

The α - Helix and β - Pleated sheet structures of protein

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Alpha-Helix and Beta-Pleated sheets are types of the secondary structure of the protein.

They both are shaped by hydrogen bonding between the carbonyl O of one amino acid and the amino H of another.

This section will discuss the protein, types of protein, and the primary and secondary protein structures, i.e. alpha-helix and beta-pleated sheets.

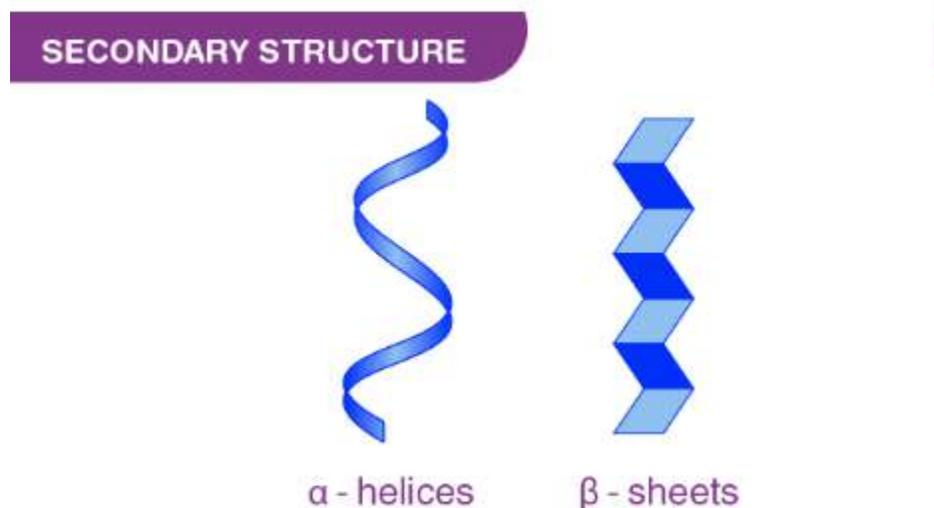
Alpha-Helix Protein,

The most common type of secondary structure of a protein is the alpha-helix.

Linus Pauling predicted the structure of the alpha-helix protein. The prediction was confirmed when the first three-dimensional structure of protein myoglobin was determined by X-ray crystallography.

In the alpha-helix protein, a hydrogen bond is formed between the N-H group to the C=O group of the amino acid.

The alkyl groups of the alpha-helix chain are not involved in the H bonds but maintain the alpha-helix structure. Every winding turn in an alpha helix has 3.6 amino acids residues.



Beta-Pleated Sheets of Protein

The second essential type of secondary structure of a protein is the Beta-Pleated Sheets of Protein. It consists of various beta strands linked by hydrogen bonds between adjacent strands. Three to ten amino acids are combined to create a beta-strand polypeptide.

Beta sheets are involved in forming the fibrils and protein aggregates observed in amyloidosis.

Alike alpha-helix, the residue hydrogen bond between the adjacent strands is separate from each other.

Differences between Alpha-Helix and Beta-Sheet

S N o.	Alpha-Helix	Beta-Sheet
1	Amino acids exist in the right-handed coiled rod-like structure.	Amino acids exist in an almost entirely extended conformation, i.e. linear or sheet-like structure.
2	Intramolecular hydrogen bonding forms within the polypeptide chain to create a spiral structure.	Beta sheets are formed by linking two or more beta strands by intermolecular hydrogen bonds.
3	3.6 amino acid residues are winded to form an alpha-helix polypeptide.	Three to ten amino acids are combined to form a beta-strand polypeptide.
4	Alpha-Helix can be a single chain polypeptide.	Beta-Sheet cannot be in a single chain Polypeptide. There must be two or more beta-strands.
5	Alkyl groups of alpha-helix are oriented outside of the helix.	Alkyl groups are oriented both inside and outside of the sheet.

