

Amino Acids Structure

General Structure

- Central α -carbon
- Amino group ($-\text{NH}_2$)
- Carboxyl group ($-\text{COOH}$)
- Variable R group (side chain)

Classification

- Nonpolar/hydrophobic
- Polar uncharged
- Positively charged (basic)
- Negatively charged (acidic)

Chirality

- All are L-amino acids in proteins
- D-amino acids rare in nature
- Asymmetric α -carbon
- Mirror image isomers

Ionization States

- pK_a values determine charge
- Zwitterion at physiological pH
- Affects protein interactions
- Important for enzyme catalysis