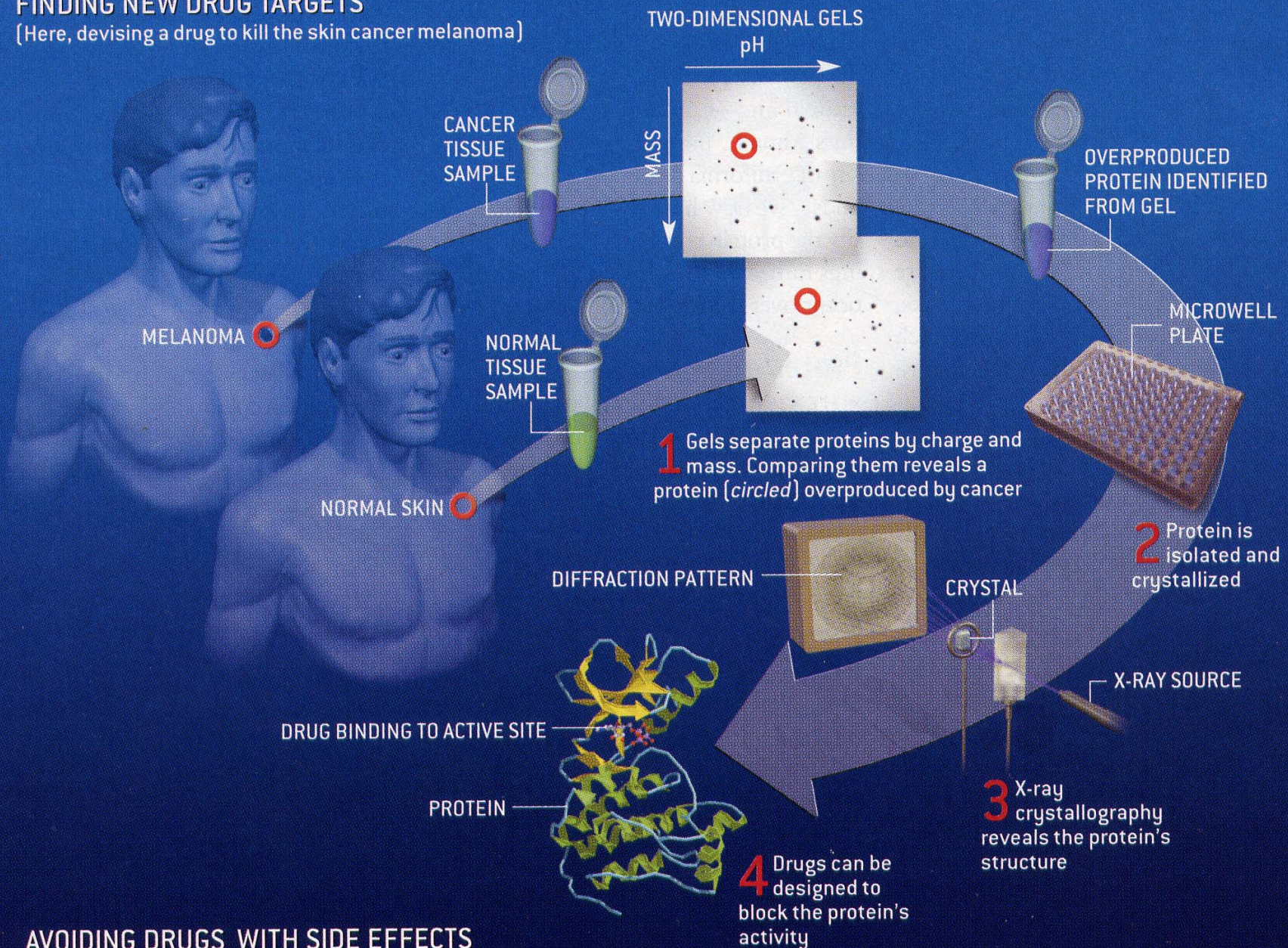


HOW PROTEOMICS CAN HELP DRUG DEVELOPMENT

FINDING NEW DRUG TARGETS

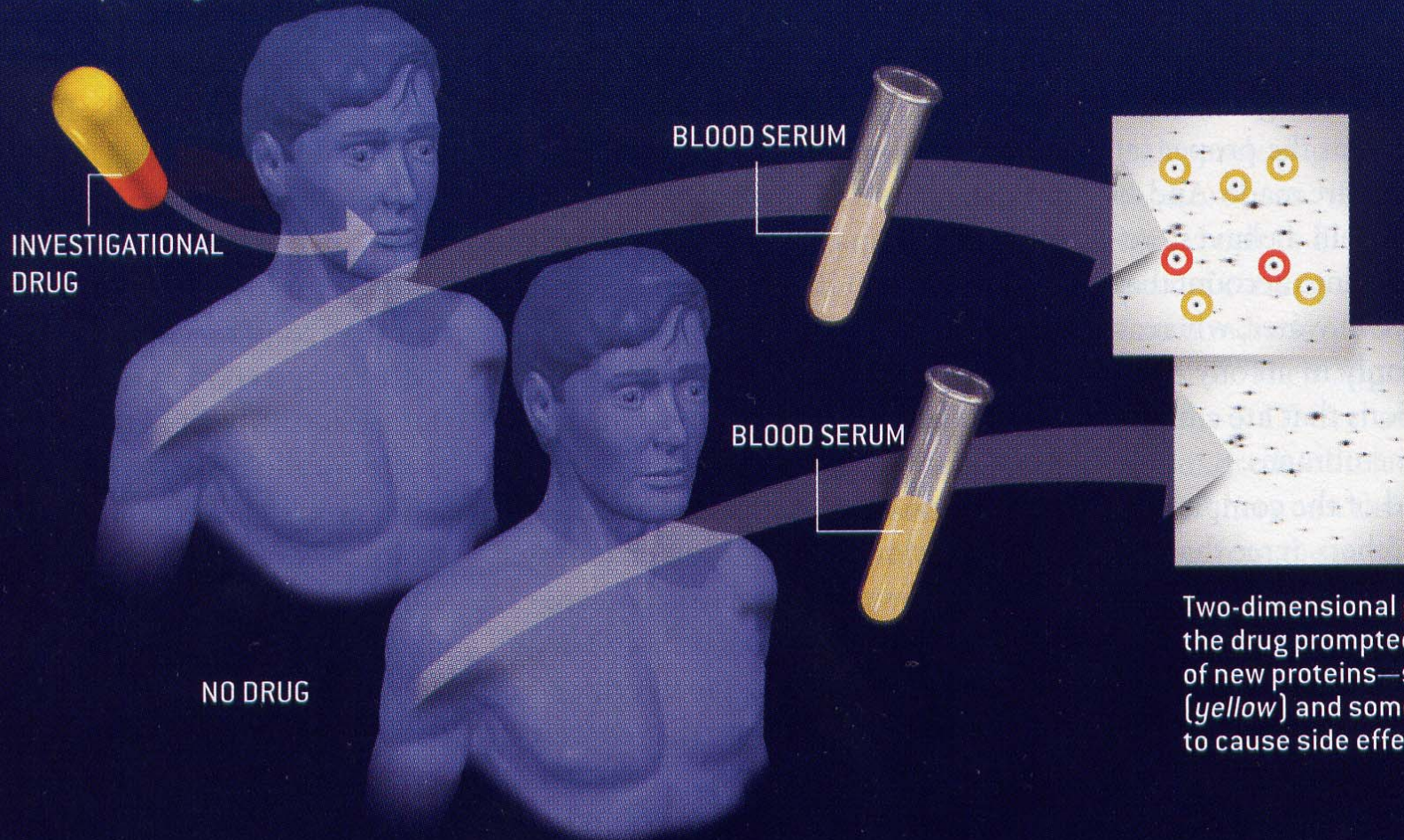
(Here, devising a drug to kill the skin cancer melanoma)

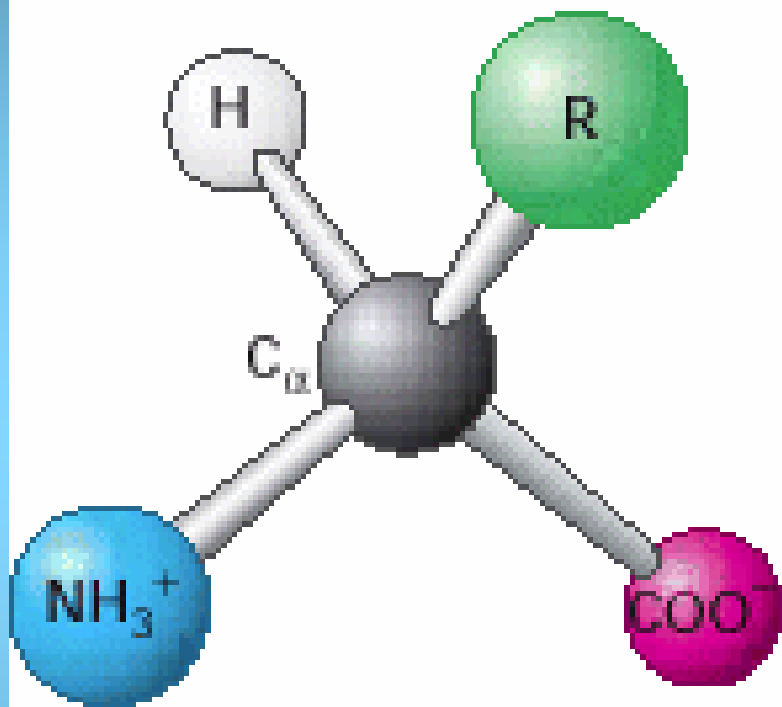


AVOIDING DRUGS WITH SIDE EFFECTS

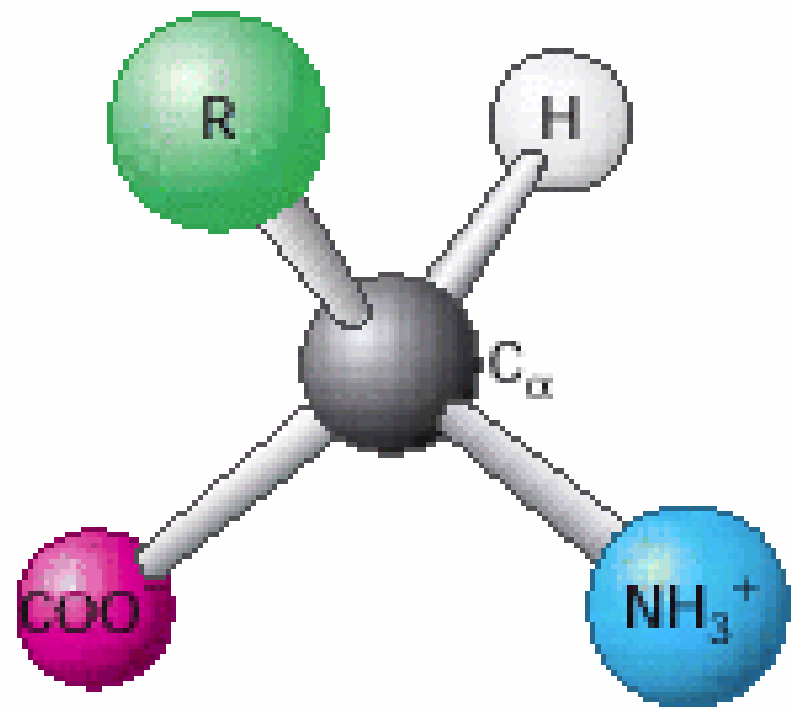
(Here, determining whether an investigational drug prompts production of possibly harmful proteins)

