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Chapter 1 : Biological Macromolecules - Proteins | National Diagnostics

The application of circular dichroism (CD) to various problems involving conÂ- formation of proteins and other biopolymers is emphasized in this revised and enlarged second edition. The usefulness of CD and ORD in helping to solve structural probÂ- lems is demonstrated by many examples, and the most.

Nucleosides and Nucleotides Nucleosides are molecules formed by attaching a nucleobase to a ribose or deoxyribose ring. 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. 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. 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. 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. 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. 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. They essentially contain an aldehyde or ketone group in their structure. Similarly, a ketone group is denoted by the prefix keto-. 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. Disaccharides are formed when two monosaccharides, or two single simple sugars, form a bond with removal of water. They can be hydrolyzed to yield their saccharin building blocks by boiling with dilute acid or reacting them with appropriate enzymes. Polysaccharides are polymerized monosaccharides, or complex carbohydrates. They have multiple simple sugars. Examples are starch , cellulose , and glycogen. They are generally large and often have a complex branched connectivity. Because of their size, polysaccharides are not water-soluble, but their many hydroxy groups become hydrated individually when exposed to water, and some polysaccharides form thick colloidal dispersions when heated in water. It successfully discriminated three brands of orange juice beverage. After cellulose, lignin is the second most abundant biopolymer and is one of the primary structural components of most plants. It contains subunits derived from p-coumaryl alcohol , coniferyl alcohol , and sinapyl alcohol [13] and is unusual among biomolecules in that it is racemic. The lack of optical activity is due to the polymerization of lignin which occurs via free radical coupling reactions in which there is no preference for either configuration at a chiral center. Lipids[edit] Lipids oleaginous are chiefly fatty acid esters , and are the basic building blocks of biological membranes. Another biological role is energy storage e. Most lipids consist of a polar or hydrophilic head typically glycerol and one to three nonpolar or hydrophobic fatty acid tails, and therefore they are amphiphilic. Fatty acids consist of unbranched chains of carbon atoms that are connected by single bonds alone saturated fatty acids or by both single and double bonds unsaturated fatty acids. The chains are usually carbon groups long, but it is always an even number. For lipids present in biological membranes, the hydrophilic head is from one of three classes: Glycolipids , whose heads contain an

oligosaccharide with saccharide residues. Phospholipids , whose heads contain a positively charged group that is linked to the tail by a negatively charged phosphate group. Sterols , whose heads contain a planar steroid ring, for example, cholesterol. Other lipids include prostaglandins and leukotrienes which are both carbon fatty acyl units synthesized from arachidonic acid. They are also known as fatty acids Amino acids[edit] Amino acids contain both amino and carboxylic acid functional groups. In biochemistry , the term amino acid is used when referring to those amino acids in which the amino and carboxylate functionalities are attached to the same carbon, plus proline which is not actually an amino acid. Modified amino acids are sometimes observed in proteins; this is usually the result of enzymatic modification after translation protein synthesis. For example, phosphorylation of serine by kinases and dephosphorylation by phosphatases is an important control mechanism in the cell cycle. Only two amino acids other than the standard twenty are known to be incorporated into proteins during translation, in certain organisms: Selenocysteine is incorporated into some proteins at a UGA codon , which is normally a stop codon. Pyrrolysine is incorporated into some proteins at a UAG codon. For instance, in some methanogens in enzymes that are used to produce methane. Besides those used in protein synthesis , other biologically important amino acids include carnitine used in lipid transport within a cell , ornithine , GABA and taurine. This sequence is determined by the genetic makeup of the individual. It specifies the order of side-chain groups along the linear polypeptide "backbone". Proteins have two types of well-classified, frequently occurring elements of local structure defined by a particular pattern of hydrogen bonds along the backbone: Their number and arrangement is called the secondary structure of the protein. The spiral has about 3. Beta pleated sheets are formed by backbone hydrogen bonds between individual beta strands each of which is in an "extended", or fully stretched-out, conformation. The strands may lie parallel or antiparallel to each other, and the side-chain direction alternates above and below the sheet. Hemoglobin contains only helices, natural silk is formed of beta pleated sheets, and many enzymes have a pattern of alternating helices and beta-strands. The secondary-structure elements are connected by "loop" or "coil" regions of non-repetitive conformation, which are sometimes quite mobile or disordered but usually adopt a well-defined, stable arrangement. It is formed as result of various attractive forces like hydrogen bonding , disulfide bridges , hydrophobic interactions , hydrophilic interactions, van der Waals force etc. When two or more polypeptide chains either of identical or of different sequence cluster to form a protein, quaternary structure of protein is formed. Quaternary structure is an attribute of polymeric same-sequence chains or heteromeric different-sequence chains proteins like hemoglobin , which consists of two "alpha" and two "beta" polypeptide chains. Apoenzymes[edit] An apoenzyme or, generally, an apoprotein is the protein without any small-molecule cofactors, substrates, or inhibitors bound. It is often important as an inactive storage, transport, or secretory form of a protein. This is required, for instance, to protect the secretory cell from the activity of that protein. Apoenzymes becomes active enzymes on addition of a cofactor. Cofactors can be either inorganic e. Isoenzymes[edit] Isoenzymes , or isozymes, are multiple forms of an enzyme, with slightly different protein sequence and closely similar but usually not identical functions. They are either products of different genes , or else different products of alternative splicing. They may either be produced in different organs or cell types to perform the same function, or several isoenzymes may be produced in the same cell type under differential regulation to suit the needs of changing development or environment. LDH lactate dehydrogenase has multiple isozymes, while fetal hemoglobin is an example of a developmentally regulated isoform of a non-enzymatic protein. The relative levels of isoenzymes in blood can be used to diagnose problems in the organ of secretion.

