

## Amino Acids

Name		Structure
Glycine (Gly)	* R chain= <b>Hydrogen</b> "Non polar"  * Achiral Amino acid  *Polar amino acid  *the simplest and smallest amino acid  *derivative of acetic acid; it can also be considered a derivative of amino ethane	COOH H <sub>2</sub> N-C-H H
	Non-polar	
Alanine(Ala)	R chain= <b>CH3</b> *Aliphatic *second simplest amino acid	$COOH$ $H_2N-C-H$ $CH_3$
Valine(Val)	*Baranched,aliphatic *Nonpolar amino acids.	COOH  H <sub>2</sub> N-C- H  CH  CH <sub>3</sub> CH <sub>3</sub> Valine (Val)
Leucine (Leu)	* Baranched ,aliphatic nonpolar amino acids. *branching occurs in its R group at gamma-carbon	COOH H <sub>2</sub> N-C- H CH <sub>2</sub> CH <sub>3</sub> CH <sub>3</sub>

Isoleucine(Ile)	* Baranched aliphatic nonpolar amino acids.  *branching occurs at betacarbon	COOH H <sub>2</sub> N-C-H CH CH <sub>3</sub> CH <sub>2</sub> CH <sub>3</sub>
Methionine (Met)	*thioether (RSR)  *Methionine can react to form S-Adenosyl-L- Methionine (SAM), which serves as a methyl donor in reactions	COOH H <sub>2</sub> N-C-H C-C-C-C-C-C-C-C-C-C-C-C-C-C-C-C-C-C

Proline (Pro)	*only cyclic amino acid *rigid molecule *nitrogen in the amino group within the backbone is a secondary nitrogen	COOH H <sub>2</sub> N-C-H CH <sub>2</sub> -CH <sub>2</sub>
Phenylalanine (Phe)	*basically an alanine amino acid with its R group attached to a phenyl group (benzene ring).  * highly hydrophobic	COOH H <sub>2</sub> N-C-H CH <sub>2</sub> Phenylalanine (Phe)
Tryptophan (Trp)	*Tryptophan is the most hydrophobic amino acid residue *Tryptophan contains a double ring structure which contains nitrogen.  *The largest amino acid *R group: <b>indole group</b>	COOH H2N-C-H CH2 Tryptophan (Trp)
	Positively charged(Basic)	

Lysine (Lys)	*have relatively long side chains that terminate with groups that are positively charged  *terminal group is an amino group  **have relatively long side	COOH  H <sub>2</sub> N-C-H  (CH <sub>2</sub> ) <sub>4</sub> NH <sub>2</sub> Lysine (lys)*
Arginine (Arg)	chains that terminate with groups that are positively charged *the terminal group is called a Guanidinium group	H <sub>2</sub> N-C-H  (CH <sub>2</sub> ) <sub>3</sub> NH HN-C NH <sub>2</sub> Arginine (arg)*
Histidine (His)	*R group: contains imidazole	Hadden that "  This is the Nitrogen atom that will get protonated and carry the positive charge.
	Negatively charged	**These amino acids are often
	(Acidic)	called Aspartate and Glutamate
	*	when they are charged/ionized.
Aspartic Acid (Asp)	* contain a carboxyl group	COOH  H <sub>2</sub> N-C-H  CH <sub>2</sub> COOH  Aspartic acid (asp)
Glutamic acid (Glu)	* contain a carboxyl group *Glutamic acid has a larger size because its terminal (R) group is a longer chain.	COOH H <sub>2</sub> N-C-H CH <sub>2</sub> CH <sub>2</sub> COOH Glutamic acid (glu)
	Polar, hydrophilic,	
	neutral amino acids	
	*reactive*	
Serine (Ser) Threonine (Thr)	*Their R groups contain a hydroxyl group (polar group)	COOH  H <sub>2</sub> N-C-H  CH <sub>2</sub> OH  Serine (ser)  COOH  H <sub>2</sub> N-C-H  H <sub>2</sub> N-C-H  CH <sub>3</sub> Threonine (thr)*

Cysteine (Cys)	*It contains a sulfhydryl (thiol because it is terminal) group which is also a polar reactive group.	COOH  H <sub>2</sub> N-C-H  CH <sub>2</sub> SH  Cysteine (cys)
Glutamine (Gln) Asparagine (Asn)	* They are uncharged polar derivatives of Glutamate and Aspartate, which are negatively charged amino acids *Each contains a terminal Carboxamide group in place of a Carboxyl group.	COOH  H <sub>2</sub> N - C - H  CH <sub>2</sub> COOH  Asparic acid (asp)  Asparagine (asn)  COOH  H <sub>2</sub> N - C - H  CH <sub>2</sub> COOH  H <sub>2</sub> N - C - H  CH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> COOH  COH <sub>2</sub> COOH  COH <sub>2</sub> CH <sub>2</sub> COOH  CH <sub>2</sub> COOH  CONH <sub>2</sub>
Tyrosine (Tyr)	It is derived from phenylalanine, which is hydrophobic.  It has a polar and a reactive aromatic ring (with a hydroxyl group attached)	COOH H <sub>2</sub> N-C-H CH <sub>2</sub> Phenylalanine (phe)*  COOH H <sub>2</sub> N-C-H CH <sub>2</sub> OH Tyrrosine (tyr)