

Biomolecule and its Types

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BIOMOLECULES

Biomolecules are the building block of life. Cell which is known as the building of body is made up of these biomolecules. These biomolecules are further made up of inorganic compounds. C, H, N, O is the four major inorganic compounds which make the 94% of the cell. S, P makes 3% of the cell. Biomolecules also called as biological molecule, which are produced by cells and living organisms. The four major types of biomolecules are carbohydrates, lipids, nucleic acids, and proteins.

CARBOHYDRATES

Carbohydrate is the sugar molecules. Carbohydrate is one of the main nutrients found in food and drink. In our body carbohydrate breaks into sugars. Glucose is also known as blood sugar which is the main source of energy in our body. Glucose can be used immediately or it is stored in liver and muscle. Grains, Fruits, Dairy products, Legumes, Snack foods and sweets, other desserts Juices, regular sodas, fruit drinks, sports drinks, and energy drinks that contain sugar. Every day we should take 40-60% calories from carbohydrate every day. Daily Value for total carbohydrates is 275 g per day. Carbohydrates are of different types such as Monosaccharide's, Disaccharides, Oligosaccharides and polysaccharides.

LIPIDS

A lipid is an organic compound that is insoluble in water. Example of lipids is fats, waxes, oils, hormones. The four main groups of lipids include: Fatty acids, Glycerides, Non glyceride lipids, Complex lipids. Lipid functions different function in our body such as they serve as structural components of cell membranes, function as energy storehouses, and function as important signaling molecules. It helps to maintain the homeostatic of body. Lipids are fatty, waxy, or oily compounds that are soluble in organic solvents and insoluble in polar solvents such as water. Cholesterol is the most common sterol in the body. An excess amount of

lipids can cause fat deposits in the arterial wall and increases the risk of heart disease. Lipids are the polymers of fatty acids that contain a long, non-polar hydrocarbon chain with a small polar region containing oxygen. Lipid is of two types such as (a) Non-saponifiable lipids (b) Saponifiable lipids. Nonsaponifiable lipids cannot be disintegrated into smaller molecules through hydrolysis. Eg- cholesterol, prostaglandins; A saponifiable lipid contains one or more ester groups, enabling it to undergo hydrolysis in the presence of a base, acid, or enzymes, including waxes, triglycerides, sphingolipids and phospholipids. Polar lipids make an external environment with the water environment. Plasma membrane contains polar lipids. Nonpolar lipids used as fuel to store energy.

PROTEINS

Protein is the building block of life. A protein is a complex substance that consists of amino acid residues joined by peptide bonds. Proteins are present in all living organisms and include many essential biological compounds such as enzymes, hormones, and antibodies. Proteins are essential for life and many cellular activities. It catalyzes vast range of chemical reaction in body proteins, in the form of antibodies, protect animals from disease, and many hormones are proteins. Proteins control the activity of genes and regulate gene expression. Protein molecules are large, complex molecules made up of amino acid residue. Each amino acid is connected to the next amino acid by covalent bonds. It is of four types- Primary, Secondary, Tertiary, and Quaternary. Proteins are the polymers of about twenty different amino acids which are linked by peptide bonds. Ten amino acids are called essential amino acids because they cannot be synthesized by our body, hence must be provided through diet. Proteins perform various structural and dynamic functions in the organisms. Proteins which contain only amino acids are called simple proteins. The secondary or tertiary structure of proteins gets disturbed on change of pH or temperature and they are not able to perform their functions. This is called denaturation of

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proteins. Enzymes are biocatalysts which speed up the reactions in bio systems. They are very specific and selective in their action and chemically all enzymes are proteins.

Protein found in a biological system with a unique three-dimensional structure and biological activity is called a native protein. When a protein in its native form, is subjected to physical change like change in temperature or chemical change like change in pH, the hydrogen bonds are disturbed. Due to

this, globules unfold and helix gets uncoiled and protein loses its biological activity. This is called denaturation of 14.2.4 Denaturation of Proteins 2020-21 425 Biomolecules protein. During denaturation secondary and tertiary structures are destroyed but primary structure remains intact. The coagulation of egg white on boiling is a common example of denaturation. Another example is curdling of milk which is caused due to the formation of lactic acid by the bacteria present in milk.