



# Amino Acid Sidechain List

- Dual Color Scheme:**
1. Color of amino acid name and sidechain shading indicate: hydrophobic amino acids (yellow); hydrophilic non-charged amino acids (white); positive charged amino acids (blue); negative charged amino acids (red); cysteine (green).
  2. Atom type indicates carbon (gray), oxygen (red), nitrogen (blue), and sulfur (yellow).

Name	Amino Acid	Sidechain	Name	Amino Acid	Sidechain	Name	Amino Acid	Sidechain	Name	Amino Acid	Sidechain
Alanine			Glutamine			Leucine			Serine		
Ala			Gln	$\begin{array}{c} \text{NH}_2 \\   \\ \text{C}=\text{O} \\   \\ \text{CH}_2 \\   \\ \text{CH}_2 \\   \\ \text{H}_3\text{N}^+-\text{CH}-\text{COO}^- \end{array}$		Leu	$\begin{array}{c} \text{CH}_3 \quad \text{CH}_3 \\   \quad   \\ \text{CH} \\   \\ \text{CH}_2 \\   \\ \text{H}_3\text{N}^+-\text{CH}-\text{COO}^- \end{array}$		Ser	$\begin{array}{c} \text{OH} \\   \\ \text{CH}_2 \\   \\ \text{H}_3\text{N}^+-\text{CH}-\text{COO}^- \end{array}$	
A	$\begin{array}{c} \text{CH}_3 \\   \\ \text{H}_3\text{N}^+-\text{CH}-\text{COO}^- \end{array}$		Q	$\begin{array}{c} \text{NH}_2 \\   \\ \text{C}=\text{O} \\   \\ \text{CH}_2 \\   \\ \text{CH}_2 \\   \\ \text{H}_3\text{N}^+-\text{CH}-\text{COO}^- \end{array}$		L	$\begin{array}{c} \text{CH}_3 \quad \text{CH}_3 \\   \quad   \\ \text{CH} \\   \\ \text{CH}_2 \\   \\ \text{H}_3\text{N}^+-\text{CH}-\text{COO}^- \end{array}$		S	$\begin{array}{c} \text{OH} \\   \\ \text{CH}_2 \\   \\ \text{H}_3\text{N}^+-\text{CH}-\text{COO}^- \end{array}$	
Arginine			Glutamic Acid			Lysine			Threonine		
Arg			Glu	$\begin{array}{c} \text{O} \\    \\ \text{C} \\   \\ \text{O}^- \\   \\ \text{CH}_2 \\   \\ \text{CH}_2 \\   \\ \text{H}_3\text{N}^+-\text{CH}-\text{COO}^- \end{array}$		Lys	$\begin{array}{c} \text{NH}_3^+ \\   \\ \text{CH}_2 \\   \\ \text{CH}_2 \\   \\ \text{CH}_2 \\   \\ \text{H}_3\text{N}^+-\text{CH}-\text{COO}^- \end{array}$		Thr	$\begin{array}{c} \text{CH}_3 \quad \text{OH} \\   \quad   \\ \text{CH} \\   \\ \text{H}_3\text{N}^+-\text{CH}-\text{COO}^- \end{array}$	
R	$\begin{array}{c} \text{NH}_2 \quad \text{NH}_2^+ \\   \quad   \\ \text{C} \\   \\ \text{NH} \\   \\ \text{CH}_2 \\   \\ \text{CH}_2 \\   \\ \text{CH}_2 \\   \\ \text{H}_3\text{N}^+-\text{CH}-\text{COO}^- \end{array}$		E	$\begin{array}{c} \text{O} \\    \\ \text{C} \\   \\ \text{O}^- \\   \\ \text{CH}_2 \\   \\ \text{CH}_2 \\   \\ \text{H}_3\text{N}^+-\text{CH}-\text{COO}^- \end{array}$		K	$\begin{array}{c} \text{NH}_3^+ \\   \\ \text{CH}_2 \\   \\ \text{CH}_2 \\   \\ \text{CH}_2 \\   \\ \text{H}_3\text{N}^+-\text{CH}-\text{COO}^- \end{array}$		T	$\begin{array}{c} \text{CH}_3 \quad \text{OH} \\   \quad   \\ \text{CH} \\   \\ \text{H}_3\text{N}^+-\text{CH}-\text{COO}^- \end{array}$	
Asparagine			Glycine			Methionine			Tryptophan		
