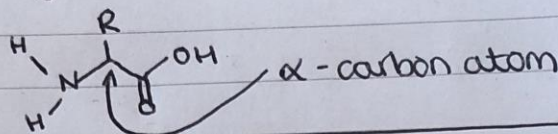


AMINO ACIDS

Definition: A group of water-soluble organic compounds that possess both a carboxyl ($-\text{COOH}$) and an amino ($-\text{NH}_2$) group.



Some amino acids never occur in proteins, but have important roles in the **urea cycle**.
converts highly toxic NH_3 (with CO_2) into urea

pKa: derived from the acid dissociation constant and is a quantitative measure of acid strength. $\text{pKa} = -\log(\text{Ka})$
high Ka = low pKa = strong acid

The Amino Group:

↳ Primary amines: $\text{R}-\text{NH}_2$

↳ Secondary amines: $\text{R}-\text{NH}-\text{R}'$

↳ Tertiary amine: $\text{R}-\text{N}-\text{R}'$

Nitrogen has a lone pair to act as a base and accepts a H^+

To assign absolute

stereochemistry, the S and R designators are used.

R =

S =

Amino acids contain a carboxylic acid functionality. The acidity is based on the stability of the conjugate base.

Stereochemistry: all **alpha-amino acids** are chiral (apart from glycine). Numbering the substituents from 1 to 4, starting from the highest atomic weight. The majority rotate plane polarised light to the left (L).

Isoelectric Points: the pH at which the amino acid **does not migrate** when placed in an electric field.

↳ Neutral aminos: average of the two pKa values

↳ Acidic aminos: average of the two lower pKa values

↳ Basic aminos: average of the two higher pKa values.

Electrophoresis: using electrostatics to separate amino acids. Set the pH of the buffer and turn on the power source.