BIOMOLECULES

NATURE OF BOND LINKING MONOMERS IN A POLYMER

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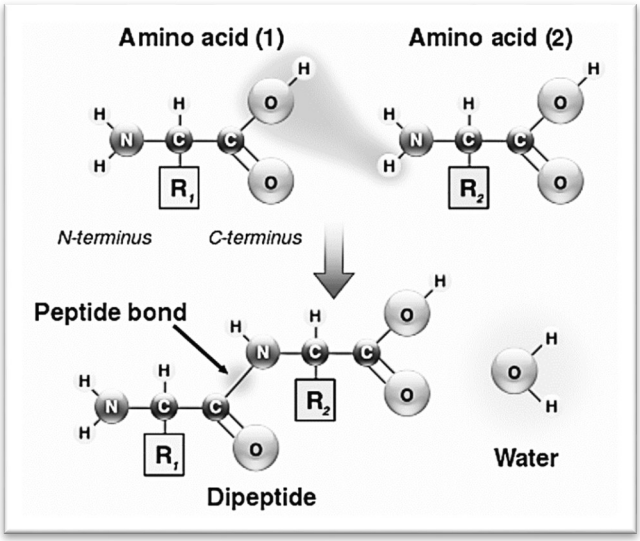
Proteins, carbohydrates, nucleic acids, and certain important biomolecules are collectively referred to as macromolecules. These macromolecules are polymers whose monomers are linked through specific bonds.

We would be discussing some of these bonds like peptide bond, glycosidic bond, etc in this article in order to gain a better understanding.

PEPTIDE BOND



Peptide bond

Proteins consist of polypeptides as they are polymers of amino acids. The amino acids are linked through peptide bonds. An amino acid has two functional groups, the amine ($-NH_2$) group, and the carboxylic acid (-COOH) group. A peptide bond is an amide bond (-CONH) between the $-NH_2$ group and the –COOH group of adjacent amino acids. A water molecule is eliminated when a peptide bond is formed.

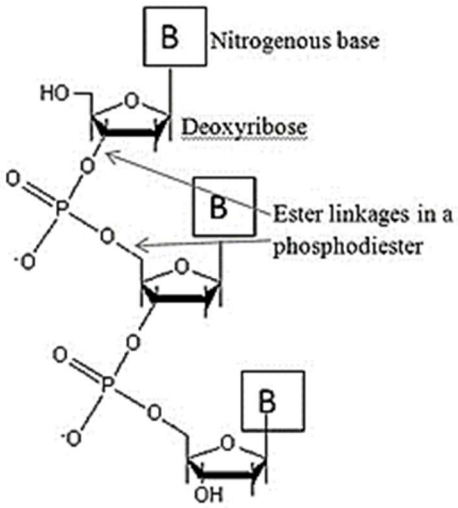
GLYCOSIDIC BOND

A glycosidic bond is a bond present in disaccharides and polysaccharides. This is a bond formed between two adjacent monosaccharides. Like peptide bond, elimination of a water molecule accompanies the formation of a glycosidic bond as well. In other words, it is a dehydration reaction.

The above figure shows the formation of a 1,4-glycosidic bond between carbon 1 and carbon 4 of adjacent glucose molecules. A water molecule is eliminated from the two hydroxyls (-OH) groups of carbon 1 of the first glucose molecule and carbon 4 of the second glucose molecule.

PHOSPHODIESTER BOND

In DNA double helix, the backbone of the strands consists of deoxyribose sugar and phosphate groups. They are linked by phosphodiester bonds.



Phosphodiester bond

Proteins of tertianz structure are highly folded to give a globular appearance. They are soluble in water (colloid solution). This structure of protein has following bonds-

(i) Peptide bonds = strongest bond in proteins.

(ii) Hydrogen bonds

(iii) **Disulphide bond :-** These bonds are formed between- SH group of amino acid (Cysteine). These bonds are second strongest bond and stabilise tertiary structure of protein.

(iv) **Hydrophobic bond :** Between amino acids which have hydrophobic side chains for e.g. Aromatic amino acid

(v) **Ionic bond :** Formation of ionic bond occurs between two opposite ends of protein molecule due to electrostatic attraction.