

7.6: Quaternary structure of proteins

Learning Objectives

- Define and understand the quaternary structure of proteins and its need.

Several proteins function as a single polypeptide with primary, secondary, and tertiary structures. Some proteins require more than one polypeptide with their primary, secondary, and tertiary structures combined to function.

Quaternary structure of proteins

The association of more than one protein into a closely packed arrangement is called the **quaternary structure** of proteins.

The individual proteins in the assembly are called monomers or subunits. The subunits are held together by the same interactions that hold the tertiary structure of individual subunits, i.e., hydrogen bonds, hydrophobic interactions, salt bridges, etc.

An association of two proteins is called a dimer; three proteins is a trimer; four is a tetramer; five is a pentamer. For example, hemoglobin, shown in Figure 7.6.1, is a tetramer of two α subunits of 141 amino acid residues each and two β subunits of 146 amino acid residues each. These subunits are structurally similar, about the same size, and work cooperatively in the hemoglobin tetramer.

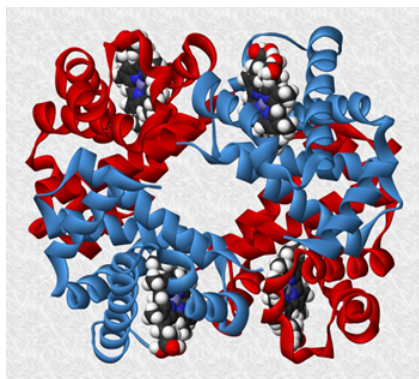


Figure 7.6.1: Illustration of a hemoglobin composed of four subunits: two α and two β subunits. Each subunit has a heme molecule inserted into cavities inside the subunit. (Copyright; Benjah-bmm27. Modificado por Alejandro Porto., CC0, via Wikimedia Commons)

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