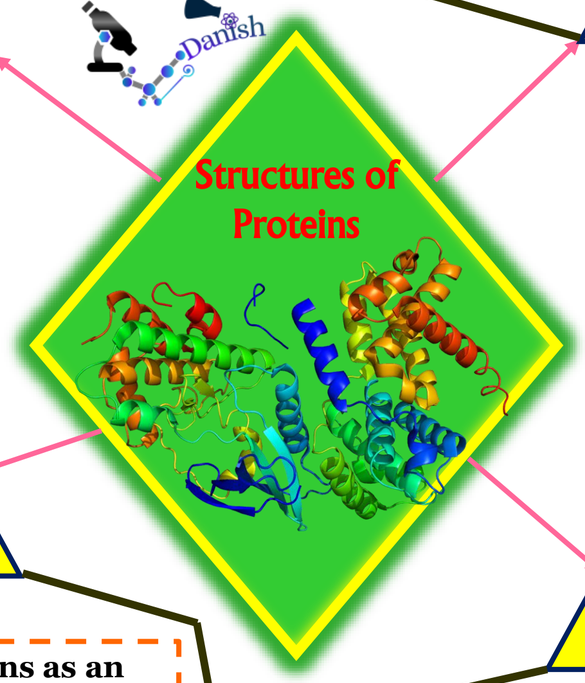
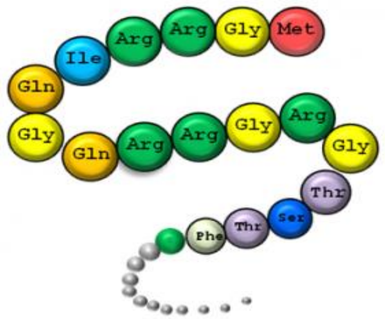
Structures of Proteins



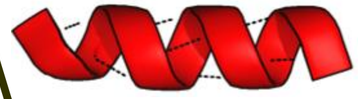
Prepared by:

Primary Structure

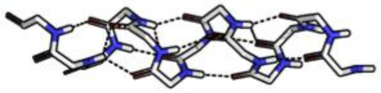


The amino acid sequence of a protein is determined by the information found in the cellular genetic code. Polypeptide chain of the order of amino acids is unique and specific to a particular protein.

Secondary Structure



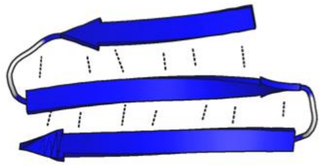
α-helix



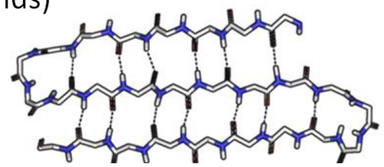
Alpha helix = Resembles a coiled spring and is secured by hydrogen bonding in the polypeptide chain

2° structure refers to the coiling or folding of a polypeptide chain that gives the protein its 3-D shape.

Beta Pleated Sheet



β-Sheet (3 strands)



= It is folded/pleated and held together by hydrogen bonding between polypeptide units of the folded chain that lie adjacent to one another.

Quartenary Structure

4° structure refers to the structure of a protein macromolecule formed by interactions between multiple polypeptide chains

Each polypeptide chain is referred to as a subunit. Proteins with quaternary structure may consist of more than one of the same type of protein subunit

E.g:

- Myoglobin
  - Functions as an oxygen storage and transport protein in muscles.
  - Monomer
  - Has one binding site for oxygen
- Hemoglobin
  - A tetramer of two alpha and beta chains
  - Bind up to four molecules of oxygen
  - Functions as an oxygen storage and transport protein in blood vessels.

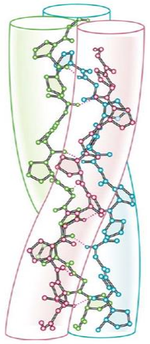
Tertiary Structure

3° structure refers to the comprehensive 3-D structure of the polypeptide chain of a protein.

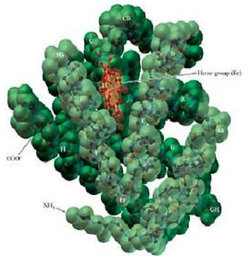
Fibrous = Consists of polypeptide chains organized approximately parallel along a single axis.

E.g:

- Keratin of hair
- Fibrion of silk
- Collagen of connective tissue



Globular = Proteins which are folded to a more spherical shape.

E.g:

- Myoglobin
- Hemoglobin