

Proteins

polymers Materials It is of high molecular weight and has a colloidal nature and does not penetrate through Semi-permeable membranes and proteins have amphoteric properties, meaning that they act as acids and bases at the same time. Proteins are degraded into amino acids in general, except for some additional groups such as heme Iron, copper, and some proteins may contain organic compounds, as in conjugated proteins

Proteins are among the basic components of living cells and are used in the formation and regeneration of various living systems. Some proteins have very specialized functions, such as enzymes. Some of them act as antibodies, and some of them perform important functions in controlling metabolism.

Plants are able to synthesize proteins from inorganic sources such as nitrogen, water and dioxide Carbon, while animals and humans depend on plant sources or animal protein in their diet to provide them with some components such as essential amino acids.

Protein is made of nitrogen, carbon, and oxygen, and some proteins contain sulfur Some contain phosphorous and sometimes contain zinc, iron and copper. Proteins consist of nitrogen, carbon, oxygen, hydrogen and sulfur in proportions (16, 50, 22, 7), respectively, and sulfur (0.5-3) %

There are 20 types of amino acids, each protein has its own effectiveness in the human body, and gives Each gram of protein has 4 calories for the human body

The biological value of proteins varies, and the difference is that some proteins are rich in acids Essential amino acids and others do not contain sufficient amounts of these acids, for example, proteins The ones found in meat and other animal products are complete proteins, that is, they provide all Amino acids that the body cannot manufacture on its own. As for plant proteins, they are incomplete proteins, meaning that other proteins must be added to them in order for the body to obtain all the amino acids needed for it.

The amount of protein your body needs each day depends on your age and gender. The person needs Quantity They have more protein when they get older, and men also need more protein than Women need it.

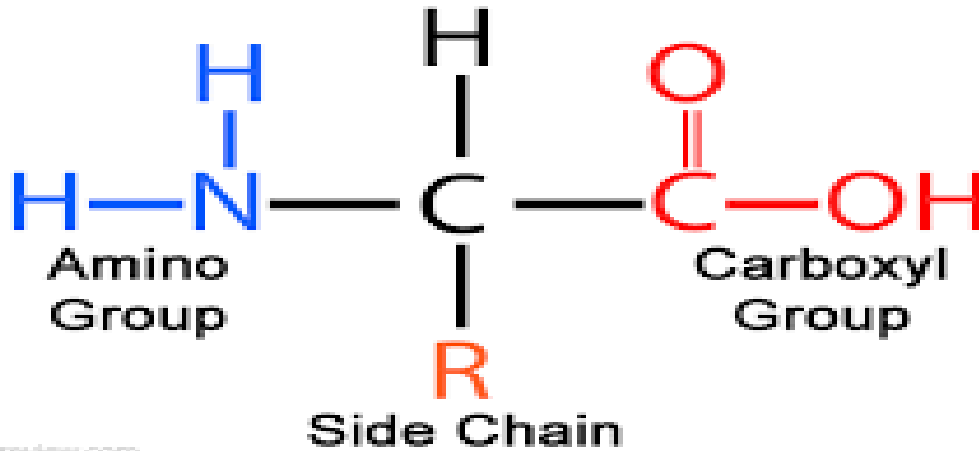
The most important vital functions of proteins

- 1. Maintaining the acid-base balance in the body.**
- 2. It is involved in the formation of antibodies responsible for the body's natural immunity.**
- 3. It is involved in the formation of hormones responsible for regulating the activities of the body.**
- 4. It is involved in the formation of enzymes responsible for chemical reactions in the body.**
- 5. Contributes to the synthesis of blood plasma proteins and hemoglobin is a protein responsible for carrying and transporting oxygen through the body.**
- 6. Storage of molecules, such as the protein ferritin, which is used to store iron in the liver.**
- 7. Building, strengthening, and repairing body tissues, such as keratin found in hair.**
- 8. Provide the body with its needs of essential amino acids.**
- 9. Prevention of protein deficiency diseases such as growth retardation and dropsy.**
- 10. Lecithin and myosin are proteins responsible for the contraction of the muscles in the body.**
- 11 Rhodopsin is a protein in the eye that is used for vision**

Amino acids and peptide bonds

Amino acids consist of a carbon atom, a hydrogen atom, an amine group, a carboxyl group and a side chain. that varies according to amino acids.

