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Organic Chemistry: Current Research

Commentary

Structure of Proteins and Its Uses in Macromolecular Polypeptides

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DESCRIPTION

Proteins are macromolecular polypeptides *i.e.* very large molecules (macromolecules) composed of many peptide bonded amino acids. Most of the common ones contain more than 100 amino acids linked to each other in a long peptide chain. Amino acids although there are obviously many different kinds of proteins, they are all created from amino acids that are joined through the process of dehydration synthesis. As additional of the amino acids known as peptides are added, two amino acids combine to make dipeptides join together they form polypeptides. The quantity and kind of amino acids that make up the chain determine the length and complexity of proteins. There are around 20 different types of amino acids, and each one has a unique chemical makeup and set of properties. For instance, some amino acids are polar while others are nonpolar. The amino acids that make up a protein ultimately determine its structure. The relationship between a protein's structure and function is direct. The function of a protein is determined by its unique form. The protein becomes denatured and ceases to function as intended if the three dimensional structure of the protein is altered as a result of a change in the structure of the amino acids. Proteins are the structural and motor components of the cell and operate as the catalysts for almost all biochemical reactions that take place in living things, making them the cell's workhorses. A breathtakingly basic code that defines a tremendously varied collection of structures yields this amazing array of functions. Proteins have the general formula $RCH(NH_2)COOH$, where C is carbon, H is hydrogen, N is nitrogen, O is oxygen, and R is a group called a side chain that varies in composition and structure. The protein's basic structure is recognized as being its straightforward sequence. A protein's folding and three-dimensional shape can be influenced by the local interactions that take place inside a protein chain, which determine secondary protein structure. The result of a protein's structural modifications demonstrates how much a protein's structure affects how well it performs.

Polypeptide structure

A polymer produced by a living organism is called a biopolymer. There are four major classes of biopolymers:

- Polysaccharides
- Polypeptides
- Polynucleotides
- Fatty acids

Which polymers are composed of amino acids? A polypeptide is an unbranched chain of amino acids that are linked together by peptide bonds. The peptide bond links the carboxyl group of one amino acid to the amine group of the next amino acid to form an amide. What are peptides? Short polypeptides may be named based on the number of monomeric amino acids that comprise them. For instance, a dipeptide is a peptide consisting of two amino acids sub units, a tripeptide is a peptide comprised of three amino acid sub-units, and tetra peptide is a peptide comprised of four amino acid sub units. Many polysaccharides become glycoconjugates when they become covalently bonded to proteins or lipids. Glycolipids and glycoproteins can be used to send signals between and within cells. To form polypeptides and proteins, amino acids are joined together by peptide bonds, in which the amino or NH_2 of one amino acid bonds to the carboxyl (acid) or COOH group of another amino acid. Amino acids are the building blocks for proteins. All amino acids contain an amino or NH_2 group and a carboxyl (acid) or COOH group. There are 20 different amino acids commonly found in proteins and often 300 or more amino acids per protein molecule. Each amino acid differs in terms of its "R" group. The "R" group of an amino acid is the remainder of the molecule, that is, the portion other than the amino group, the acid group, and the central carbon. Each different amino acid has a unique "R" group and the unique chemical properties of an amino acid depend on that of its "R" group.

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Received: 15-Sep-2023, Manuscript No. OCCR-23-22316; **Editor assigned:** 18-Sep-2023, PreQC No. OCCR-23-22316 (PQ); **Reviewed:** 04-Oct-2023, QC No. OCCR-23-22316; **Revised:** 12-Oct-2023, Manuscript No.OCCR-23-22316 (R); **Published:** 20-Oct-2023, DOI: 10.35841/2161-0401.23.12.339.

Citation: Chung S (2023) Structure of Proteins and Its Uses in Macromolecular Polypeptides. Organic Chem Curr Res. 12:339.