Opinion

iMedPub Journals
www.imedpub.com

Journal of Applied Microbiology and Biochemistry
ISSN 2576-1412

2022
Vol.6 No.2:69

Study of Biology and its Subfields of Biochemistry and Molecular Biology

Kresno Wiyatno*

Department of Biology, University of Missouri-Columbia, Columbia, United States

***Corresponding author:** Kresno Wiyatno**,** Department of Biology, University of Missouri-Columbia, Columbia, United States, E-mail: wiyatno_k@gmail.com

Received date: 07-Jan-2021, Manuscript No. Ipjamb-22-13266; **Editor assigned date:** 09- Jan-2021, PreQC No. Ipjamb-22-13266 (PQ); **Reviewed date:** 23-Jan-2021, QC No. Ipjamb-22-13266; **Revised date:** 28-Jan-2021, Manuscript No. Ipjamb-22-13266 (R); **Published date:** 07-Feb-2022, DOI: 10.36648/J Appl Microbiol Biochem.6.2.69

Citation: Wiyatno K (2022) Study of Biology and its Subfields of Biochemistry and Molecular Biology. J Appl Microbiol Biochem Vol.6 No.2:69.

Description

Biomolecule, also called biological molecule, any of numerous substances that are produced by cells and living organisms. Biomolecules have a wide range of sizes and structures and perform a vast array of functions. The four major types of biomolecules are carbohydrates, lipids, nucleic acids, and proteins.

Systematic Review

A biomolecule or biological molecule is a loosely used term for molecules present in organisms that are essential to one or more typically biological processes, such as cell division, morphogenesis, or development. Biomolecules include large macromolecules (or polyanions) such as proteins, carbohydrates, lipids, and nucleic acids, as well as small molecules such as primary metabolites, secondary metabolites and natural products. A more general name for this class of material is biological materials. Biomolecules are an important element of living organisms, those biomolecules are often endogenous, produced within the organism but organisms usually need exogenous biomolecules, for example certain nutrients, to survive.

Biology and its subfields of biochemistry and molecular biology study biomolecules and their reactions. Most biomolecules are organic compounds, and just four elements oxygen, carbon, hydrogen, and nitrogen make up 96% of the human body's mass. But many other elements, such as the various biometals, are also present in small amounts.

The uniformity of both specific types of molecules (the biomolecules) and of certain metabolic pathways are invariant features among the wide diversity of life forms; thus these biomolecules and metabolic pathways are referred to as "biochemical universals" or "theory of material unity of the living beings", a unifying concept in biology, along with cell theory and evolution theory.

Nucleosides are molecules formed by attaching a nucleobase to a ribose or deoxyribose ring. Examples of these include cytidine (C), uridine (U), adenosine (A), guanosine (G), and thymidine (T).

Nucleosides can be phosphorylated by specific kinases in the cell, producing nucleotides. Both DNA and RNA are polymers, consisting of long, linear molecules assembled by polymerase enzymes from repeating structural units, or monomers, of mononucleotides. DNA uses the deoxynucleotides C, G, A, and T, while RNA uses the ribonucleotides (which have an extra hydroxyl(OH) group on the pentose ring) C, G, A, and U. Modified bases are fairly common (such as with methyl groups on the base ring), as found in ribosomal RNA or transfer RNAs or for discriminating the new from old strands of DNA after replication. RNA, in contrast, forms large and complex 3D tertiary structures reminiscent of proteins, as well as the loose single strands with locally folded regions that constitute messenger RNA molecules. Those RNA structures contain many stretches of A-form double helix, connected into definite 3D arrangements by single-stranded loops, bulges, and junctions. Examples are tRNA, ribosomes, ribozymes, and riboswitches. These complex structures are facilitated by the fact that RNA backbone has less local flexibility than DNA but a large set of distinct conformations, apparently because of both positive and negative interactions of the extra OH on the ribose. Structured RNA molecules can do highly specific binding of other molecules and can themselves be recognized specifically; in addition, they can perform enzymatic catalysis (when they are known as "ribozymes", as initially discovered by Tom Cech and colleagues).

DNA Structure

DNA structure is dominated by the well-known double helix formed by Watson-Crick base-pairing of C with G and A with T. This is known as B-form DNA, and is overwhelmingly the most favorable and common state of DNA; its highly specific and stable base-pairing is the basis of reliable genetic information storage. DNA can sometimes occur as single strands (often needing to be stabilized by single-strand binding proteins) or as A-form or Z-form helices, and occasionally in more complex 3D structures such as the crossover at Holliday junctions during DNA replication.

Monosaccharides are the simplest form of carbohydrates with only one simple sugar. They essentially contain an aldehyde or ketone group in their structure. The presence of an aldehyde group in a monosaccharide is indicated by the prefix aldo.

Similarly, a ketone group is denoted by the prefix keto. Examples of monosaccharides are the hexoses, glucose, fructose, Trioses, tetroses, heptoses, galactose, pentoses, ribose, and deoxyribose. Consumed fructose and glucose have different rates of gastric emptying, are differentially absorbed and have different metabolic fates, providing multiple opportunities for 2 different saccharides to differentially affect food intake. Most saccharides eventually provide fuel for cellular respiration.

Each nucleotide is made of an acyclic nitrogenous base, a pentose and one to three phosphate groups. They contain carbon, nitrogen, oxygen, hydrogen and phosphorus. They serve as sources of chemical energy (adenosine triphosphate and guanosine triphosphate), participate in cellular signaling (cyclic guanosine monophosphate and cyclic adenosine monophosphate), and are incorporated into important cofactors of enzymatic reactions (coenzyme A, flavin adenine dinucleotide, flavin mononucleotide, and nicotinamide adenine dinucleotide phosphate).