activity

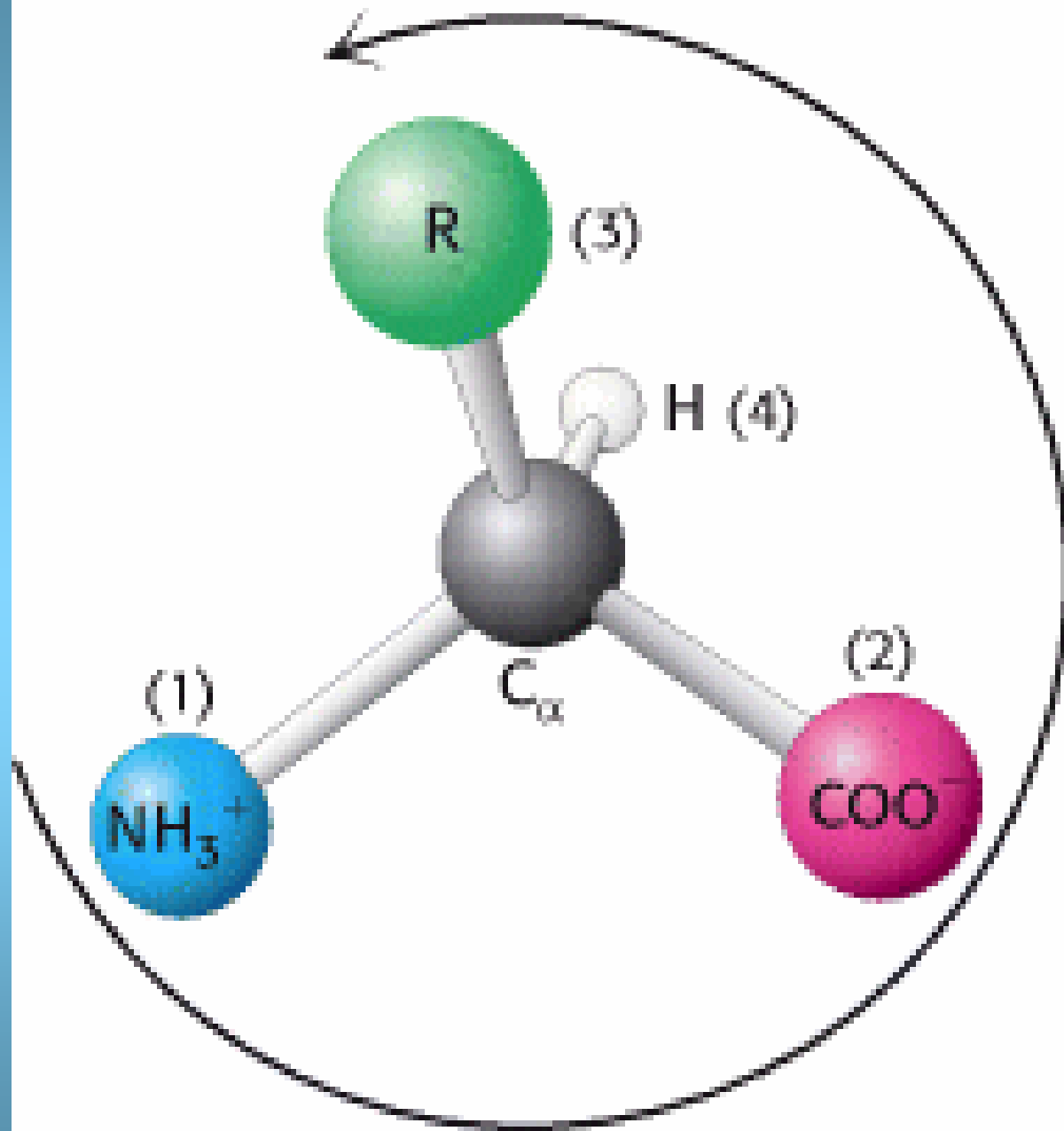


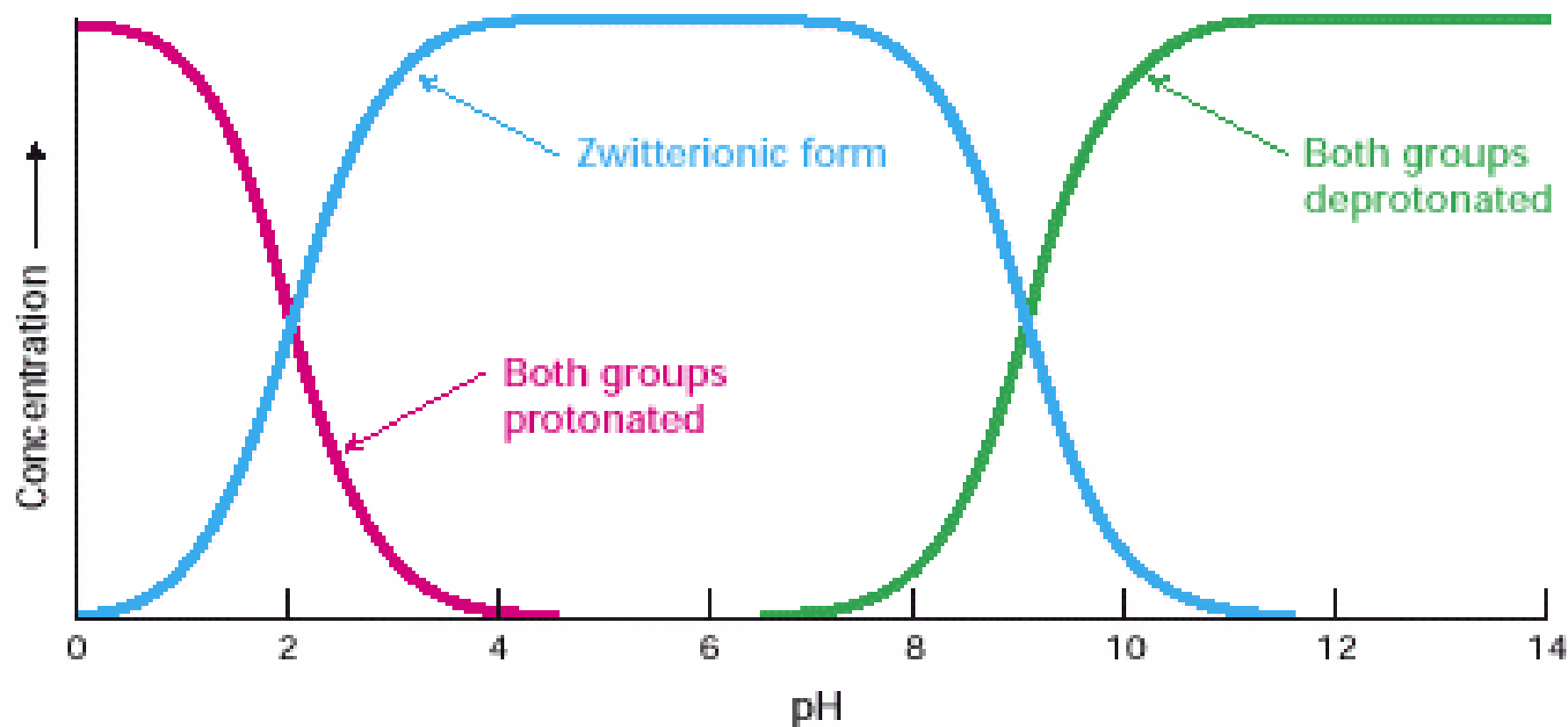
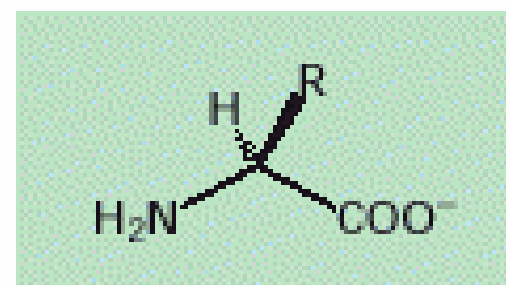
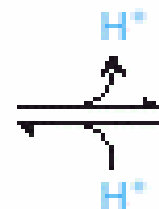
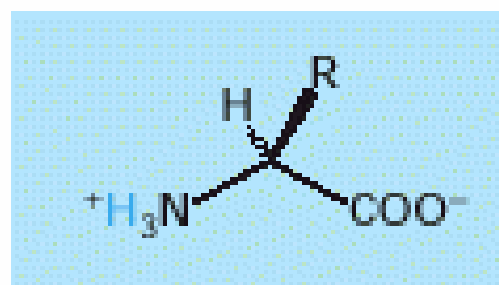
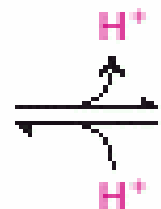
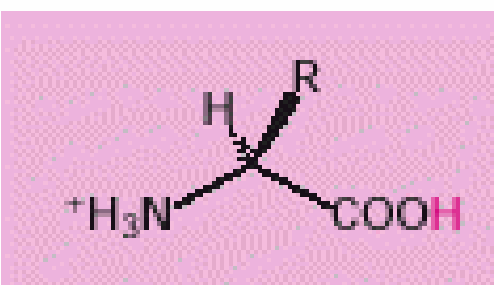


L isomer

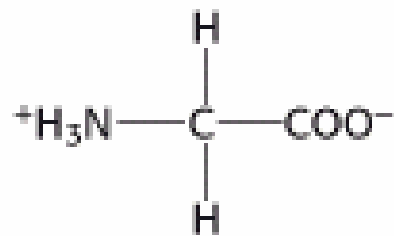
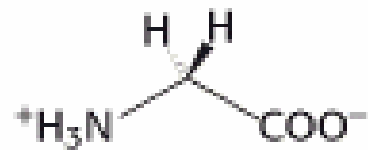
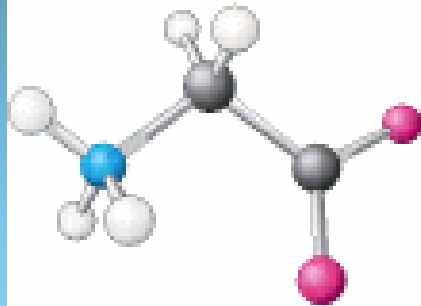


D isomer



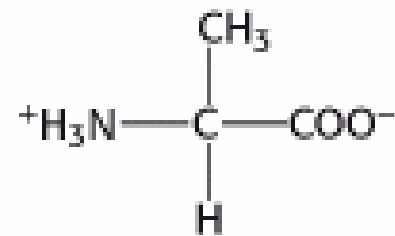
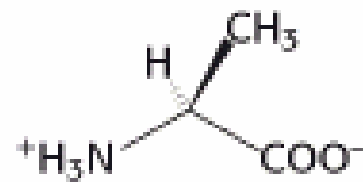
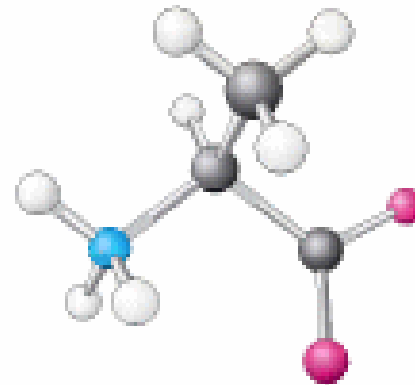


**Glycine
(Gly, G)**

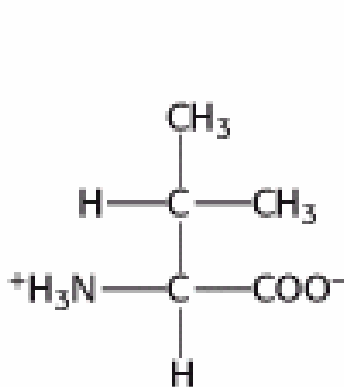
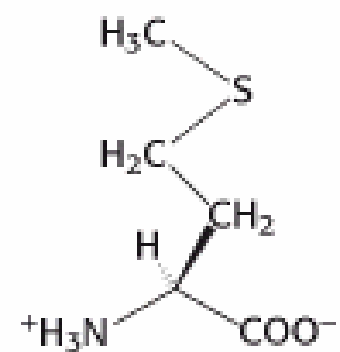
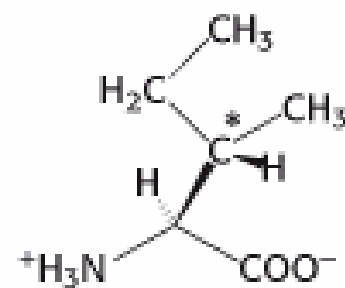
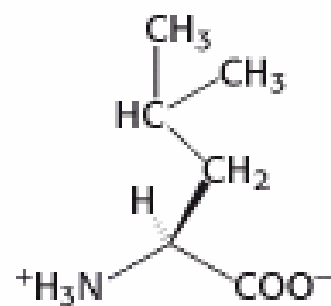
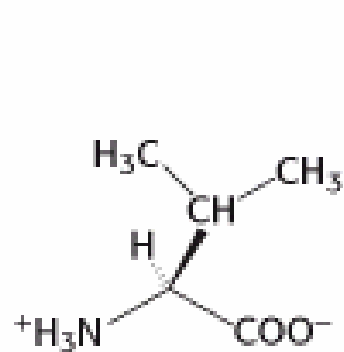


**Glycine
(Gly, G)**

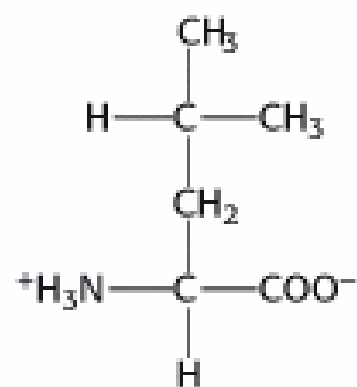
**Alanine
(Ala, A)**



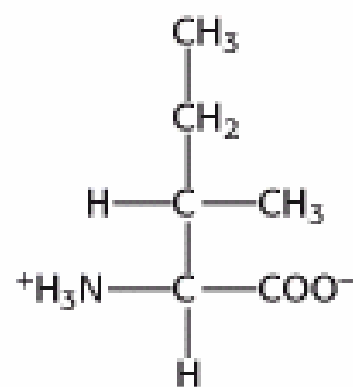
**Alanine
(Ala, A)**



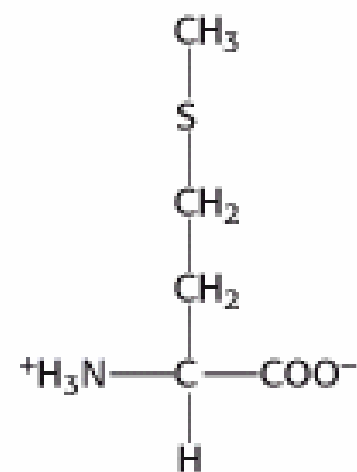
Valine
(Val, V)



