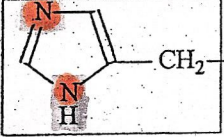


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The 20 Amino Acids of Human Protein

Structure	(amine) (N) B Basic (amide, SH) P POLAR/neutral (hydrocarbon) n & NONPOLAR	Name	Abbreviation	Dietary Requirement*
$\text{H}-\text{CH}-\text{CO}_2\text{H}$ NH_2	B BASE	Glycine	Gly	Nonessential
$\text{CH}_3-\text{CH}-\text{CO}_2\text{H}$ NH_2	P POLAR	Alanine	Ala	Nonessential
NH_2 $\text{C}=\text{NH}$ NH	B BASE	Arginine	Arg	Essential for infants
$\text{H}_2\text{N}-\text{C}(=\text{O})-\text{CH}_2-\text{CH}(\text{NH}_2)-\text{CO}_2\text{H}$	P POLAR not B	Asparagine	Asn	Nonessential
$\text{HO}_2\text{C}-\text{CH}_2-\text{CH}(\text{NH}_2)-\text{CO}_2\text{H}$	A ACID	Aspartic acid	Asp	Nonessential
$\text{HS}-\text{CH}_2-\text{CH}(\text{NH}_2)-\text{CO}_2\text{H}$	P POLAR	Cysteine	Cys	Nonessential
$\text{HO}_2\text{C}-\text{CH}_2-\text{CH}_2-\text{CH}(\text{NH}_2)-\text{CO}_2\text{H}$	A ACID	Glutamic acid	Glu	Nonessential
$\text{H}_2\text{N}-\text{C}(=\text{O})-\text{CH}_2-\text{CH}_2-\text{CH}(\text{NH}_2)-\text{CO}_2\text{H}$	P POLAR not B	Glutamine	Gln	Nonessential
 -CH ₂ -CH(NH ₂)-CO ₂ H	B BASE	Histidine	His	Essential for infants
$\text{CH}_3-\text{CH}_2-\text{CH}(\text{CH}_3)-\text{CH}(\text{NH}_2)-\text{CO}_2\text{H}$	n NONPOLAR	Isoleucine	Ile	Essential
$\text{CH}_3-\text{CH}(\text{CH}_3)-\text{CH}_2-\text{CH}(\text{NH}_2)-\text{CO}_2\text{H}$	n NONPOLAR	Leucine	Leu	Essential
$\text{H}_2\text{N}-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}(\text{NH}_2)-\text{CO}_2\text{H}$	B BASE	Lysine	Lys	Essential

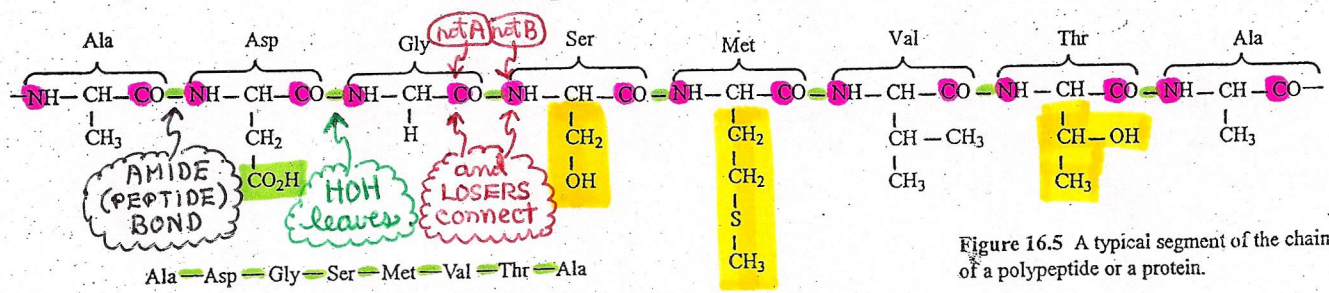


Figure 16.5 A typical segment of the chain of a polypeptide or a protein.

389 essential AAs