

Topic: Protein; Structure

B.Sc. Botany Hons. III

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Quaternary Structure of Proteins

Quaternary structure is exhibited by oligomeric proteins.

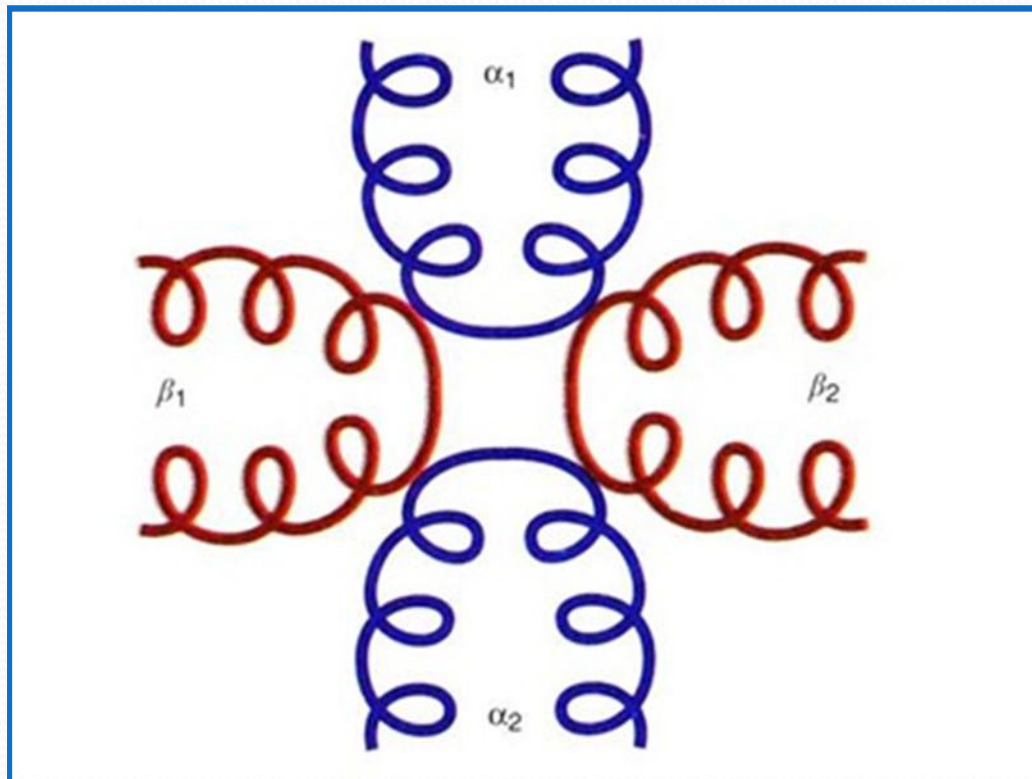
Oligomeric proteins:

They have two or more polypeptide chains.

Quaternary structure refers to the type of arrangement of the polypeptides in an oligomeric protein. These polypeptides are held together by either hydrogen bonds, ionic bonds or Vander Waals' forces, e.g., Hemoglobin has four polypeptide chains which are arranged in a particular fashion that is referred to the quaternary structure of hemoglobin.

The Quaternary structure of hemoglobin describes that it is made up of four polypeptide chains; two of which are α (α_1 & α_2) and the other two are β (β_1 & β_2). The two alpha chains are opposite to each other and adjacent to each β -chain.

The α chains and the β chains are linked together by salt bridges.



Structure function relationship in proteins:

Hemoglobin plays a vital role in transport of oxygen from the lungs to the peripheral tissues and transport of carbon dioxide from the tissue to the lungs.

There are three types of normal hemoglobin with the following polypeptides-

- (i) Adult hemoglobin (Hb A) has $2\alpha 2\beta$ chains.
- (ii) Foetal hemoglobin (Hb F) has $2\alpha 2\gamma$ chains.
- (iii) Minor adult hemoglobin (Hb A₁) has $2\alpha 2\delta$ chains.