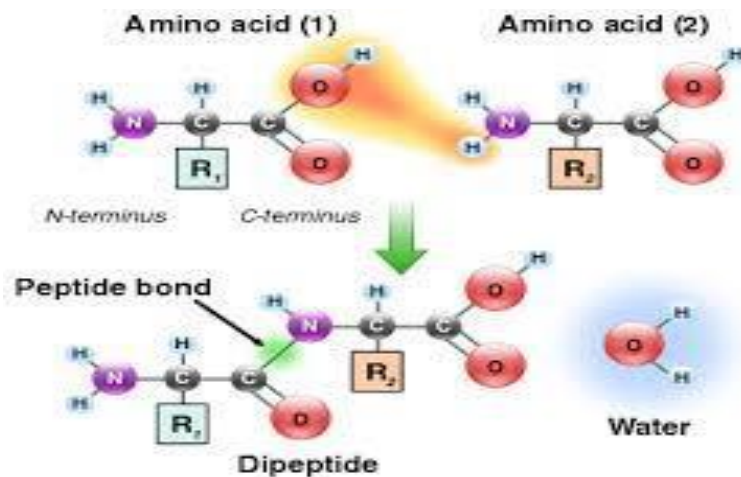
Amino Acid Structure



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Figure (1): The structure of the amino acid

Amino acids combine to form proteins through imide bonds that form between the α (alpha) carboxyl group. And the amino group is called these bonds. (Peptide links)



Substances resulting from the formation of peptide bonds are called peptides, and a peptide composed of two amino acids is called a dipeptide. which contain several amino acids polypeptide

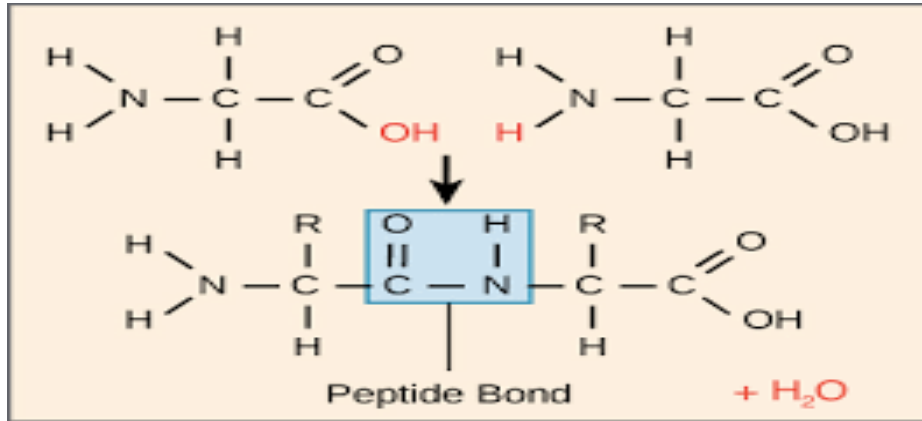


Figure (3): acid glycine a dipeptide composed of two molecules of the amino

The chemical structure of peptides is usually written with the α -terminal amino group.(N-terminus)To the left while the terminal carboxylic group is placed Alpha (C-terminus) To the right.

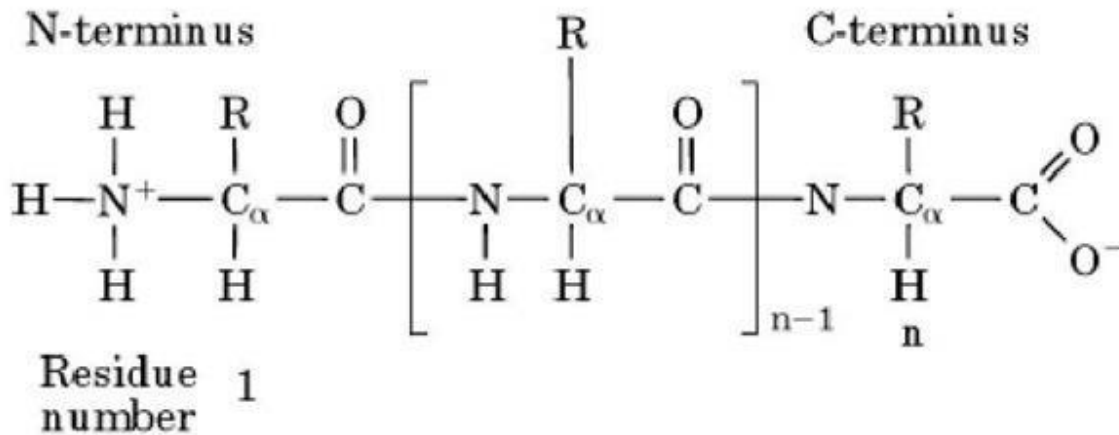


Figure (4): The amino and carboxylic terminal groups in the peptides

The peptide bonds in proteins are somewhat resistant to hydrolysis and use acids or Strong bases for long periods of time to complete decomposition. Some specialized enzymes analyze Proteins have moderate temperatures and a very short time compared to acids and bases. The acid hydrolysis of proteins is preferred over the basic hydrolysis, because the bases convert the amino acids present in nature in the form (L) into a racemic mixtureIt contains the two bodies D and L.

Acid-mediated proteolysis leads to the breakdown of most of the tryptophan and the breakdown of some serine And threonine, as well as glutamine and asparagine, while basic hydrolysis leads to the breakdown of arginine And cysteine, cysteine, asparagine and glutamine.