

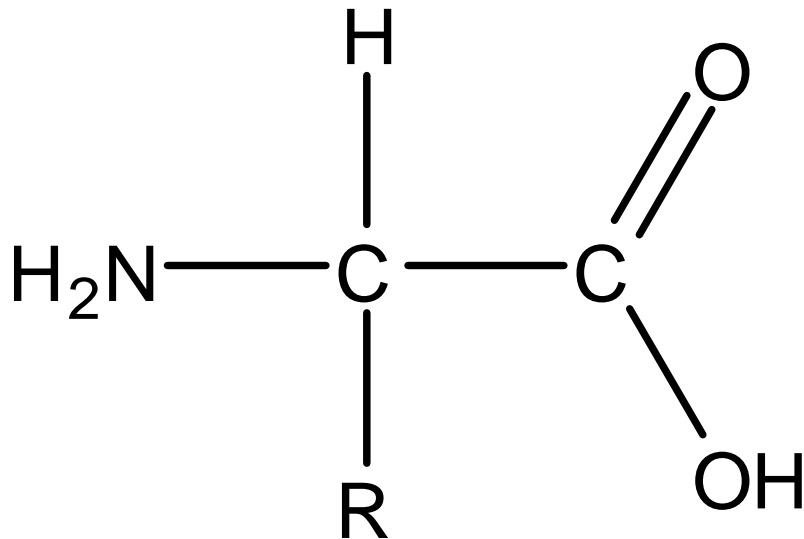
Chemistry 3.5

Advanced Organic Chemistry

Amino acid and Proteins

Amino acid and protein

- Proteins are polymers made of amino acid monomers.
- Each amino acid contains the NH_2 group of an amine and the COOH group of an acid



Glycine $\text{R} = \text{H}$

Alanine $\text{R} = \text{CH}_3$

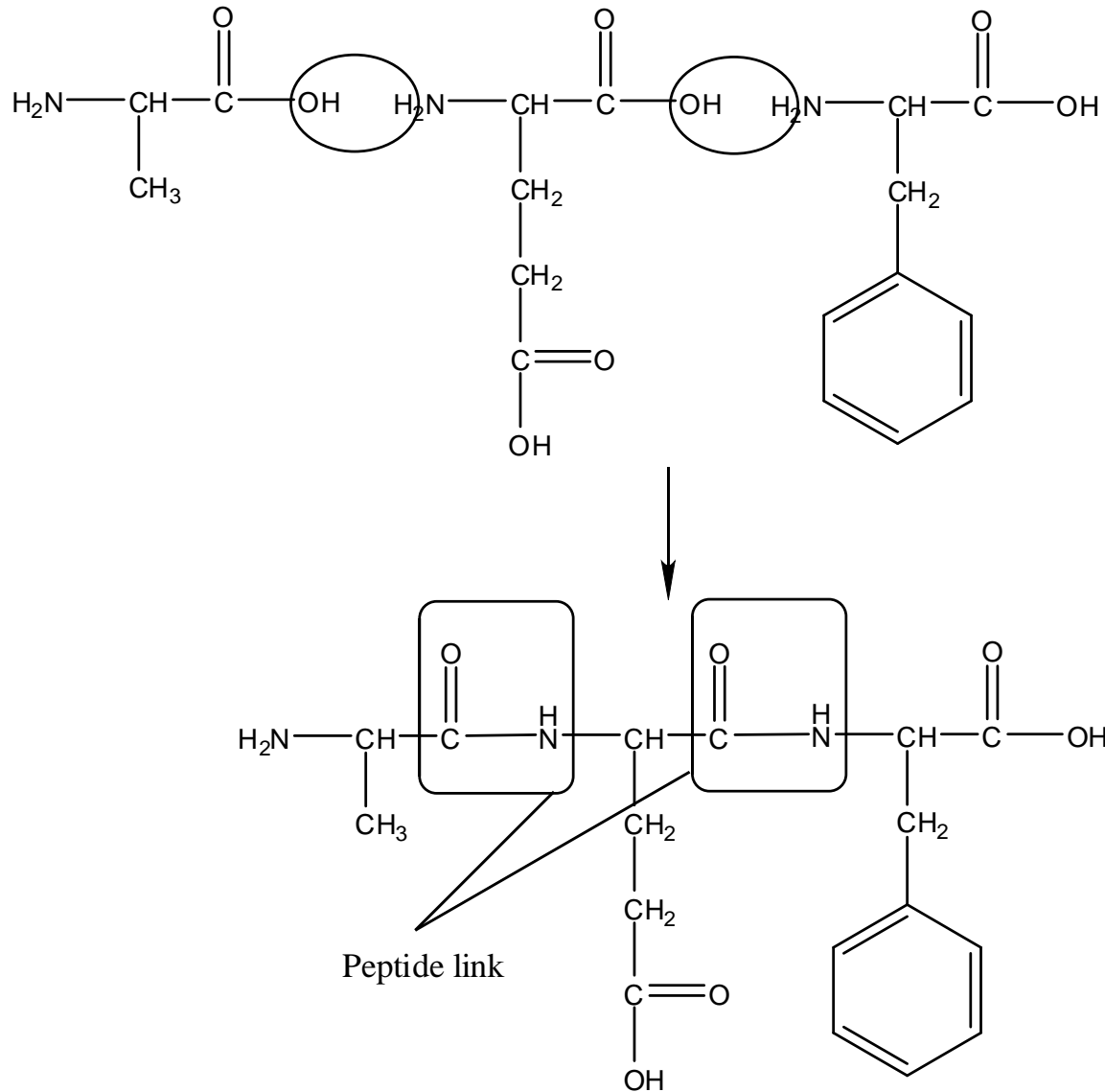
Optically active

- Apart from glycine, all amino acid contain a chiral carbon, hence it could form optical isomers
- Naturally, only one of the enantiomers is biologically active

Peptides

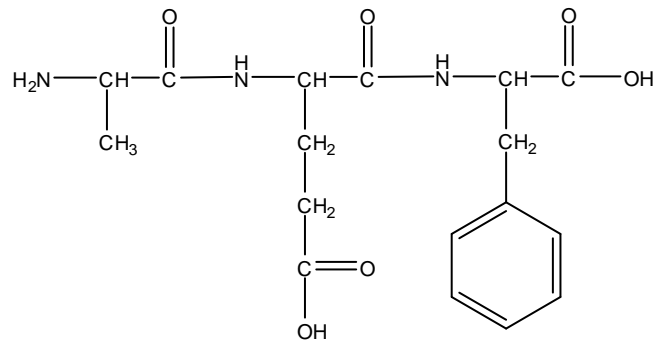
- A peptide is formed when two or more amino acids join together.
 - Two amino acids join together = dipeptides
 - Three amino acids join together = tripeptides
 - Lots of amino acids join together = polypeptides
- This is a condensation reaction controlled by biological enzymes
- The amine reacts with the carboxylic acid forming an amide link
- The amide link in peptides are also known as peptide link

Example



Hydrolysis of proteins

- Proteins can undergo hydrolysis under acidic or basic condition
- That is why stomach has such an acidic environment
- In acidic condition
 - Any amine (R-NH_2) will turn to alkyl ammonium ion (R-NH_3^+)
- In basic condition
 - Any carboxylic acid (R-COOH) will turn to carboxylate ion (R-COO^-)



Acidic

Basic