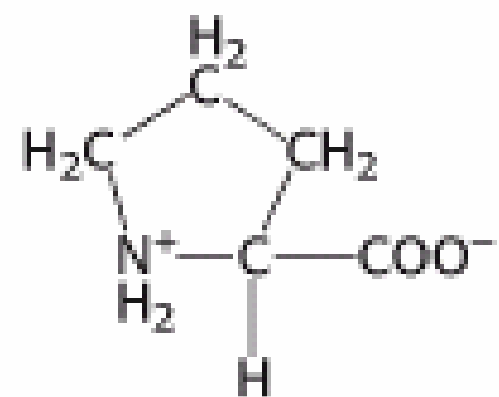
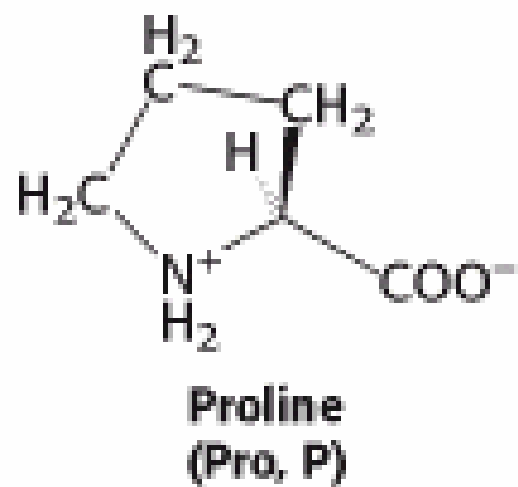
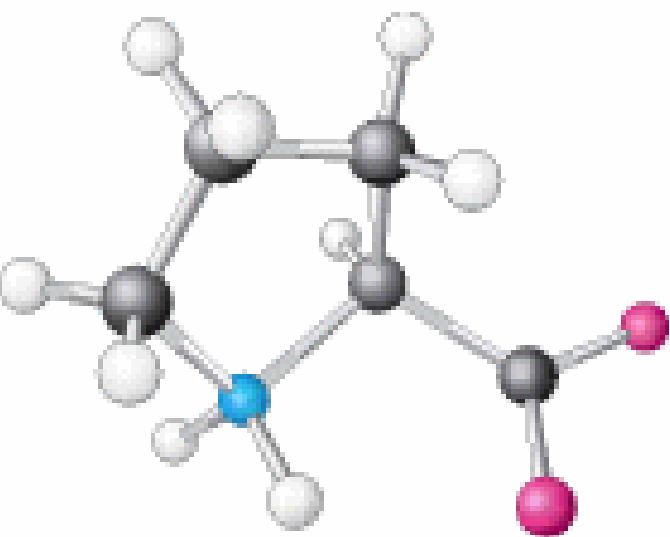
Leucine
(Leu, L)

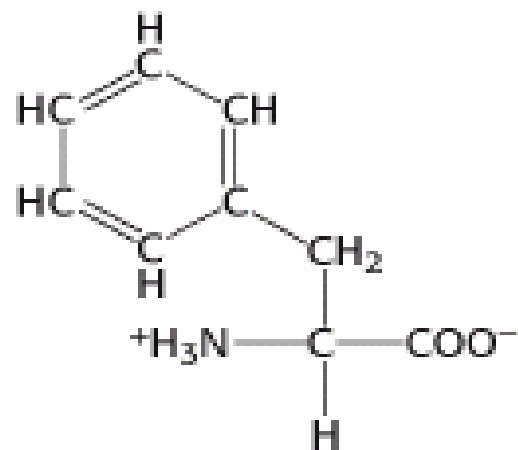
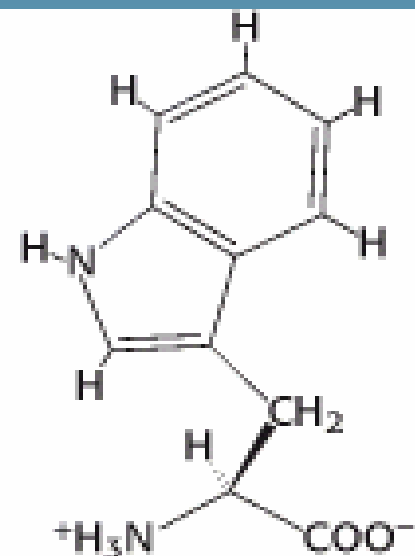
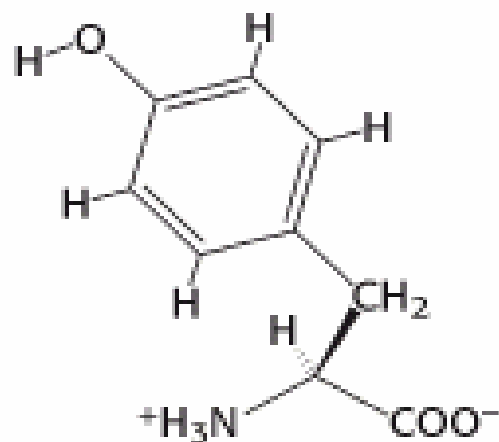
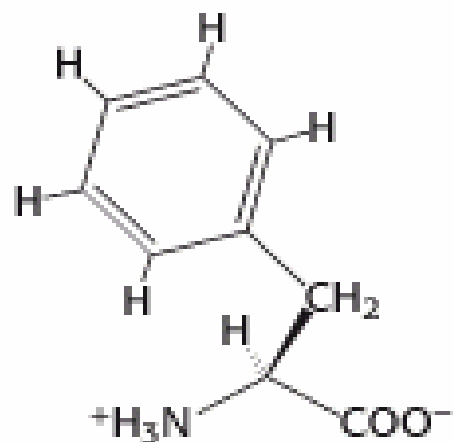


Isoleucine
(Ile, I)

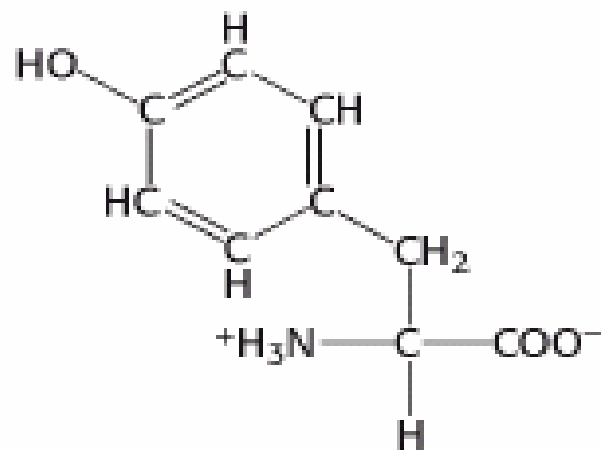


Methionine
(Met, M)

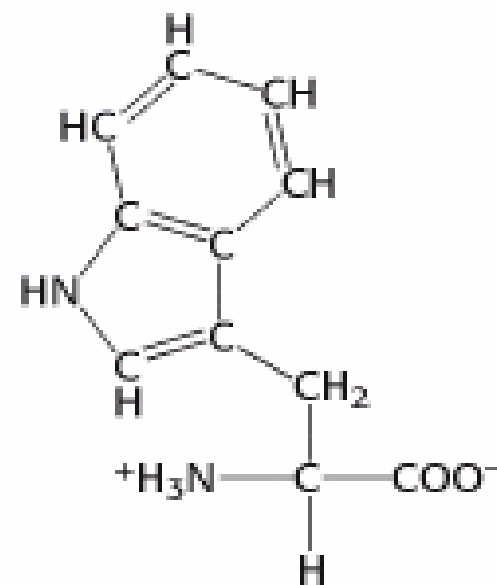




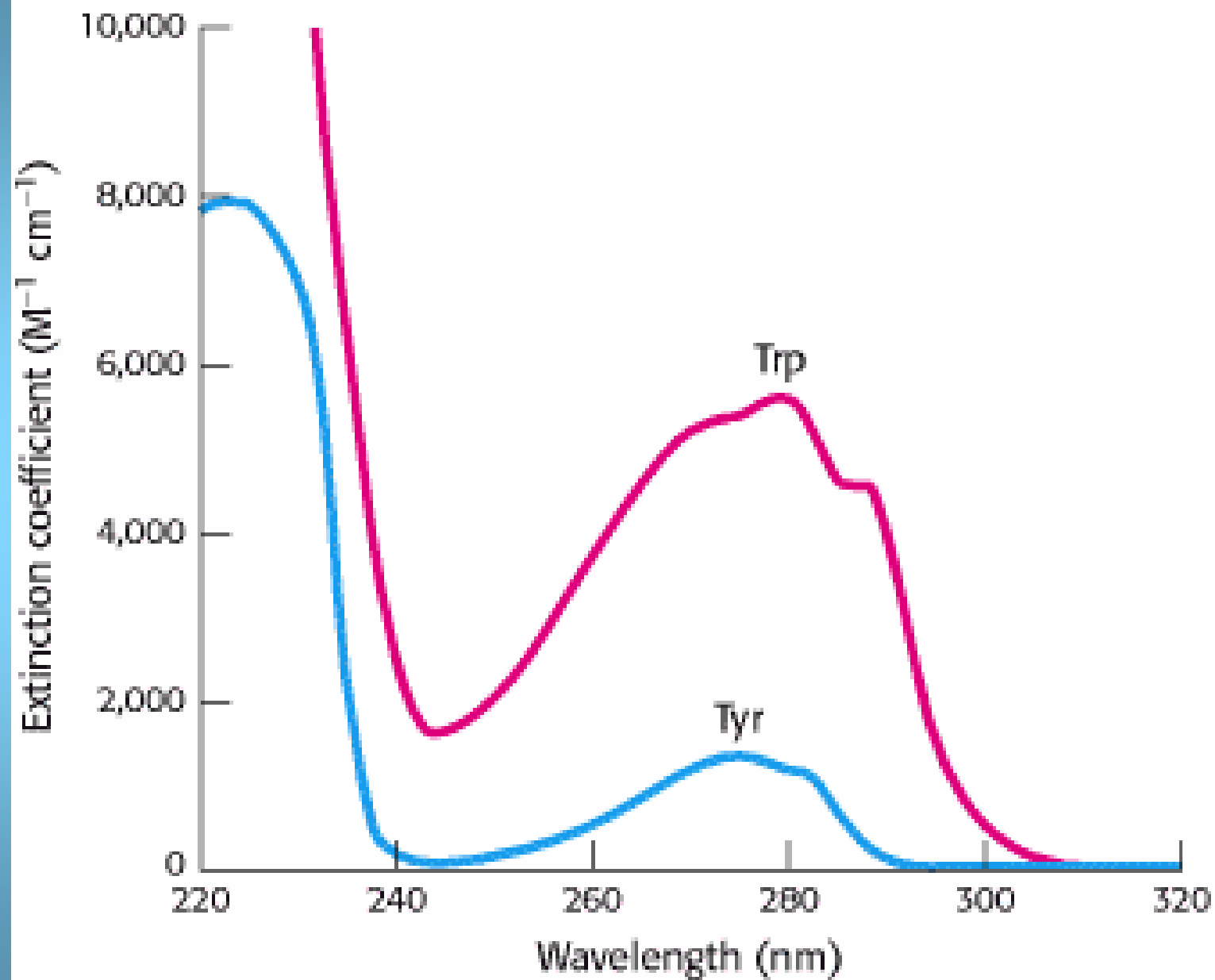
Phenylalanine
(Phe, F)

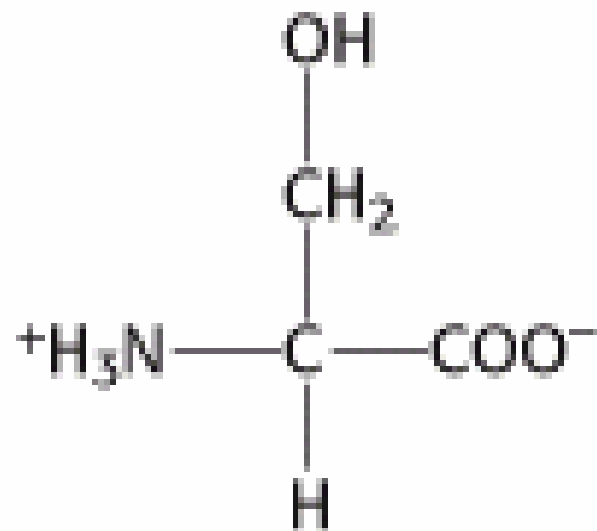
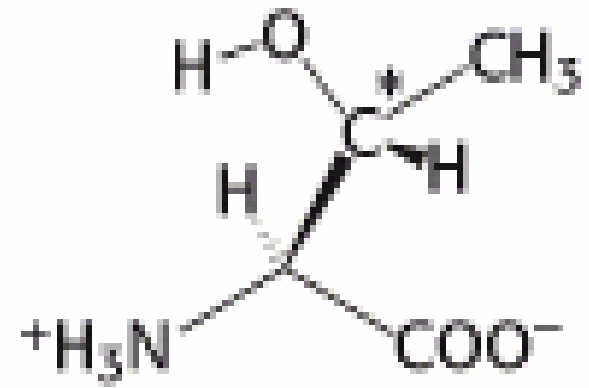
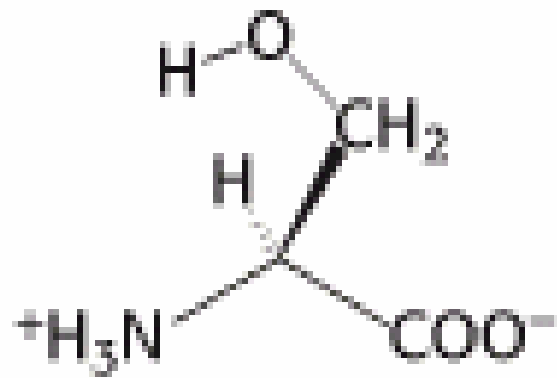


