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The Types of Organic Compound in Living Body

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Abstract*: Organic compound, any of a large class of chemical compounds in which one or more atoms of carbon are covalently linked to atoms of other elements, most commonly hydrogen, oxygen, or nitrogen. carbon atoms provide the key structural framework that generates the vast diversity of organic compounds. All things on Earth (and most likely elsewhere in the universe) that can be described as living have a crucial dependence on organic compounds Foodstuffs—namely, fats, proteins, and carbohydrates—are organic compounds, as are such vital substances as hemoglobin, chlorophyll, enzymes, hormones, and vitamins. Other materials that add to the comfort, health, or convenience of humans are composed of organic compounds, including clothing made of cotton, wool, silk, and synthetic fibres; common fuels, such as wood, coal, petroleum, and natural gas; components of protective coatings, such as varnishes, paints, lacquers, and enamels; antibiotics and synthetic drugs; natural and synthetic rubber; dyes; plastics; and pesticides.*

Keywords: crucial, framework, lacquers.

I. INTRODUCTION

The first significant synthesis of an organic compound from inorganic materials was an accidental discovery of Friedrich Wohler, a German chemist. Working in Berlin in 1828, Wohler mixed two salts (silver cyanate and ammonium chloride) in an attempt to make the inorganic substance ammonium cyanate organic compounds commonly are represented by simplified structural formulas, which show not only the kinds and numbers of atoms present in the molecule but also the way in which the atoms are linked sin formation they convey, and the type of structural formula used for any one molecule depends on the nature of the information the formula is meant to display. Structural formulas vary widely in the amount of three-dimensional information they convey, and the type of structural formula used for any one molecule depends on the nature of the information the formula is meant to display. the properties of each of the several million organic molecules whose structure is known are unique in some way, all molecules that contain the same functional group have a similar pattern of reactivity at the functional group site. Thus, functional groups are a key organizing feature of organic chemistry Alkanes are compounds that consist entirely of atoms of carbon and hydrogen (a class of substances known as hydrocarbons) joined to one another by single bonds. Organic compounds are termed alkenes if they contain a carbon-carbon double bond. The shared electron pair of one of the bonds is a σ bond. Molecules that contain a triple bond between two carbon atoms are known as alkynes. The triple bond is made up of one σ bond and two π bonds. Molecules that contain a triple bond between two carbon atoms are known as alkynes. To his complete surprise, he obtained a product that had the same molecular formula as ammonium cyanate but was instead the well-known organic compound urea. structures of organic compounds commonly are represented by simplified structural formulas, which show not only the kinds and numbers of atoms present in the molecule but also the way in which the atoms are linked by the covalent bond Structural formulas vary widely in the amount of three-dimensional information they coveny, and the type of structural formula used for any one molecule depends on the nature of the information the formula is meant to display. Organic compounds are termed alkenes if they contain a carbon-carbon double bond. The shared electron pair of one of the bonds is a σ bond. The triple bond is made up of one σ bond and two π bonds. Ether molecules occur widely in nature. Diethyl ether was once widely used anesthetic. An aromatic ether known as neroli (2-ethoxynaphthalene) is used in perfumes to impart the scent of orange blossom.

Most organic compounds making up our cells and body belong to one of four classes:

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Proteins

- Carbohydrate
- Lipid.
- Nucleic acid

Proteins

A protein is a naturally occurring, extremely complex substance that consists of amino acid residues joined by peptide bond. Proteins are present in all living organisms and include many essential biological compounds such as enzymes, hormones, and antibodies **Protein**, highly complex substance that is present in all living organism Proteins are of great nutritional value and are directly involved in the chemical processes essential for life. Higher percentages of protein are found in hair, bones, and other organs and tissues with a low water content. The quantity of free amino acids and peptides in animals is much smaller than the amount of protein; protein molecules are produced in cells by the stepwise alignment of amino acids and are released into the body fluids only after synthesis is complete. Proteins are macromolecular polypeptide complete 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. Plants can grow in a medium containing inorganic nutrients that provide nitrogen, potassium and other substances essential for growth. The protein content of animal organs is usually much higher than that of the blood plasma. Muscles, for example, contain about 30 percent protein, the liver 20 to 30 percent, and red blood cell 30% Higher percentages of protein are found in hair, bones, and other organs and tissues with a low water content. The quantity of free amino acids and peptides in animals is much smaller than the amount of protein; protein molecules are produced in cells by the stepwise alignment of amino acids and are released into the body fluids only after synthesis is complete. The high protein content of some organs does not mean that the importance of proteins is related to their amount in an organism or tissue; on the contrary, some of the most important proteins, such as enzymes and hormones, occur in extremely small amounts. The importance of proteins is related principally to their function. All enzymes identified thus far are proteins. Enzymes, which are the catalyst of all metabolic reactions, enable an organism to build up the chemical substances necessary for life—proteins, nucleic acid, carbohydrates, and lipids—to convert them into other substances, and to degrade them. Life without enzymes is not possible. There are several protein hormones with important regulatory functions In all vertebrates, the respiratory protein heomoglobin acts as oxygen carrier in the blood, transporting oxygen from the lung to body organs and tissues. A large group of structural proteins maintains and protects the structure of the animal body. Proteins usually are almost neutral molecules; that is, they have neither acidic nor basic properties. This means that the acidic carboxyl groups of aspartic and glutamic acid are about equal in number to the amino acids with basic side chains. Three such basic amino acids, each containing six carbon atoms, occur in proteins.

