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The Bifidobacteria and Related Organisms: Biology, Taxonomy, Applications brings together authoritative reviews on all aspects of Bifidobacteria and related genera. Their place within the Phylum Actinobacteria is discussed first, and this is followed by descriptions of the genera Bifidobacterium, Alloscardovia, Aeriscardovia, Bombiscardovia, Gardnerella, Metascardovia, Parascardovia and Scardovia and the currently accredited species within those genera. The increased availability of genome sequences and molecular tools for studying bifidobacteria provides important information about their taxonomy, physiology and interactions with their host. Also considerations about common bifidobacterial core maintenance during the mutual coevolution of a host and its intestinal microbes could be relevant for health claims for the ability of symbiotic gut bacteria to provide health benefits to their host, and for evaluating such claims in scientifically valid experiments. Chemotaxonomy is important to our understanding of these genera and so is considered along with physiological and biochemical aspects before proceeding to examine clinical and other practical aspects. The ability to maintain pure cultures and to grow cells in industrial quantities when required for applications requires that the cells' environmental and nutritional needs are well understood. Some species are important clinically and as animal digestive tract synbionts—and even play a part in honey production—so these matters are considered along with milk oligosaccharides' roles in gut flora development in neonates. Presents information on all bacteria in this group in one place Provides applications and technological considerations placed alongside more academic matters such as nomenclature and phylogeny Includes basic information on the beneficial role of bifidobacteria in the human gut, with particular importance for infants Provides information on genomic and gene modification technologies The search for life in the solar system and beyond has to date been governed by a model based on what we know about life on Earth (terran life). Most of NASA's mission planning is focused on locations where liquid water is possible and emphasizes searches for structures that resemble cells in terran organisms. It is possible, however, that life exists that is based on chemical reactions that do not involve carbon compounds, that occurs in solvents other than water, or that involves oxidation-reduction reactions without oxygen gas. To assist NASA incorporate this possibility in its efforts to search for life, the NRC was asked to carry out a study to evaluate whether nonstandard biochemistry might support life in solar system and conceivable extrasolar environments, and to define areas to guide research in this area. This book presents an exploration of a limited set of hypothetical chemistries of life, a review of current knowledge concerning key questions or hypotheses about nonterran life, and suggestions for future research. Biology for AP® courses covers the scope and sequence requirements of a typical two-semester Advanced Placement® biology course. The text provides comprehensive coverage of foundational research and core biology concepts through an evolutionary lens. Biology for AP® Courses was designed to meet and exceed the requirements of the College Board's AP® Biology framework while allowing significant

flexibility for instructors. Each section of the book includes an introduction based on the AP® curriculum and includes rich features that engage students in scientific practice and AP® test preparation; it also highlights careers and research opportunities in biological sciences. This book presents molecular biology underpinning bacterial structure and function, and forms a bridge between large, expensive generalist textbooks and highly technical original literature. Although bacteria have been the subject of extensive scientific research for many decades, it is only in recent years that we have begun to recognize their complexity. Recent technical advances that have made it possible to study the distribution of macromolecules in individual bacteria have shown that bacterial cells are in fact highly complex, and that bacteria derived from cell division from the same parent cell are often physiologically very different. Bacteria also have the ability to communicate with members of their own species and with cells of other species, helping them to collaborate and compete. These characteristics are made possible by the ability of bacteria to exert exquisite control over gene expression and protein localization. The relative simplicity of bacterial cells, combined with the ease with which they can be cultivated and genetically manipulated, makes them ideal model systems for understanding the fundamental principles of gene expression, cell differentiation and inter-cellular communication. The study of microbial systems also provides data for numerical modeling of how single celled and multicellular systems work. A better understanding of bacterial physiology is also essential for combating bacterial disease as well as for using bacteria in industrial processes. Presents bacterial physiology and development and the importance of gene expression using a variety of common model organisms Offers content that has been developed by authors during five years of teaching microbiology at the undergraduate and graduate level; material bridges the gap between large survey texts and narrowly-focused articles Useful for any life science researcher interested in using microbes to explore fundamental biological questions, or using bacteria as a model for cellular behavior Professor William H. Elliott, Emeritus Professor, Department of Biochemistry, University of Adelaide, Australia Dr Daphne C. Elliott, formerly Lecturer, Department of Biochemistry, Flinders University, Adelaide, Australia Concepts of Biology is designed for the single-semester introduction to biology course for non-science majors, which for many students is their only college-level science course. As such, this course represents an important opportunity for students to develop the necessary knowledge, tools, and skills to make informed decisions as they continue with their lives. Rather than being mired down with facts and vocabulary, the typical non-science major student needs information presented in a way that is easy to read and understand. Even more importantly, the content should be meaningful. Students do much better when they understand why biology is relevant to their everyday lives. For these reasons, Concepts of Biology is grounded on an evolutionary basis and includes exciting features that highlight careers in the biological sciences and everyday applications of the concepts at hand.We also strive to show the interconnectedness of topics within this extremely broad discipline. In order to meet the needs of today's instructors and students, we maintain the overall organization and coverage found in most syllabi for this course. A strength of Concepts of Biology is that instructors can customize the book, adapting it to the approach that works best in their classroom. Concepts of Biology also includes an innovative art program that incorporates critical thinking and clicker questions to help students