Tyrosine
(Tyr, Y)

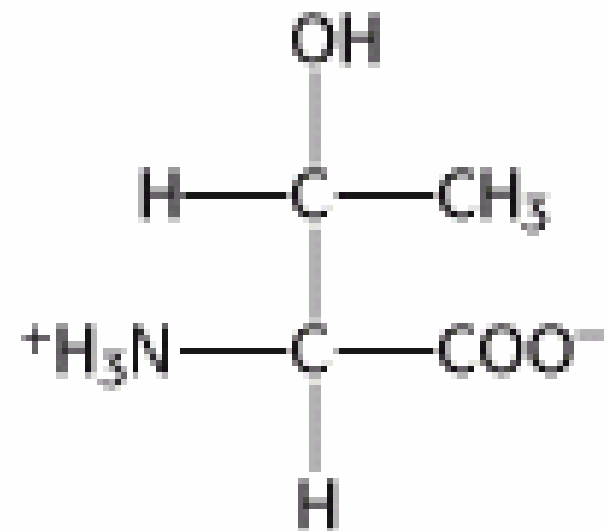


Tryptophan
(Trp, W)

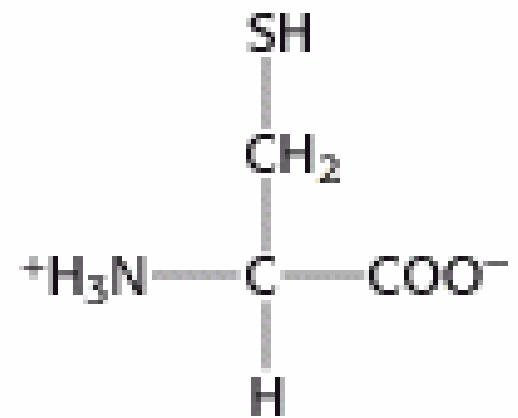
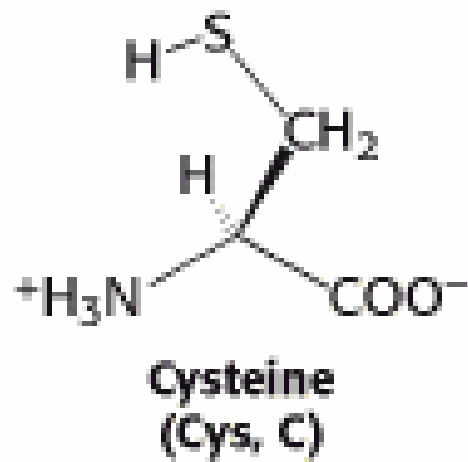
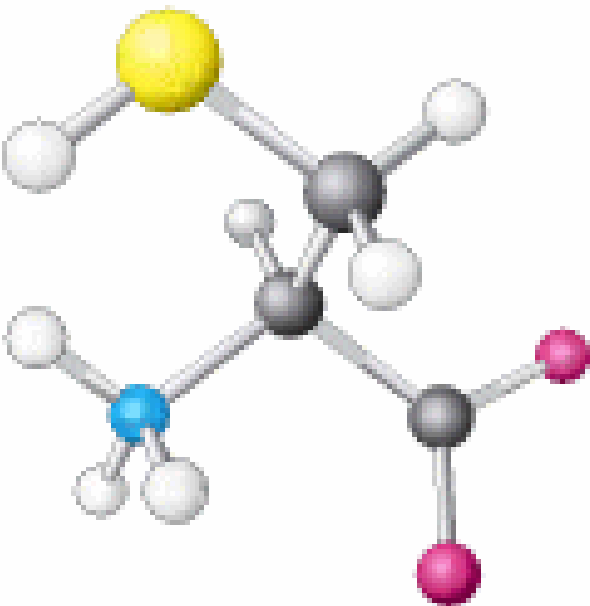


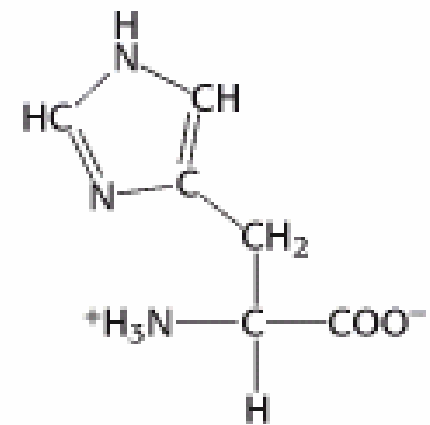
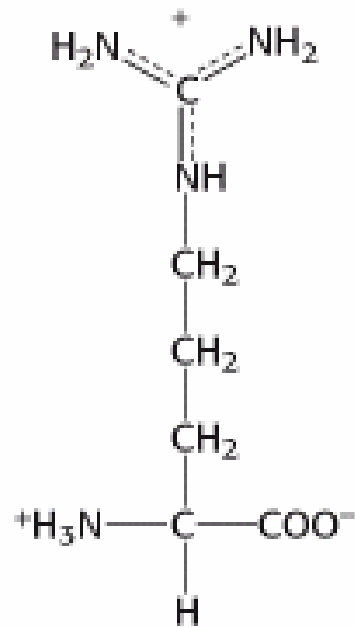
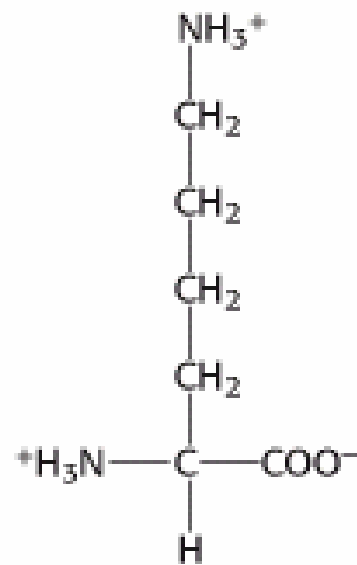
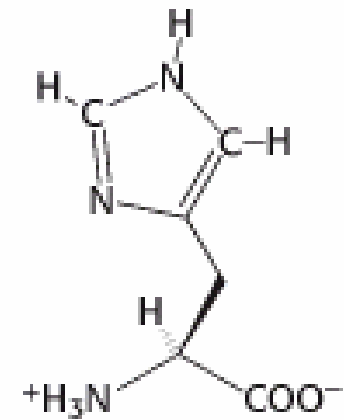
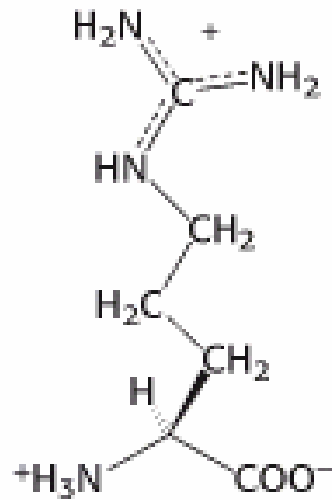
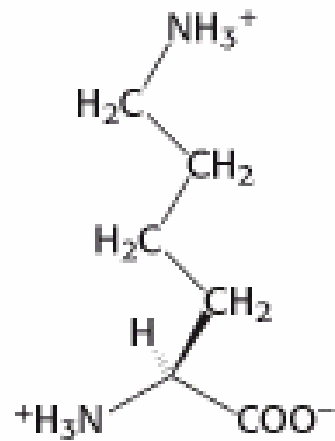


Serine
(Ser, S)



Threonine
(Thr, T)

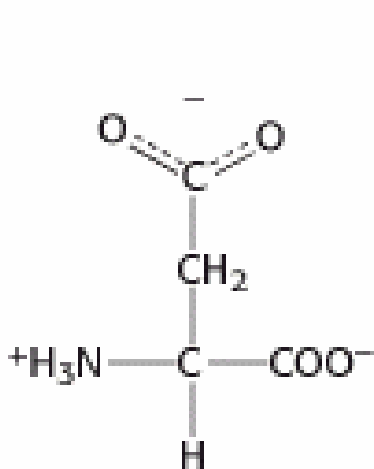
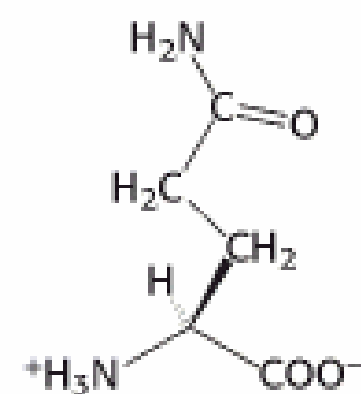
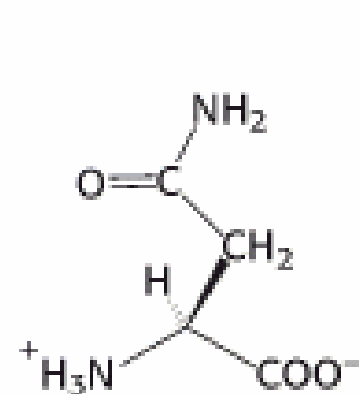
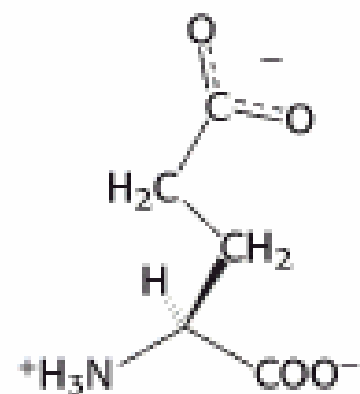
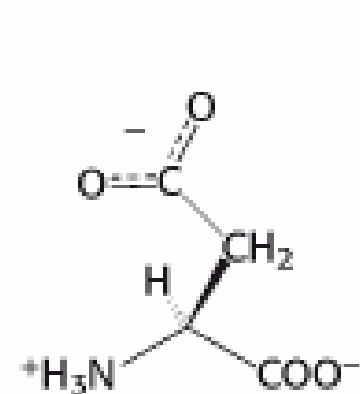




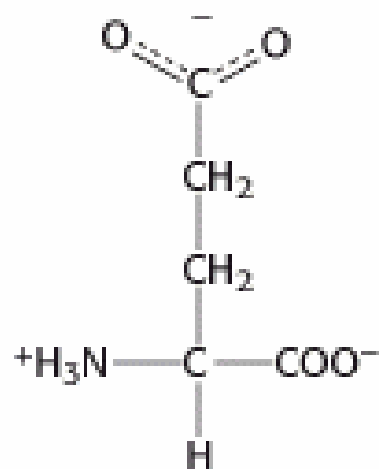
Lysine
(Lys, K)

Arginine
(Arg, R)

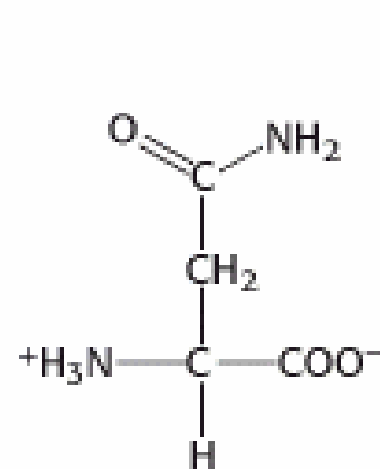
Histidine
(His, H)



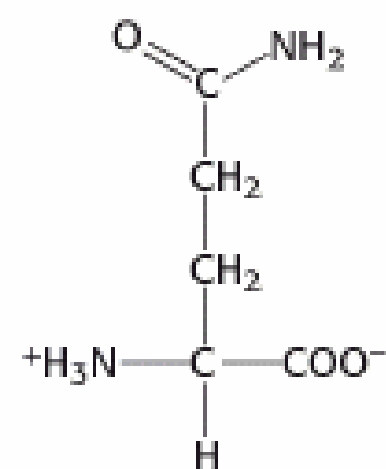
Aspartate
(Asp, D)



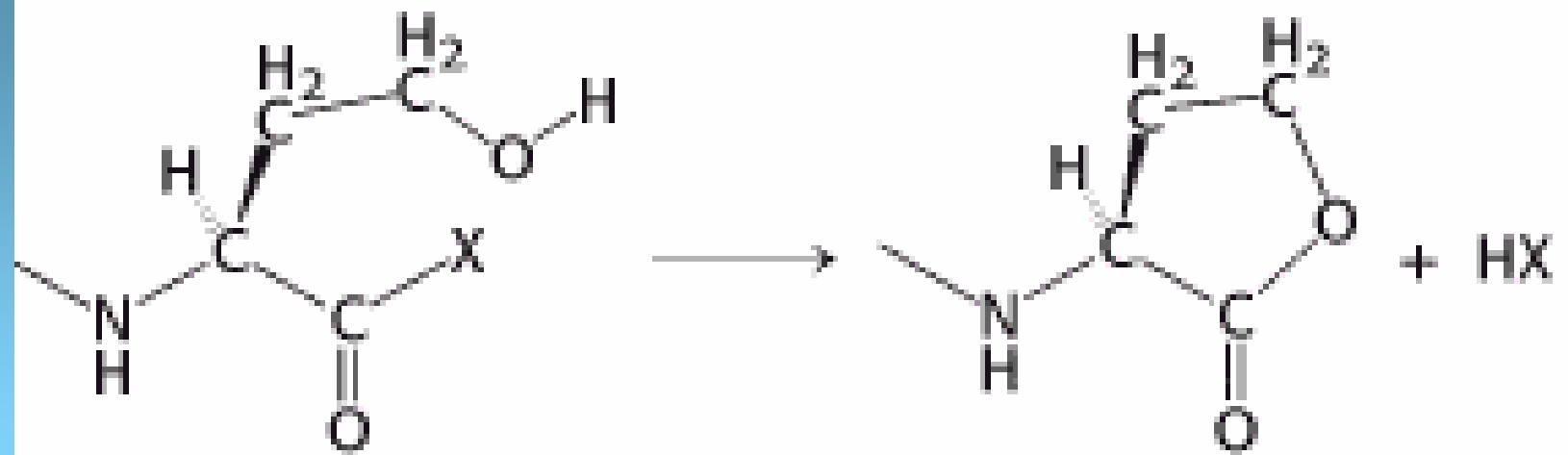
Glutamate
(Glu, E)



