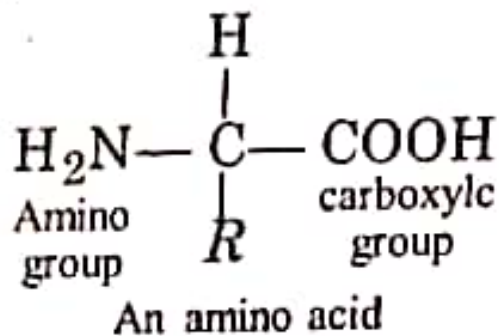


1. AMINO ACIDS

Amino acids are the amino substituted acids containing both amino ($-\text{NH}_2$) and carboxyl ($-\text{COOH}$) groups.

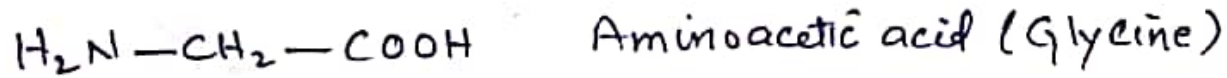


1. Classification

Amino acids are essential to all life. They are found in nature in free state as well as in polymeric form known as proteins. Simple amino acids having only one amino and carboxyl group may be classified as α -, β -, γ -, δ - etc. amino acids depending on the position of amino group with respect to the carboxyl group as illustrated below :

Classification:

1. α -Amino acids



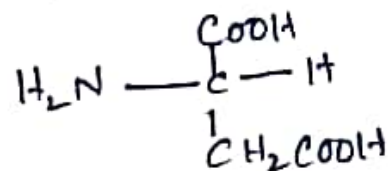
2. β -Amino acids



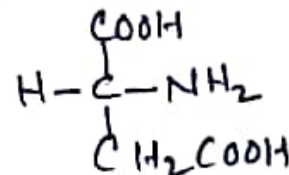
Structure and stereochemistry of α -Amino acids

All α -amino acids, except glycine, possess a chiral α -carbon atom and can exist as enantiomers. The

two enantiomers of aspartic acid are shown below.



Aspartic acid



From natural sources, over hundred amino acids have been isolated and identified. Out of these, only twenty amino acids play a vital role in the living systems. The remaining are found as intermediate or end products of metabolism. All living species are able to synthesise amino acids. The human system is capable of synthesising twelve of the twenty vital amino acids in its metabolic system. The

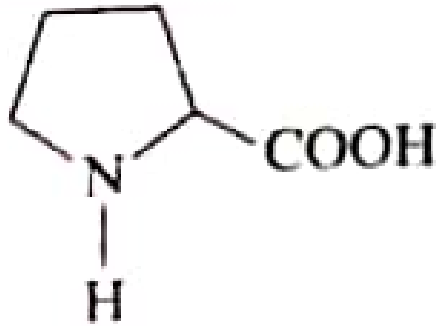
remaining eight amino acids must be supplemented through diet. These eight amino acids are known as “essential amino acids”, because the cells in human system cannot synthesise them. The essential amino acids are listed in Table 1. They are essential not because they are the only amino acids required for human body functioning, but because they are essential in the diet of the human species since their cells cannot synthesise them. The other twelve vital amino acids (Table 2) which are found in the biochemicals derived from human beings can be synthesised in individual cells from simpler starting materials.



Structure	Name	Abbreviation	R
$\begin{array}{c} \text{CH}_3 \quad \text{NH}_2 \\ \quad \\ \text{CH}_3 - \text{CH} - \text{CH} - \text{COOH} \end{array}$	Valine	Val	$\begin{array}{c} \text{CH}_3 \\ \\ \text{CH}_3 - \text{CH} - \end{array}$
$\begin{array}{c} \text{NH}_2 \\ \\ \text{CH}_3 \diagdown \text{CH} - \text{CH}_2 - \text{CH} - \text{COOH} \\ \text{CH}_3 \diagup \end{array}$	Leucine	Leu	$\begin{array}{c} \text{CH}_3 \\ \text{CH}_3 \end{array} \text{CH} - \text{CH}_2 -$

Table 2. Other Vital Amino Acids

Structure	Name	Abbreviation	R
$\begin{array}{c} \text{NH}_2 \\ \\ \text{CH}_3 - \text{CH} - \text{COOH} \end{array}$	Alanine	Ala	$\text{CH}_3 -$



Proline

Pro