The isolation and determination of proteins Animal material usually contains large amounts of protein and lipids and small amounts of carbohydrate; in plants, the bulk of the dry matter is usually carbohydrate. If it is necessary to determine the amount of protein in a mixture of animal foodstuffs, a sample is converted to ammonium salts by boiling with sulfuric acid and a suitable inorganic catalyst, such as copper sulphate. The method is based on the assumption that proteins contain 16 percent nitrogen, and that nonprotein nitrogen is present in very small amounts. The assumption is justified for most tissues from higher animals but not for insects and crustacean, in which a considerable portion of the body nitrogen is present in the form of chitin, a carbohydrate. Large amounts of nonprotein nitrogen are also found in the sap of many plants. In such cases, the precise quantitative analyses are made after the proteins have been separated from other biological compounds.

Physicochemical properties of proteins

If a protein contains only one molecule of one of the amino acids or one atom of iron, copper, or another element, the minimum molecular weight of the protein or a subunit can be calculated. The first ultracentrifuges, built in 1920, were used to determine the molecular weight of proteins. The molecular weights of a large number of proteins have been determined. Most consist of several subunits, the molecular weight of which is usually less than 100,000 and frequently ranges from 20,000 to 30,000. Proteins of very high molecular weights are found among the copper-containing

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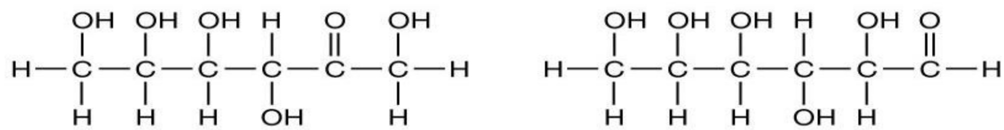
respiratory proteins of invertibrates some range as high as several million. Although there is no definite lower limit for the molecular weight of proteins, short amino acid sequences are usually called peptides.

Carbohydrate

Class of naturally occurring compound and derivatives formed from them. In the early part of the 19th century, substances such as wood, starch, and linen were found to be composed mainly of molecules containing atoms of carbon (C), hydrogen (H), and oxygen (O) Carbohydrates are formed by green plants from carbon dioxide and water during the process of photosynthesis. Carbohydrates serve as energy sources and as essential structural components in organisms; in addition, part of the structure of nucleic acid, which contain genetic information, consists of carbohydrate. carbohydrates, the division into four major groups—

- monosaccharide
- disaccharide
- oligosaccharide
- polysaccharide

Most monosaccharide, or simple sugar, are found in grapes, other fruits, and honey. Two molecules of a simple sugar that are linked to each other form a diasaccharide, or double sugar.



Fructose Glucose

The disaccharide sucrose, or table sugar, consists of one molecule of glucose and one molecule of fructose; the most familiar sources of sucrose are sugar beets and cane sugar. Milk sugar, or lactose, and maltose are also disaccharides The importance of carbohydrates to living things can hardly be overemphasized. The energy stores of most animals and plants are both carbohydrate and lipid in nature; carbohydrates are generally available as an immediate energy source lactose is one of the sugar found most commonly in human diets throughout the world. constituents about 7 percent of human milk and about 4–5 percent of the milk of mammals such as cows, goats, Foods high in carbohydrates include potatoes, corn, bananas, honey, bread, and pasta.

Role in human nutrition

Carbohydrate that can be used by humans produces four calories per gram as opposed to nine calories per gram of fat and four per gram of protein. carbohydrates may compose as much as 80 percent of the total caloric intake in the human diet. the proportion of starch to total carbohydrate is quite variable, depending upon the prevalline customs. Most plant starches consist of a mixture of two components: amylose. starches, the major plant-energy- reserve polysaccharides used by humans.

