
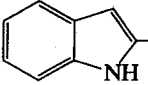
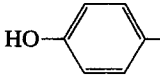



TABLE 29.1 Amino Acids

Amino Acid Formula	Name	Abbreviation	Single Letter Code
$\begin{array}{c} \text{NH}_2 \\ \\ \text{R}-\text{CH}-\text{COOH} \end{array}$			
$\begin{array}{c} \text{NH}_2 \\ \\ \text{H}-\text{CH}-\text{COOH} \end{array}$	glycine	Gly	G
$\begin{array}{c} \text{NH}_2 \\ \\ \text{CH}_3-\text{CH}-\text{COOH} \end{array}$	alanine	Ala	A
$\begin{array}{c} \text{CH}_3 \quad \text{NH}_2 \\ \quad \\ \text{CH}_3-\text{CH}-\text{CH}-\text{COOH} \end{array}$	valine	Val	V
$\begin{array}{c} \text{CH}_3 \quad \text{NH}_2 \\ \quad \\ \text{CH}_3-\text{CH}-\text{CH}_2-\text{CH}-\text{COOH} \end{array}$	leucine	Leu	L
$\begin{array}{c} \text{CH}_3 \quad \text{NH}_2 \\ \quad \\ \text{CH}_3\text{CH}_2-\text{CH}-\text{CH}-\text{COOH} \end{array}$	isoleucine	Ile	I
$\begin{array}{c} \text{NH}_2 \\ \\ \text{CH}_3\text{S}-\text{CH}_2\text{CH}_2-\text{CH}-\text{COOH} \end{array}$	methionine	Met	M
$\begin{array}{c} \text{CH}_2 \\ / \quad \backslash \\ \text{CH}_2 \quad \text{NH} \\ \backslash \quad / \\ \text{CH}_2-\text{CH}-\text{COOH} \end{array}$	proline	Pro	P
 $\begin{array}{c} \text{NH}_2 \\ \\ \text{CH}_2-\text{CH}-\text{COOH} \end{array}$	phenylalanine	Phe	F
 $\begin{array}{c} \text{NH}_2 \\ \\ \text{CH}_2-\text{CH}-\text{COOH} \end{array}$	tryptophan	Trp	W
$\begin{array}{c} \text{NH}_2 \\ \\ \text{HOCH}_2-\text{CH}-\text{COOH} \\ \\ \text{HO} \end{array}$	serine	Ser	S
$\begin{array}{c} \text{NH}_2 \\ \\ \text{CH}_3-\text{CH}-\text{CH}-\text{COOH} \\ \\ \text{NH}_2 \end{array}$	threonine	Thr	T
$\begin{array}{c} \text{NH}_2 \\ \\ \text{HSCH}_2-\text{CH}-\text{COOH} \end{array}$	cysteine	Cys	C
 $\begin{array}{c} \text{NH}_2 \\ \\ \text{CH}_2-\text{CH}-\text{COOH} \end{array}$	tyrosine	Tyr	Y
$\begin{array}{c} \text{O} \quad \text{NH}_2 \\ \quad \\ \text{H}_2\text{N}-\text{C}-\text{CH}_2-\text{CH}-\text{COOH} \end{array}$	asparagine	Asn	N
$\begin{array}{c} \text{O} \quad \text{NH}_2 \\ \quad \\ \text{H}_2\text{N}-\text{C}-\text{CH}_2-\text{CH}_2-\text{CH}-\text{COOH} \end{array}$	glutamine	Gln	Q
$\begin{array}{c} \text{O} \quad \text{NH}_2 \\ \quad \\ \text{HO}-\text{C}-\text{CH}_2-\text{CH}-\text{COOH} \end{array}$	aspartic acid	Asp	D
$\begin{array}{c} \text{O} \quad \text{NH}_2 \\ \quad \\ \text{HO}-\text{C}-\text{CH}_2-\text{CH}_2-\text{CH}-\text{COOH} \end{array}$	glutamic acid	Glu	E
$\text{H}_2\text{N}-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}-\text{COOH}$	lysine	Lys	K
$\begin{array}{c} \text{NH} \\ \\ \text{H}_2\text{N}-\text{C}-\text{NH}-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}-\text{COOH} \\ \\ \text{NH}_2 \end{array}$	arginine	Arg	R
 $\begin{array}{c} \text{NH}_2 \\ \\ \text{CH}_2-\text{CH}-\text{COOH} \end{array}$	histidine	His	H