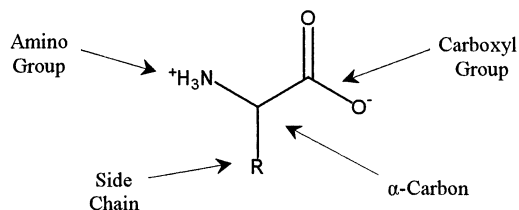


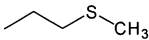
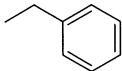
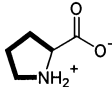


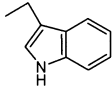
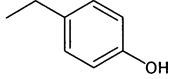
Amino Acids Found in Proteins

General structure of the 20 common amino acids found in proteins except for proline, which has a 3-carbon cyclic side chain bound to the nitrogen of the backbone.



Name	Abbreviations		pKa Values			R Group Structure
	3 Letter	1 Letter	-COOH	-NH ₃ ⁺	R Group	
Alanine	Ala	A	2.34	9.69		$-CH_3$
Arginine	Arg	R	2.17	9.04	12.48	
Asparagine	Asn	N	2.02	8.80		
Aspartic Acid	Asp	D	1.88	9.60	3.65	
Cysteine	Cys	C	1.71	8.33	10.78	
Glutamic Acid	Glu	E	2.19	9.67	4.25	
Glutamine	Gln	Q	2.17	9.13		
Glycine	Gly	G	2.34	9.60		$-H$
Histidine	His	H	1.82	9.17	6.00	
Isoleucine	Ile	I	2.36	9.68		
Leucine	Leu	L	2.36	9.60		
Lysine	Lys	K	2.18	8.95	10.53	

Amino Acids Found in Proteins (Continued)

Name	Abbreviations		pKa Values			R Group Structure
	3 Letter	1 Letter	-COOH	-NH ₃ ⁺	R Group	
Methionine	Met	M	2.28	9.21		
Phenylalanine	Phe	F	1.83	9.13		
Proline	Pro	P	1.99	10.60		
Serine	Ser	S	2.21	9.15		
Threonine	Thr	T	2.63	10.43		
Tryptophan	Trp	W	2.38	9.39		
Tyrosine	Tyr	Y	2.20	9.11	10.07	
Valine	Val	V	2.32	9.62		