Lipids

Lipid, any of a diverse group of organic compound include fats, oil, hormone. Some lipids such as steroid hormones serve as chemical messengers between cells, tissue, and organs, and others communicate signals between biochemical systems within a single cell. The homologies allow lipids to be classified into a few major groups:

- fatty acid
- fatty acid derivatives
- Lipoproteins

Fatty acid rarely occur as free molecules in nature but are usually found as components of many complex lipid molecules such as fats (energy-storage compounds) and phospholipids (the primary lipid components of cellular membranes). This section describes the structure and physical and chemical properties of fatty acids. It also explains how living organisms obtain fatty acids, both from their diets and through metabolic breakdown of stored fats. Many saturated fatty acids have a trivial or common name as well as a chemically descriptive systematic name. Oleic acid is an example of a monounsaturated fatty acid

Common representative monounsaturated fatty acids together with their names and typical sources are listed in the table same side of the double-bonded carbons. In the trans configuration, the two adjacent carbons lie on opposite sides of the double-bonded carbons. Pure fatty acids form crystals that consist of stacked layers of molecules, with each layer the thickness of two extended molecules. Lipoproteins are lipid- protein complexes that allow all lipids derived from food or synthesized in specific organs to be transported throughout the body by the circulatory system. The majority of lipids in biological systems function either as a source of stored metabolic energy or as structural matrices and permeability barriers in biological membranes. Cholesterol is insoluble in the blood, and so it must be bound to lipoproteins in order to be transported. cholesterol cholesterol broken down to bile acids and is then excreted. About 70 percent of all cholesterol in the blood is carried by LDL particle sits site of synthesis in the liver to the body's cells, The majority of lipids in biological systems function either as a source of stored metabolic energy or as structural matrices and permeability barriers in biological membranes.

Nucleic acid

Nucleic acid, naturally occurring chemical compound that is capable of being broken down to yield phosphoric acid, sugars, and a mixture of organic bases. Nucleic acids are the main information-carrying molecules of the cell, and, by directing the process of protein synthesis, they determine the inherited characteristics of every living thing

The two main classes of nucleic acids are 1deoxyribonucleic acid (DNA) 2ribonucleic acid (RNA).

DNA is the master blueprint for life and constituents the genetic material in all free- living organisms and most viruses. RNA is the genetic material of certain viruses, but it is also found in all living cells, where it plays an important role in certain processes such as the making of proteins. DNA is a polymer of the four nucleotides A, C, G, and T, which are joined through a backbone of alternating phosphate and deoxyribose sugar residues A always pairs with T through two hydrogen bonds, and G always pairs with C through three hydrogen bonds. The bonding between complementary bases also provides a mechanism for the replication of DNA and the transmission of genetic information. The double helical structure of normal DNA takes a right-handed form called the B-helix. Naturally occurring DNA molecules can be circular or linear.

RNA is a single-stranded nucleic acid polymer of the four nucleotides A, C, G, and U joined through a backbone of alternating phosphate and ribose sugar residues. It is the first intermediate in converting the information from DNA into proteins essential for the working of a cell. Some RNAs also serve direct roles in cellular metabolism. RNA is made by copying the base sequence of a section of double-stranded DNA, called a gene, into a piece of single-stranded nucleic acid Messenger RNA (mRNA) delivers the information encoded in one or more genes from the DNA to the ribosome, a specialized structure, or organelle, where that information is decoded into a protein. Ribosomal RNA (rRNA) molecules are the structural components of the ribosome. They also assist with the catalysis of protein synthesis. In the prokaryote *E. coli*, seven copies of the rRNA genes synthesize about 15,000 ribosomes per cell. In eukaryotes the numbers are much larger. The two DNA strands are replicated in different fashions dictated by the direction of the phosphodiester bond. The leading strand is replicated continuously by adding individual nucleotides to the 3′ end of the chain. The laggin strand is synthesized in a discontinuous manner by laying down short RNA primers and then filling the gaps by DNA polymerase, such that the bases are always added in the 5′ to 3′ direction. The short RNA fragments made during the copying of the lagging strand are degraded when no longer needed.

II. CONCLUSION

Organic compounds are essential because they contain carbon in all living organisms. They are the basic components that move the world in many of the cycles. For example, the carbon cycle which involves exchanging carbon in photosynthesis and cell respiration between plants and animals.

Most organic compounds making up our cells and body belong to one of four classes: carbohydrates, lipids, proteins, and nucleic acids.

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