Asn			Gly	$\begin{array}{c} \text{H} \\   \\ \text{H}_3\text{N}^+-\text{CH}-\text{COO}^- \end{array}$		Met	$\begin{array}{c} \text{CH}_3 \\   \\ \text{S} \\   \\ \text{CH}_2 \\   \\ \text{CH}_2 \\   \\ \text{H}_3\text{N}^+-\text{CH}-\text{COO}^- \end{array}$		Trp		
N	$\begin{array}{c} \text{NH}_2 \\   \\ \text{C}=\text{O} \\   \\ \text{CH}_2 \\   \\ \text{H}_3\text{N}^+-\text{CH}-\text{COO}^- \end{array}$		G	$\begin{array}{c} \text{H} \\   \\ \text{H}_3\text{N}^+-\text{CH}-\text{COO}^- \end{array}$		M	$\begin{array}{c} \text{CH}_3 \\   \\ \text{S} \\   \\ \text{CH}_2 \\   \\ \text{CH}_2 \\   \\ \text{H}_3\text{N}^+-\text{CH}-\text{COO}^- \end{array}$		W	$\begin{array}{c} \text{Indole ring} \\   \\ \text{CH}_2 \\   \\ \text{H}_3\text{N}^+-\text{CH}-\text{COO}^- \end{array}$	
Aspartic Acid			Histidine			Phenylalanine			Tyrosine		
Asp			His	$\begin{array}{c} \text{N} \\   \\ \text{C} \\   \\ \text{NH} \\   \\ \text{CH}_2 \\   \\ \text{H}_3\text{N}^+-\text{CH}-\text{COO}^- \end{array}$		Phe	$\begin{array}{c} \text{Benzene ring} \\   \\ \text{CH}_2 \\   \\ \text{H}_3\text{N}^+-\text{CH}-\text{COO}^- \end{array}$		Tyr	$\begin{array}{c} \text{OH} \\   \\ \text{Benzene ring} \\   \\ \text{CH}_2 \\   \\ \text{H}_3\text{N}^+-\text{CH}-\text{COO}^- \end{array}$	
D	$\begin{array}{c} \text{O} \\    \\ \text{C} \\   \\ \text{O}^- \\   \\ \text{CH}_2 \\   \\ \text{H}_3\text{N}^+-\text{CH}-\text{COO}^- \end{array}$		H	$\begin{array}{c} \text{N} \\   \\ \text{C} \\   \\ \text{NH} \\   \\ \text{CH}_2 \\   \\ \text{H}_3\text{N}^+-\text{CH}-\text{COO}^- \end{array}$		F	$\begin{array}{c} \text{Benzene ring} \\   \\ \text{CH}_2 \\   \\ \text{H}_3\text{N}^+-\text{CH}-\text{COO}^- \end{array}$		Y	$\begin{array}{c} \text{OH} \\   \\ \text{Benzene ring} \\   \\ \text{CH}_2 \\   \\ \text{H}_3\text{N}^+-\text{CH}-\text{COO}^- \end{array}$	
Cysteine			Isoleucine			Proline			Valine		
Cys			Ile	$\begin{array}{c} \text{CH}_3 \\   \\ \text{CH}_2 \\   \\ \text{H}_3\text{C}-\text{CH} \\   \\ \text{H}_3\text{N}^+-\text{CH}-\text{COO}^- \end{array}$		Pro	$\begin{array}{c} \text{CH}_2 \\   \quad   \\ \text{CH}_2 \quad \text{CH}_2 \\   \\ \text{H}_2\text{N}-\text{CH}-\text{COO}^- \end{array}$		Val	$\begin{array}{c} \text{CH}_3 \quad \text{CH}_3 \\   \quad   \\ \text{CH} \\   \\ \text{H}_3\text{N}^+-\text{CH}-\text{COO}^- \end{array}$	
C	$\begin{array}{c} \text{SH} \\   \\ \text{CH}_2 \\   \\ \text{H}_3\text{N}^+-\text{CH}-\text{COO}^- \end{array}$		I	$\begin{array}{c} \text{CH}_3 \\   \\ \text{CH}_2 \\   \\ \text{H}_3\text{C}-\text{CH} \\   \\ \text{H}_3\text{N}^+-\text{CH}-\text{COO}^- \end{array}$		P	$\begin{array}{c} \text{CH}_2 \\   \quad   \\ \text{CH}_2 \quad \text{CH}_2 \\   \\ \text{H}_2\text{N}-\text{CH}-\text{COO}^- \end{array}$		V	$\begin{array}{c} \text{CH}_3 \quad \text{CH}_3 \\   \quad   \\ \text{CH} \\   \\ \text{H}_3\text{N}^+-\text{CH}-\text{COO}^- \end{array}$	