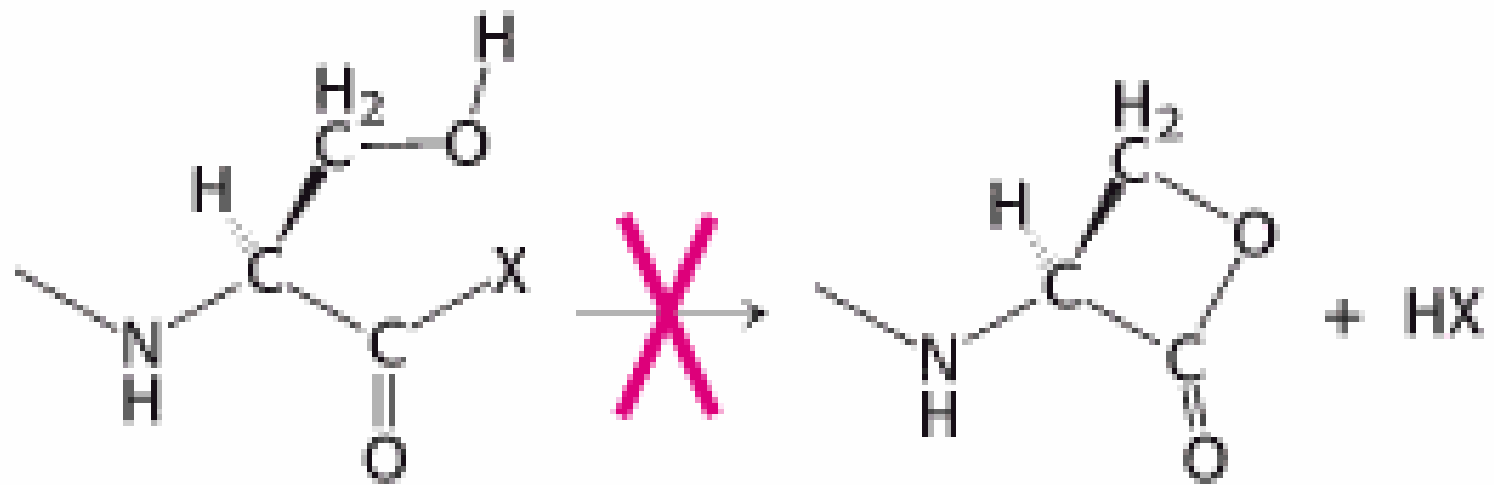
Asparagine
(Asn, N)



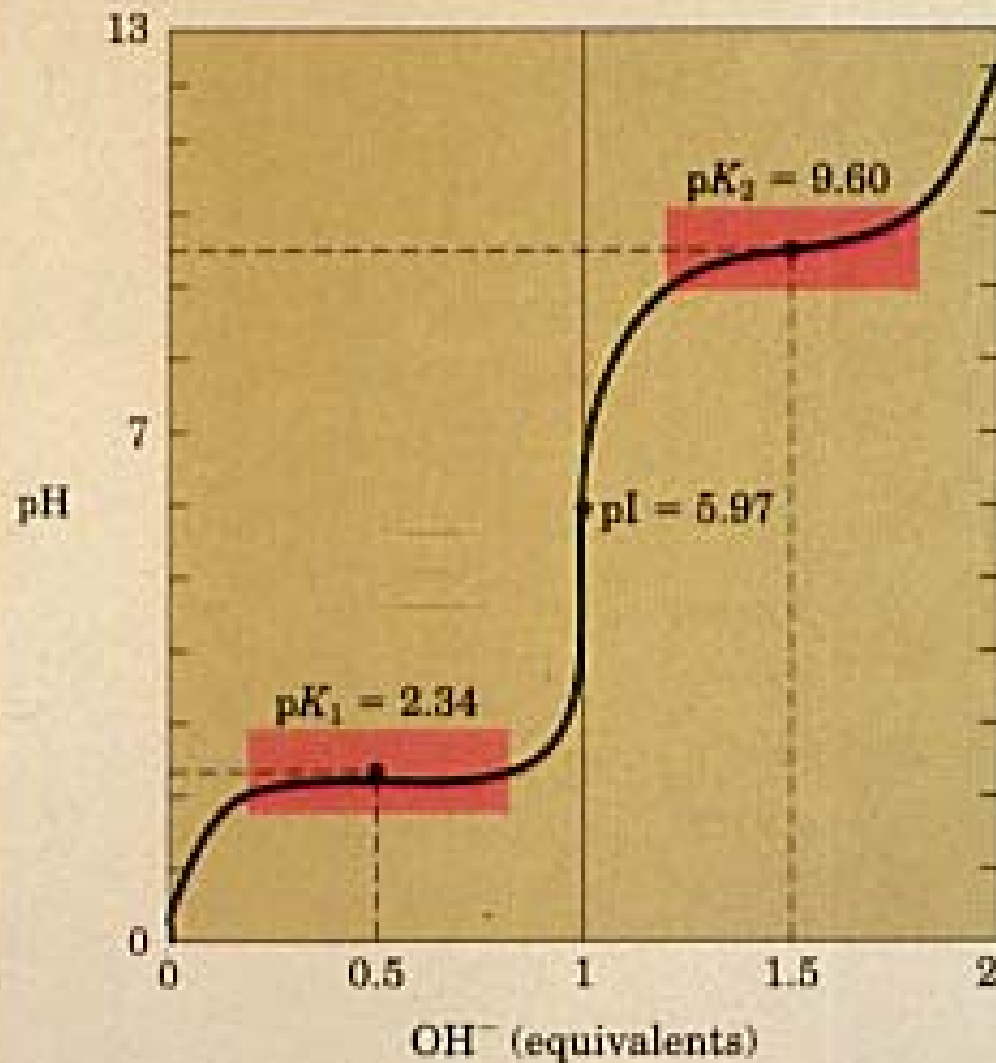
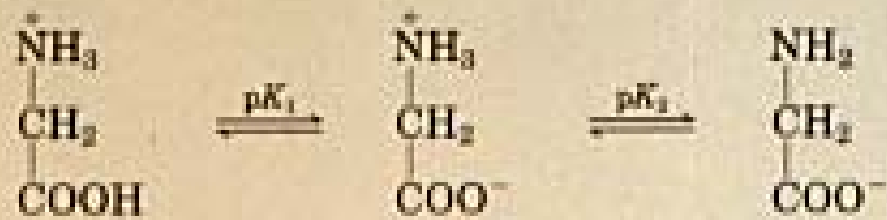
Glutamine
(Gln, Q)

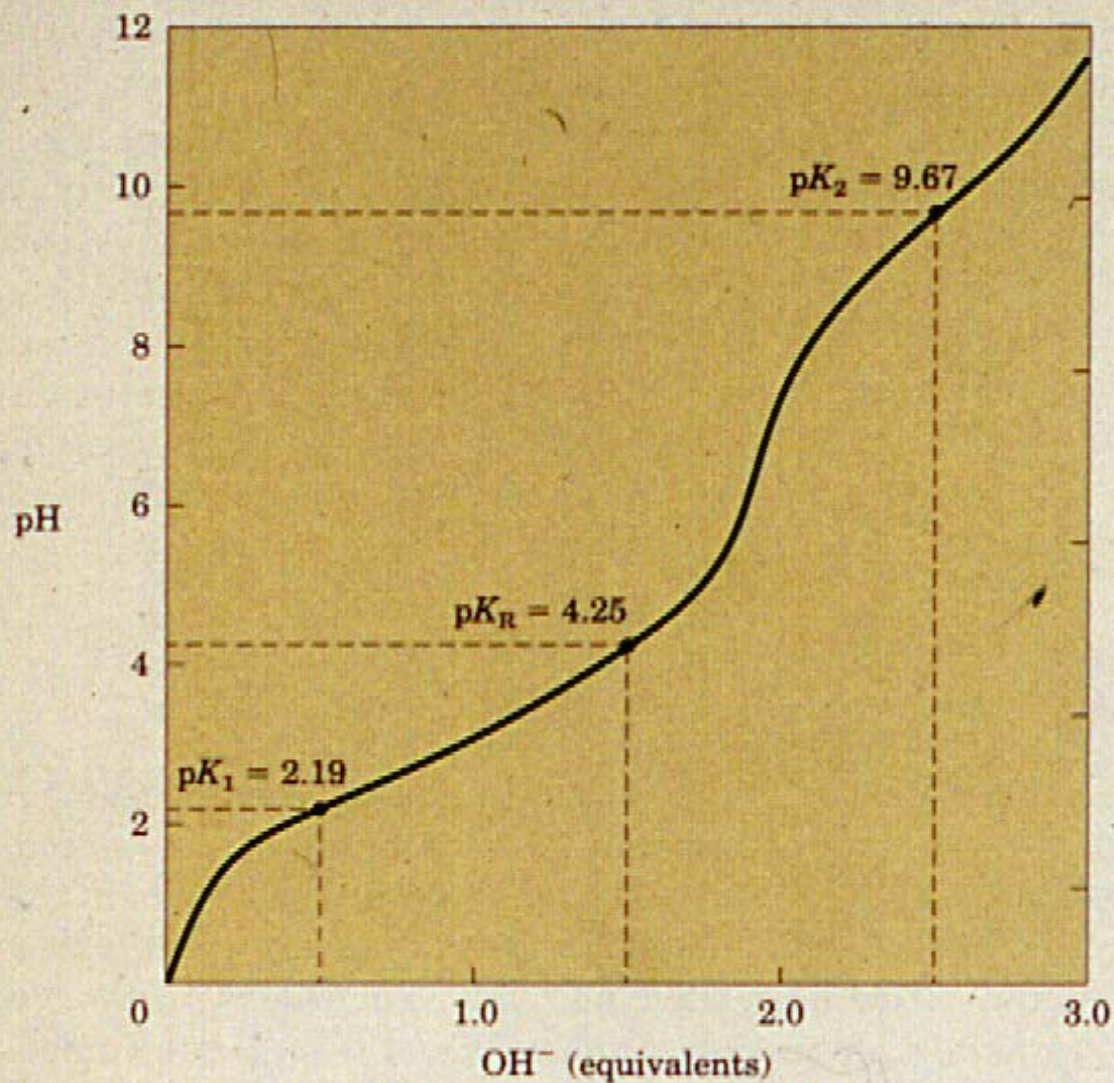
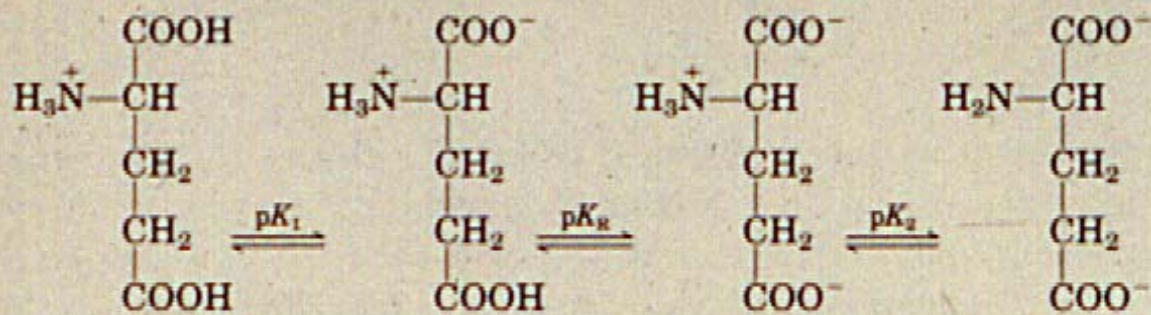


