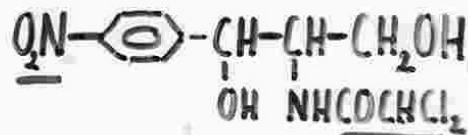


azaserin

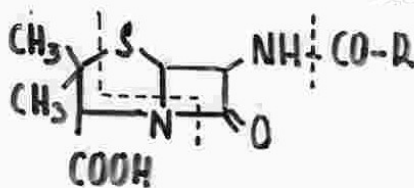
ANTIBIOTIKA:



cykloserin

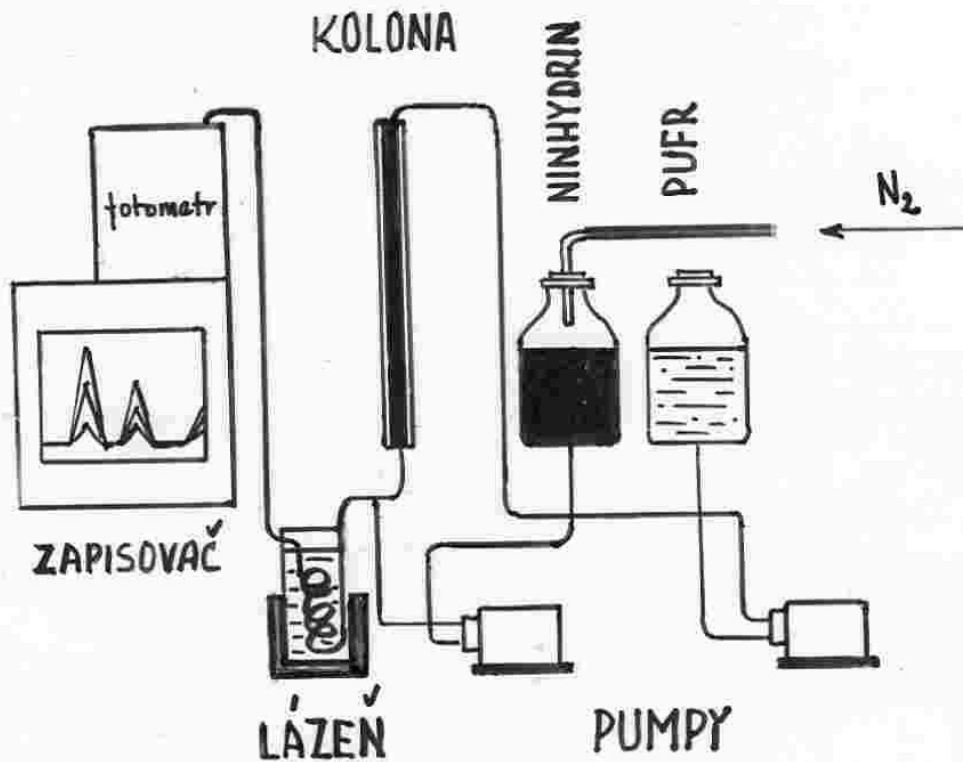


chloramfenikol



penicilin

Schéma analyzátoru aminokyselin



1. Úplná hydrolyza - kyselá - 6 M HCl, 100 - 120 °C, 10 - 100 hod.
- bazická - 2 - 4 M NaOH, 100 °C, 4 - 8 hod.
- enzymová - Pronasa