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Chapter 2 : - NLM Catalog Result

Optical rotatory dispersion has been successful in solving structural problems, and a vast amount of literature has accumulated on this subject. Several review articles appeared between and , but significant progress has been made since

National Diagnostics continues its tradition of bringing laboratories more high quality options for scientific research by introducing three new p July 23, National Diagnostics announces the release of a new, ultra-high sensitivity reagent for HRP mediated Western Blotting. You are here Biological Macromolecules - Proteins Proteins Like nucleic acids, proteins are polymers. While with nucleic acids the repeating unit is the nucleotide, with proteins, the analogous repeating unit is the amino acid. Amino acids consist of a central carbon which carries an amino group, a carboxyl group, a hydrogen, and a side chain group. Amino acids are distinguished by the properties of their side chains. Amino acids are the basic structural units of proteins. An amino acid consists of an amine group, carboxyl group, hydrogen atom, and a side-chain group, all bonded to a central carbon atom. Amino acids are classified according to the solubility properties and ionizability which they derive from their side-chains. Single chain proteins generally range from 50 to amino acids in length. When describing protein structure, biologists distinguish primary, secondary, tertiary, and quaternary levels of structure. The secondary structure refers to local bends, kinks and spirals along the chain. Tertiary structure refers to the shape of the entire polypeptide chain, and quaternary structure is used to describe proteins which consist of more than one polypeptide chain. The levels of protein structure. A protein with many basic side chains will have a positive charge a physiological pH. Conversely, a protein with many acidic amino acids, glutamic acid or aspartic acid, will have an overall negative charge in neutral solution. A protein with many acidic side chains will have a negative charge a physiological pH. A protein placed in an acidic environment will tend to become positively charged. Nondenaturing protein electrophoresis is generally carried out in a weakly basic environment. In this environment, most proteins will become negatively charged and migrate towards the positive plate. Denaturing protein electrophoresis, in the presence of sodium dodecyl sulfate SDS , also causes proteins to obtain a negative charge through emulsification by negatively charged dodecyl sulfate ions see Buffer Additives. Emulsification by sodium dodecyl sulfate gives proteins a net negative charge. At this pH, called the isoelectric point pI of the protein, it will not migrate in an electric field. Because the distribution of ionizable groups is different among proteins, they differ in their isoelectric points. This difference is a powerful tool for electrophoretic separation, used in isoelectric focusing. In acidic conditions proteins tend to acquire a net positive charge. In basic conditions, proteins tend to have a net negative charge. Between these extremes, at a precise value of the pH called the isoelectric point, the value of which is unique for each species of protein, the most thermodynamically stable form of the protein has equal numbers of positive and negative charges and does not migrate in an electric field.

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Chapter 3 : Biomolecule - Wikipedia

Optical Activity of Proteins and Other Macromolecules (Molecular Biology, Biochemistry and Biophysics Molekularbiologie, Biochemie und Biophysik) rev. and enl. 2nd ed. Edition by Bruno Jirgensons (Author).

Dans mon panier Description The application of circular dichroism CD to various problems involving con formation of proteins and other biopolymers is emphasized in this revised and enlarged second edition. The usefulness of CD and ORD in helping to solve structural prob lems is demonstrated by many examples, and the most essential data are tabulated. Our previously unpublished work reported in this second edition was supported in part by grants from the R. Welch Foundation grant G and U. Public Health Service grant CA Houston, September B. Optical rotatory dispersion has been successful in solving structural problems, and a vast amount of literature has accumulated on this subject. Several review articles appeared between and , but significant progress has been made since Important new studies, especially on the Cotton effects in the far ultraviolet spectrum, have rendered many previous publications obsolete so that a concise monograph should be useful at this time. Contenu I The Realm of Proteins. The Phenomenon of Optical Activity. The Drude and Moffitt Equations. Refraction of Monochromatic Polarized Light. Corrected Mean Residual Specific Rotation. Optical Activity and Absorption of Light. The Measurement of Optical Activity. Optical Rotatory Dispersion Measurement. General Principles of Operation. Resolution of Circular Dichroism Curves. Optical Rotation and Configuration of? Optical Rotatory Dispersion of? Optical Rotation of Proteins at Various pH. Circular Dichroism of Amino Acids. Rotatory Dispersion of Proteins. Amino Acid Composition and Conformation of Proteins. Cotton Effects of Proteins with a High? Globular Proteins of Known and Unknown Conformation. Globular Proteins having a High Content of? Other Rigid Nonhelical Proteins. Cotton Effects and Conformation of Immunoglobulins. Effect of Detergents on the Conformation of Nonhelical Proteins. Circular Dichroism of Small Polypeptide Hormones. Structural Proteins with a High? Optical Activity of Structural Proteins with? Optical Activity and Conformation of Collagen. Optical Activity of Nucleic Acids and Nucleoproteins. Membranes and Other Particulate Suspensions.

Chapter 4 : Optical activity of proteins and other macromolecules.

Book: Optical activity of proteins and other macromolecules. calendrierdelascience.com 2 calendrierdelascience.com+pp. refpp. of refpp. of Abstract: This book, which is vol. 5 in the series 'Molecular Biology, Biochemistry and Biophysics', is intended as an introduction to the use of spectropolarimetric methods and to their applications in molecular biology.