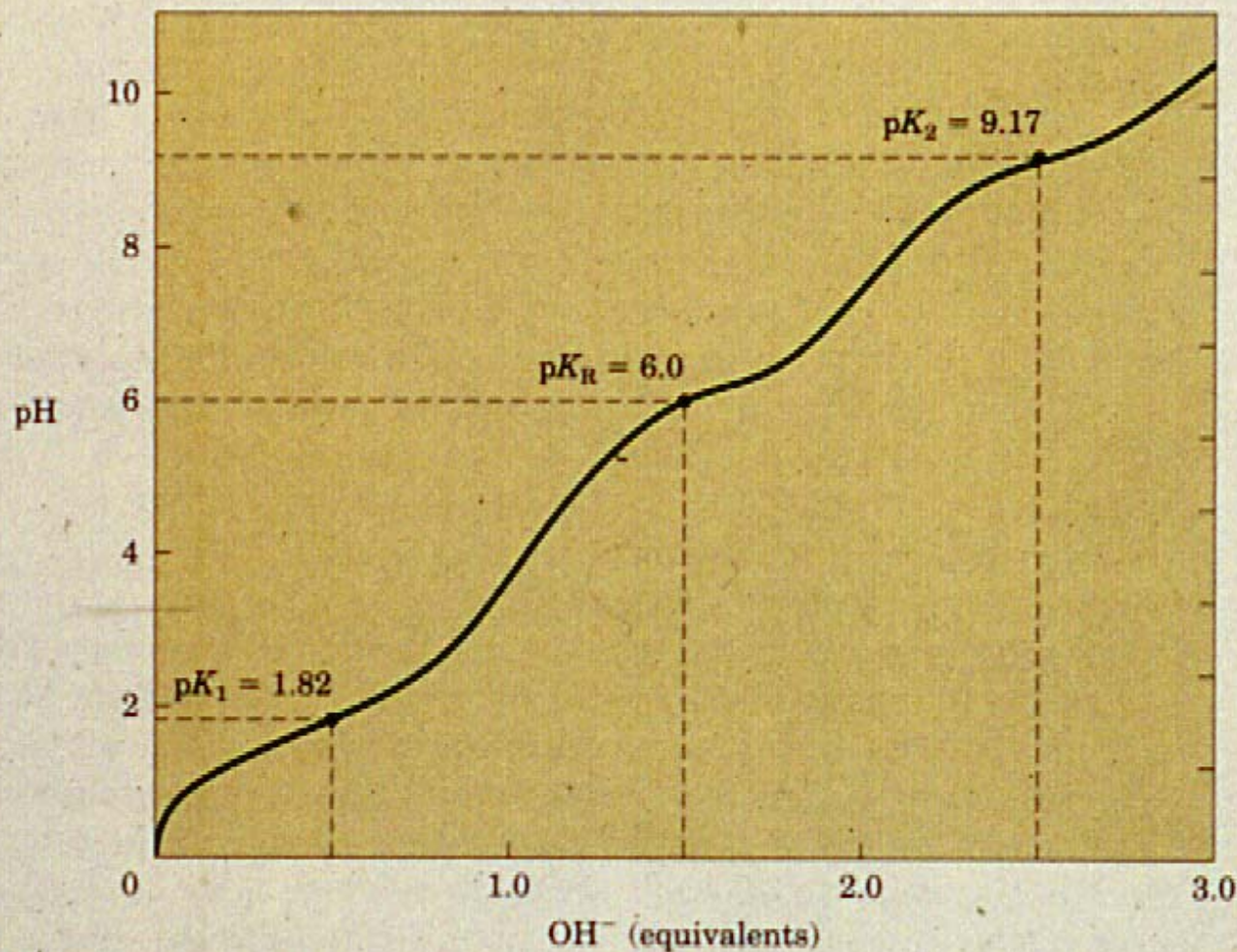
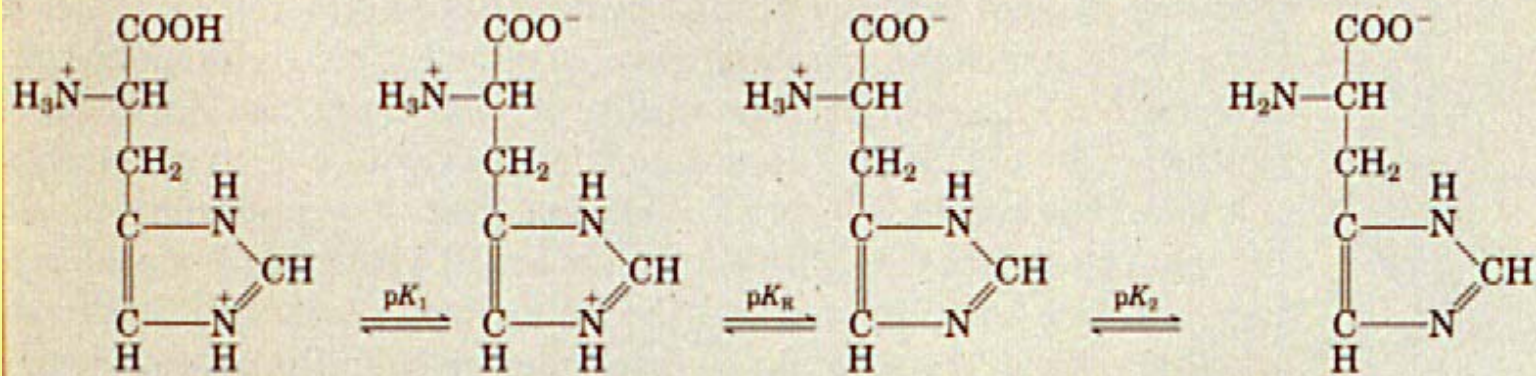
Homoserine

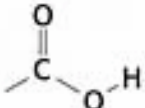
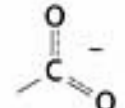
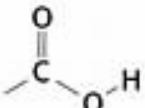
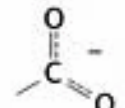
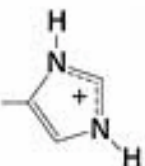
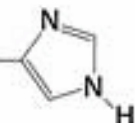
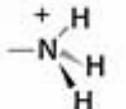
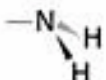
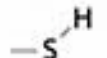

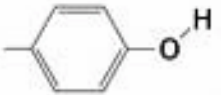
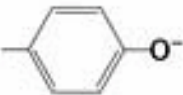
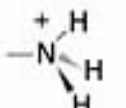
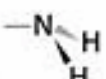
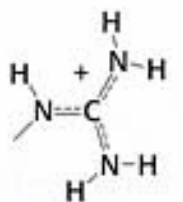
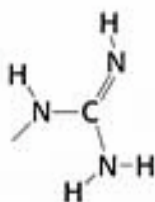


Serine





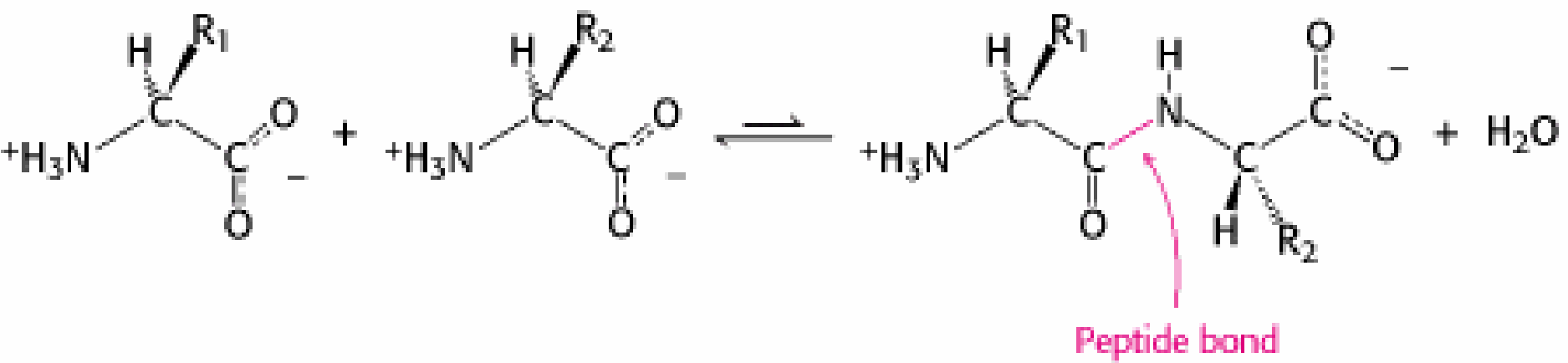


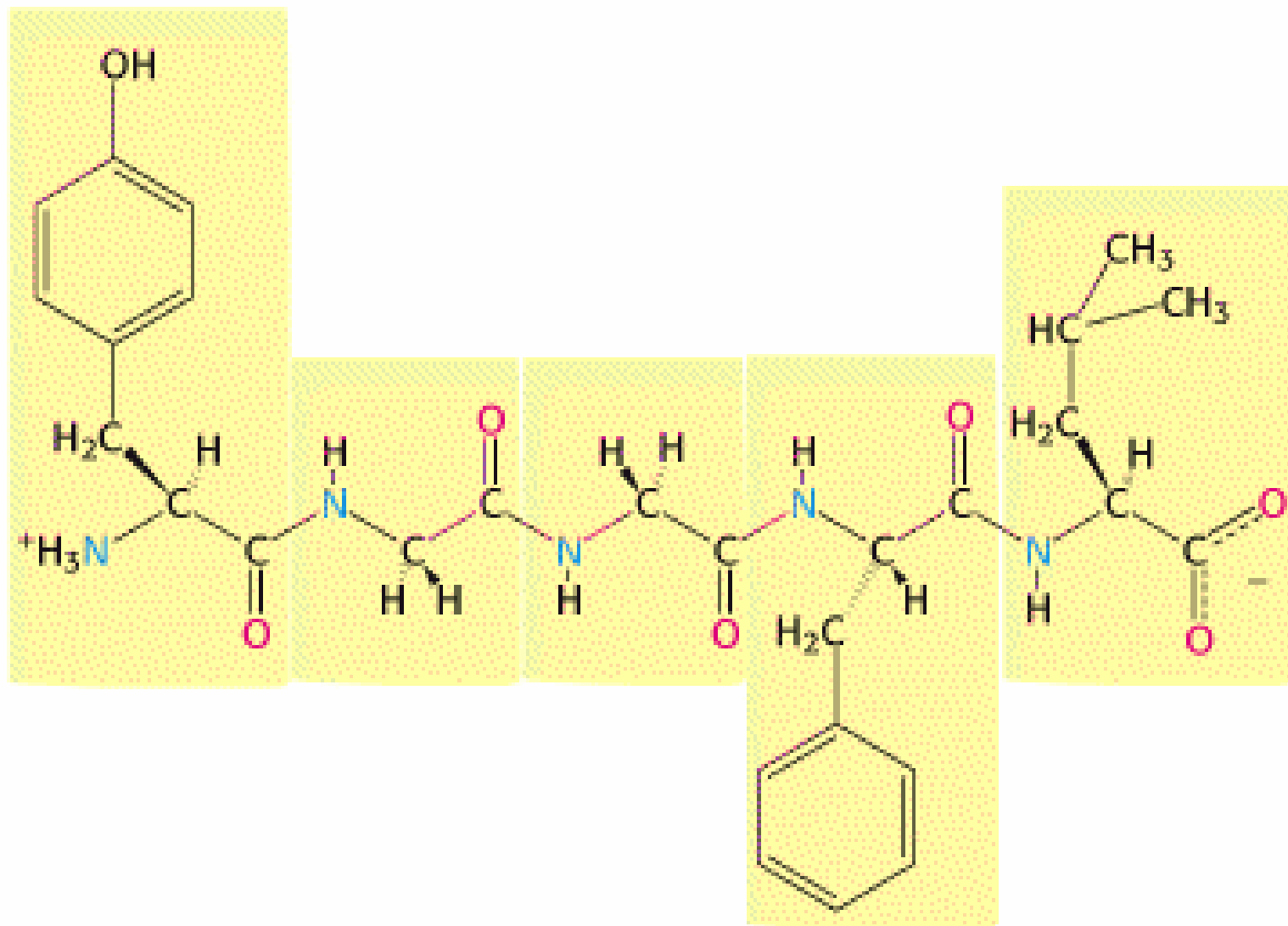
Group	Acid	\rightleftharpoons	Base	Typical pK_a^*
Terminal α -carboxyl group		\rightleftharpoons		3.1
Aspartic acid Glutamic acid		\rightleftharpoons		4.1
Histidine		\rightleftharpoons		6.0
Terminal α -amino group		\rightleftharpoons		8.0
Cysteine		\rightleftharpoons		8.3
Tyrosine		\rightleftharpoons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

Amino acid	Three-letter abbreviation	One-letter abbreviation
Alanine	Ala	A
Arginine	Arg	R
Asparagine	Asn	N
Aspartic Acid	Asp	D
Cysteine	Cys	C
Glutamine	Gln	Q
Glutamic Acid	Glu	E
Glycine	Gly	G
Histidine	His	H
Isoleucine	Ile	I

Leucine	Leu	L
Lysine	Lys	K
Methionine	Met	M
Phenylalanine	Phe	F
Proline	Pro	P
Serine	Ser	S
Threonine	Thr	T
Tryptophan	Trp	W
Tyrosine	Tyr	Y
Valine	Val	V
Asparagine or aspartic acid	Asx	B
Glutamine or glutamic acid	Glx	Z





Tyr

Gly

Gly

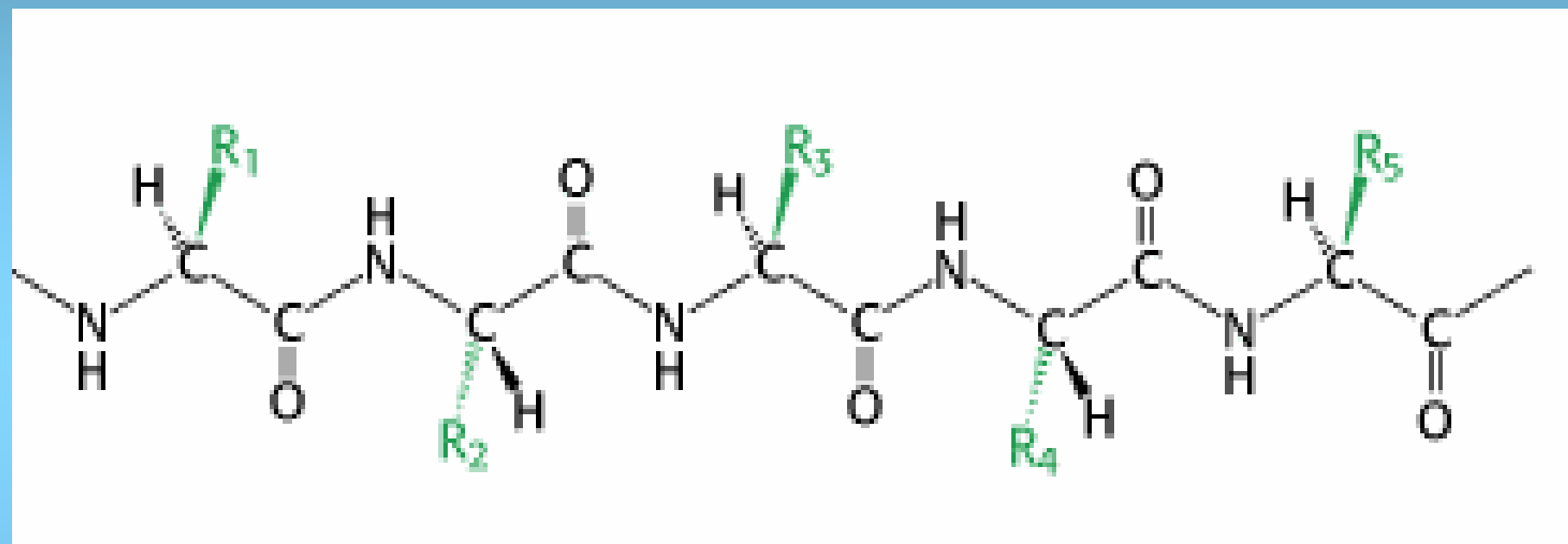
Phe

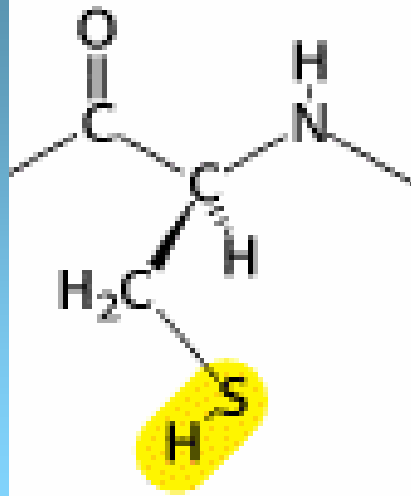
Leu

Amino
terminal residue

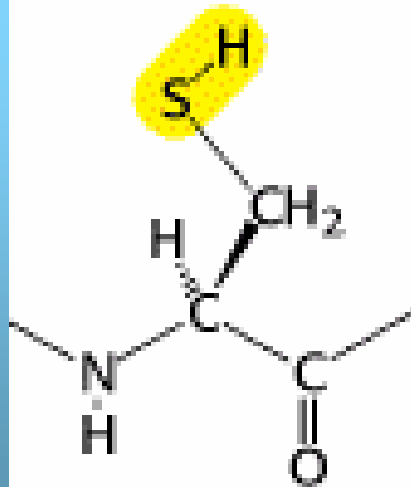


Carboxyl
terminal residue

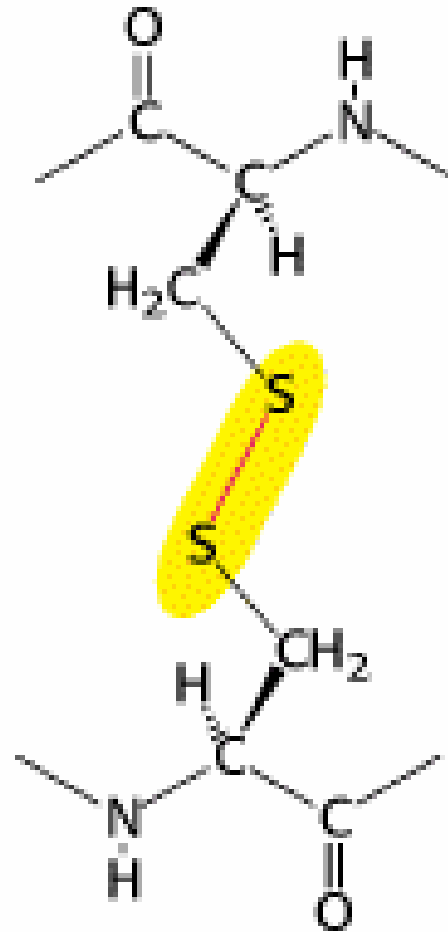




Cysteine



Cysteine



Cystine



A chain

Gly-Ile-Val-Glu-Gln-Cys-Cys-Ala-Ser-Val-Cys-Ser-Leu-Tyr-Gln-Leu-Glu-Asn-Tyr-Cys-Asn

5 10 15 21

B chain

Phe-Val-Asn-Gln-His-Leu-Cys-Gly-Ser-His-Leu-Val-Glu-Ala-Leu-Tyr-Leu-Val-Cys-Gly-Glu-Arg-Gly-Phe-Phe-Tyr-Thr-Pro-Lys-Ala

5 10 15 20 25 30

S

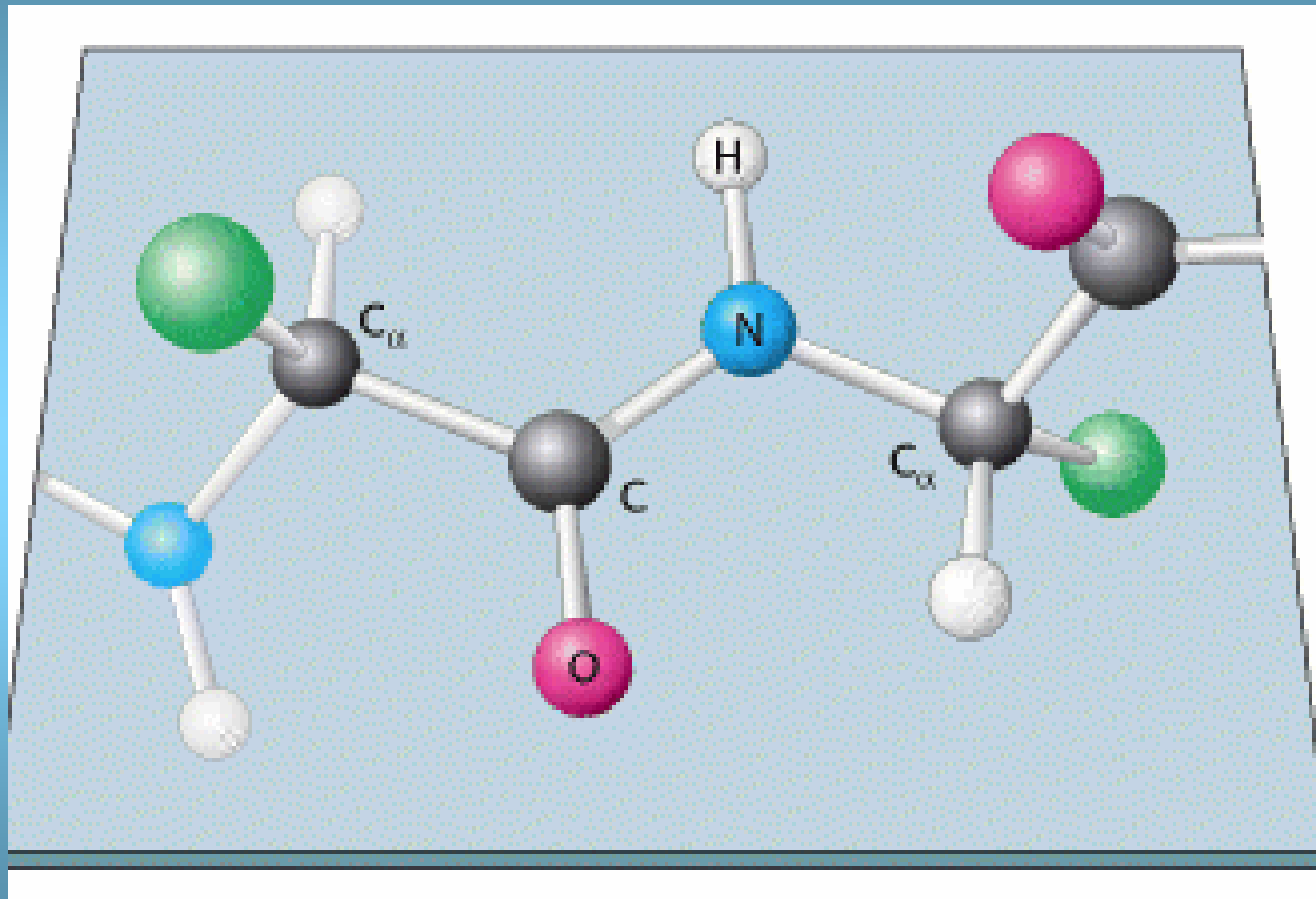
S

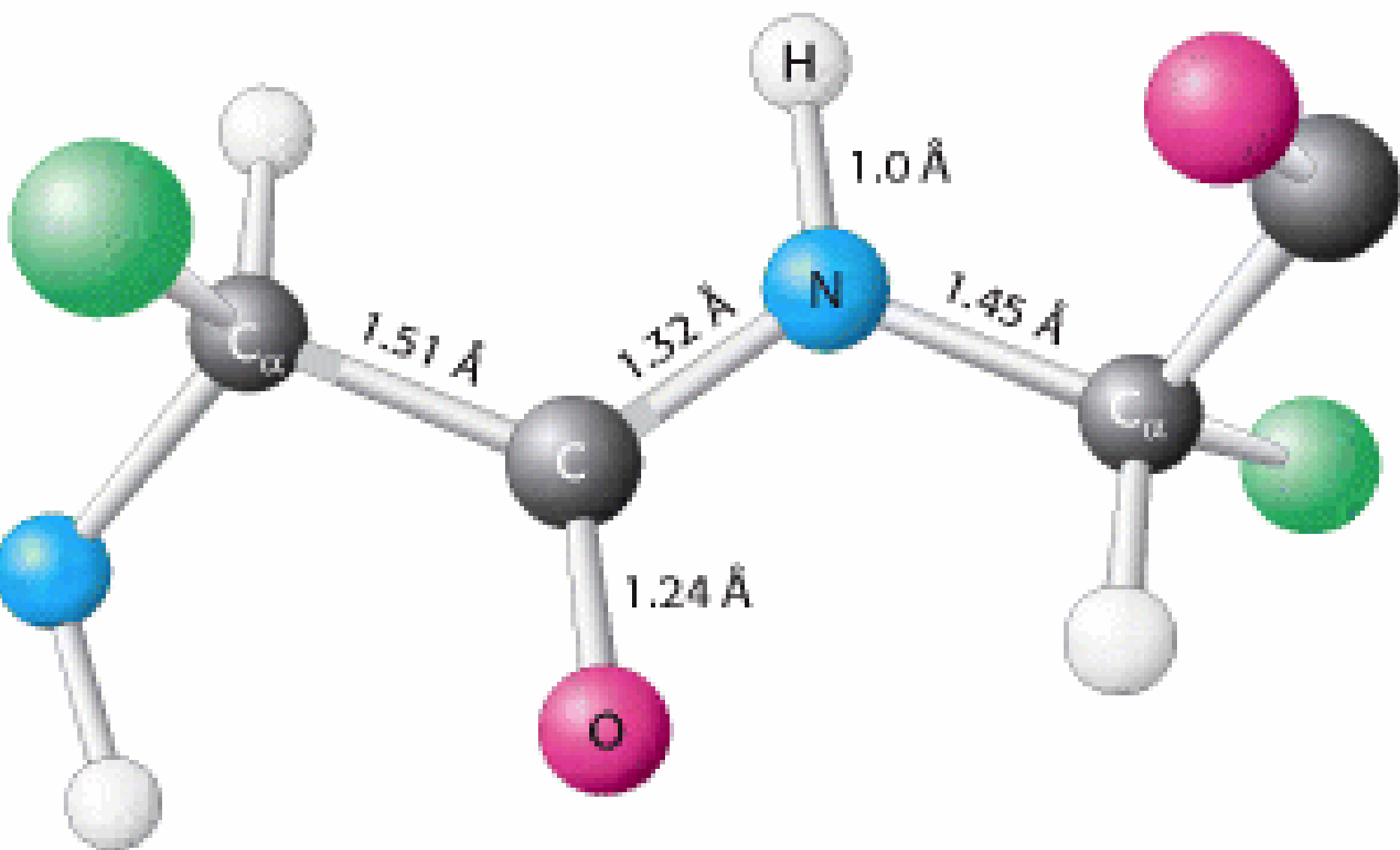
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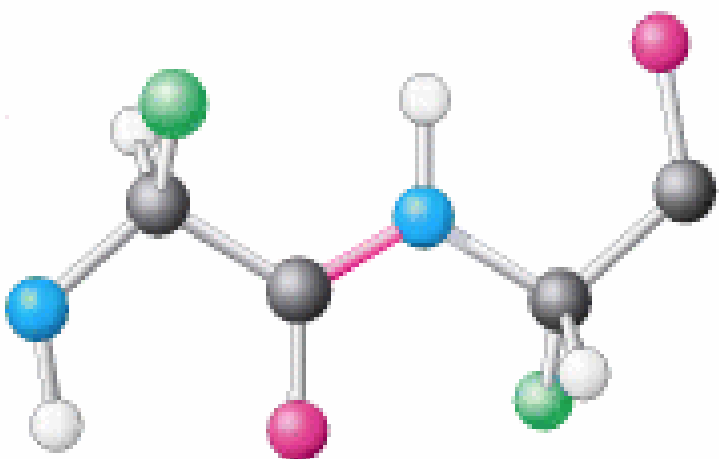
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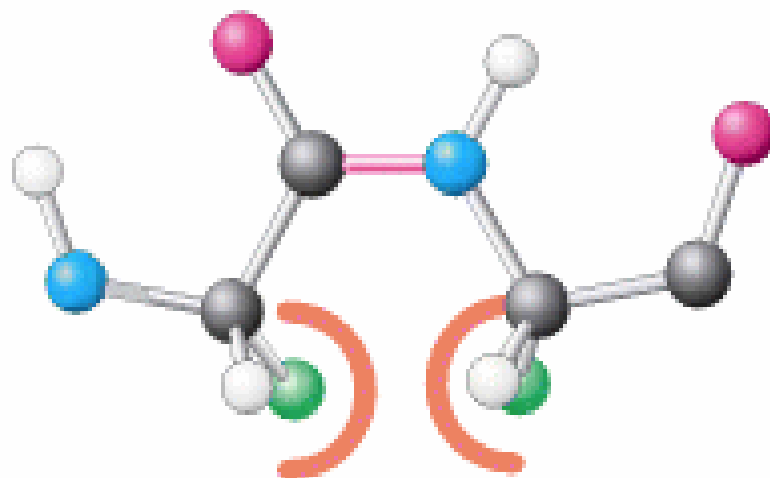
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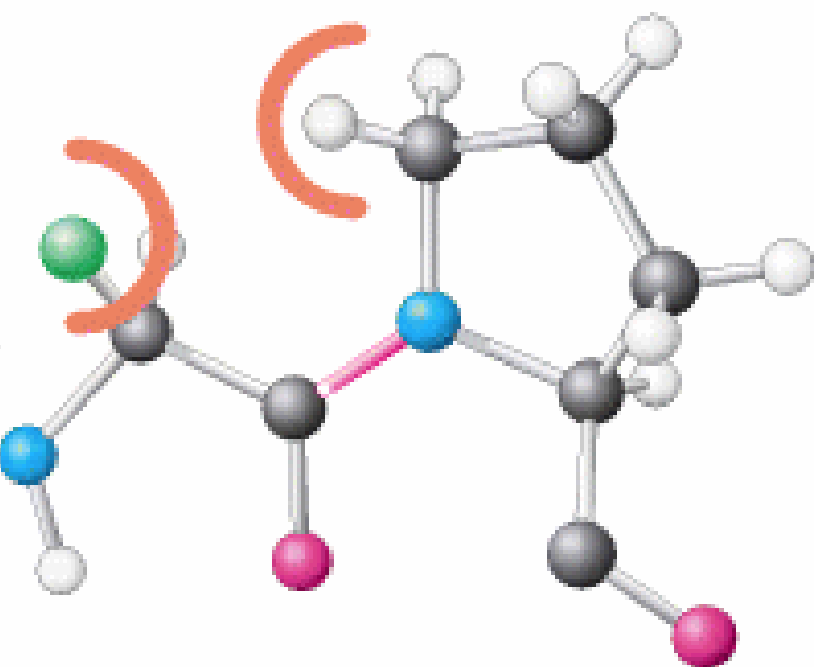




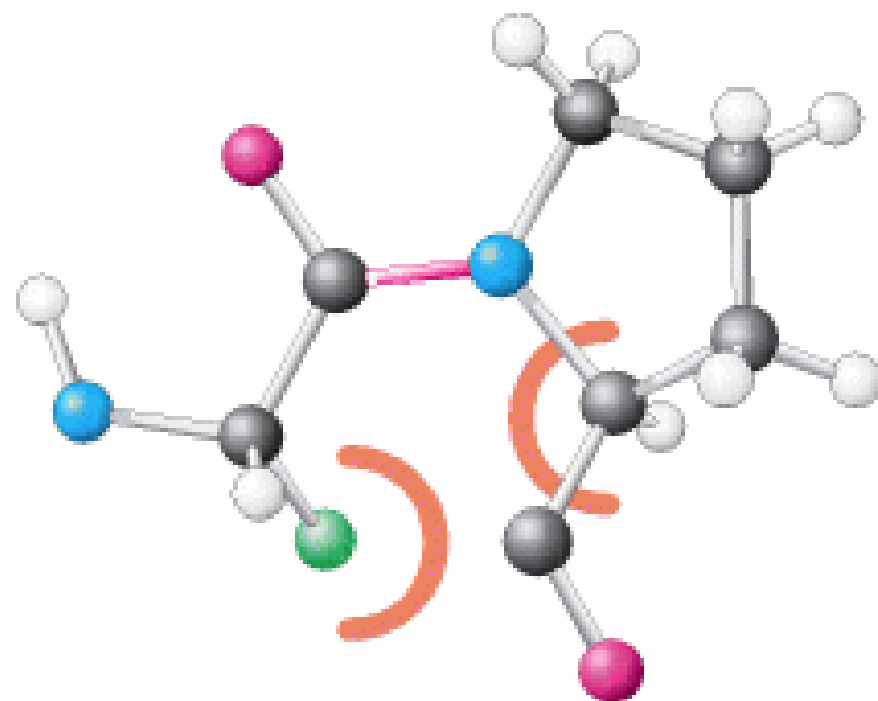
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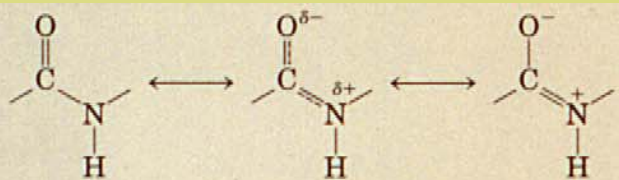
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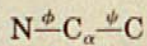
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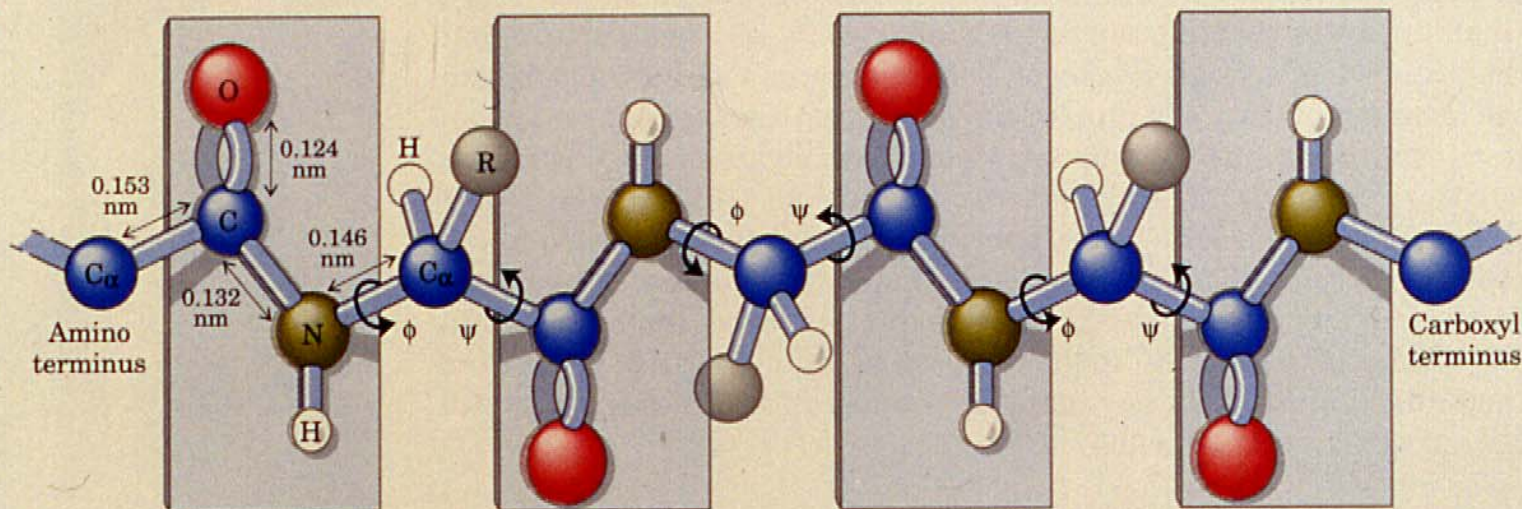
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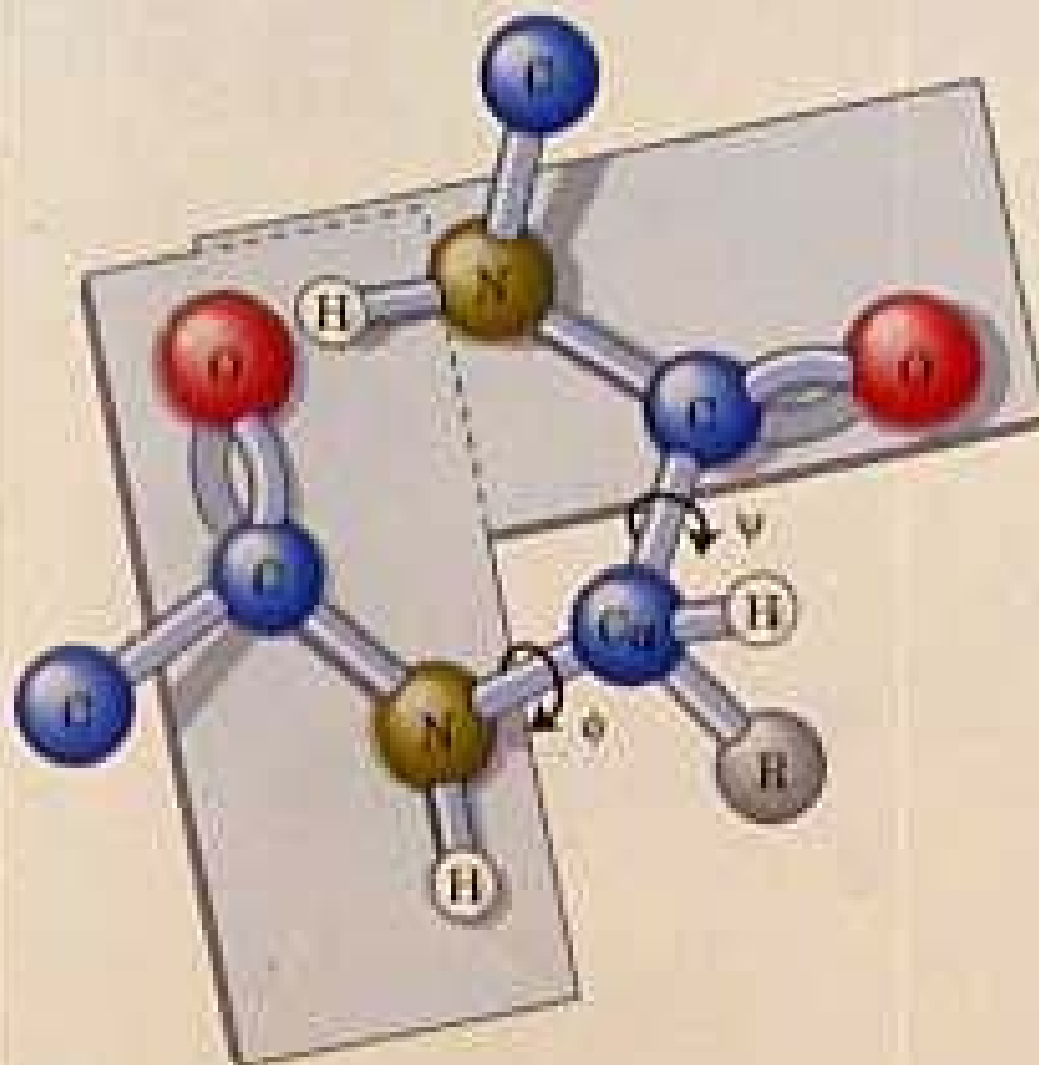


(a)

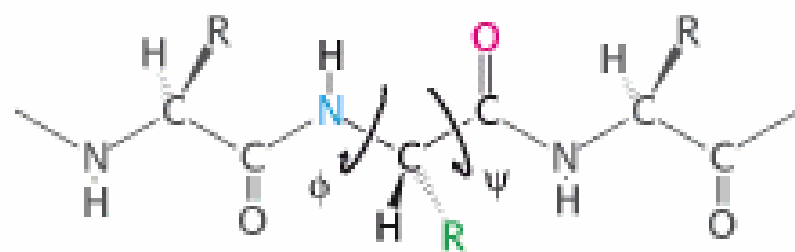


(b)

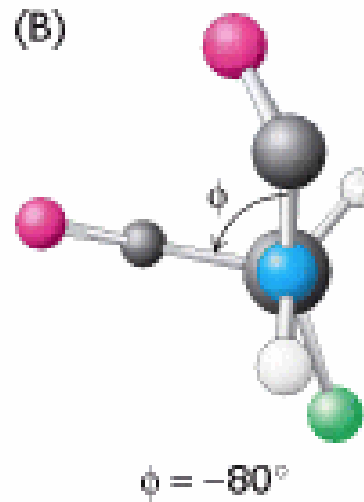




(A)



(B)



(C)