understand--and apply--key concepts. A historical account of the central line of discoveries of molecular biology, how the discoveries came to be made, and the people who made them. Aging is the progressive decline in biological functions over time. This decline targets macromolecules, cells, tissues and, as a consequence, whole organisms. Despite considerable progress in the development of testable hypothesis concerning aging in an evolutionary context, a unifying theory of the molecular/physiological mechanistic causes of aging has not been reached. In fact, is it not clear to what extent aging is a programmed or stochastic process. This book takes the reader from unicellular bacterial deterioration via senescence in fungi and worms to aging in rodents and humans, allowing a comparative view on similarities and differences in different genetic model systems. The different model systems are scrutinized in the light of contemporary aging hypothesis, such as the free radical and genomic instability theories. The Radiation Chemistry of Macromolecules is the first from a two-volume series aiming to contribute to the radiation chemistry in general. The chapters in this volume are divided into two major parts, where the first part deals with the basic processes and theory, while the second part tackles experimental techniques and applications to polyethylene. Part I focuses on the discussion on general principles of radiation effects; fundamental concepts on energy transfer; and the theory of free radicals. The subject of polymers is discussed thoroughly in several chapters including its molecular mobilities and electrical conductivity. Part II presents experimental techniques and a description of the radiation chemistry of a single polymer. This part also includes a discussion on the morphology of polyethylene and free radicals in irradiated polyethylene. This book is an important reference to students and scientists in the field of radiation chemistry of macromolecules. Discover a detailed knowledge of concepts and techniques of this unique multi-discipline Chemical Biology is devoted to understanding the way that Biology works at the molecular level. This is a problem-driven multi-discipline, incorporating as it does Organic, Physical, Inorganic, and Analytical Chemistry alongside newer emerging molecular disciplines. In recent years, Chemical Biology has emerged as a vibrant and growing multi-discipline distinct from Biochemistry that is focused on the quantitative analyses of the structures and functions of biological macromolecules and macromolecular lipid assemblies, at first in isolation, then in vitro and in vivo. The second edition of the Essentials of Chemical Biology begins with a thorough introduction to the structure of biological macromolecules and macromolecular lipid assemblies, before moving on to the principles of chemical and biological synthesis, followed by descriptions of a comprehensive variety of research techniques and experimental methods. In addition, the second edition now includes new sections on the behaviour of biological macromolecules and macromolecular lipid assemblies in cells in vitro and in organisms in vivo. Given this, the second edition of the Essentials of Chemical Biology promises to cement itself as the leading introduction to Chemical Biology, incorporating descriptions of cutting-edge research wherever appropriate. Hence, readers of the second edition of the Essentials of Chemical Biology will find: a general expansion in understanding of basic molecular mechanisms in Biology moving towards cellular and organismal mechanisms entirely new chapters covering miniaturization and array technologies, Chemical Cell Biology, and the interface between Chemical Biology and Nanotechnology updates to chapters reflecting recent research developments an increased engagement with medical applications Essentials of Chemical Biology is ideal for advanced undergraduates or (post) graduate students in Chemical Biology and adjacent fields. The Principles of Biology sequence (BI 211, 212 and 213) introduces biology as a scientific discipline for students planning to major in biology and other science disciplines. Laboratories and classroom activities introduce techniques used to study biological processes and provide opportunities for students to develop their ability to conduct research. Microbial and Natural Macromolecules: Synthesis and Applications brings together active scientists and academicians in the field who share updated information and research outcomes from global experts. Microbial macromolecular diversity, molecular composure, genetics, usability of advanced molecular tools and techniques for their study as well as their applicability are discussed with detailed research perspectives. Illustrates fundamental discoveries and methodological advancements Discusses novel functional attributes of macromolecules Updates progress on microbial macromolecular research A leading microbiologist provides thought-provoking insights into the question of "What is Life?" as he examines the relationship of living things to the inorganic realms of physics and chemistry, explains how lifeless chemicals come together to form living beings, and details the true complexity of seemingly simple microorganisms such as E. coli. International Series of Monographs on Pure and Applied Biology, Volume 1: Unity and Diversity in Biochemistry focuses on the advancements of processes, techniques, methodologies, and approaches involved in biochemistry. The publication first offers information on the constituents of the biosphere, modes of linkage by covalent bonds and macromolecules, general principles of biochemical energetics, and enzymes. The text then examines the destructive and non-destructive methods in modern biochemistry, priming reactions, and biosynthesis. Discussions focus on the mechanisms for the breakdown of amino acids, glycolysis and the hexosemonophosphate shunt, interrelations between priming reactions, respiratory chains, biochemical investigation and use of isotopes, and use of mutant strains micro-organisms. The manuscript takes a look at cellular topochemistry and regulation, aspects of biochemical diversity, inheritance of biochemical characteristics, and biochemical evolution. Topics include evolution of biochemical systems and constituents, control of biochemical characteristics by genes, biochemical differentiation of cells in a single organism, and factors which determine the velocity and path of enzymatic reaction chains. The

selection is a dependable source of data for biochemists and readers interested in the different aspects of biochemistry. “This excellent work fills the need for an upper-level graduate course resource that examines the latest biochemical, biophysical, and molecular biological methods for analyzing the structures and physical properties of biomolecules... This reviewer showed [the book] to several of his senior graduate students, and they unanimously gave the book rave reviews. Summing Up: Highly recommended...” CHOICE Chemical biology is a rapidly developing branch of chemistry, which sets out to understand the way biology works at the molecular level. Fundamental to chemical biology is a detailed understanding of the syntheses, structures and behaviours of biological macromolecules and macromolecular lipid assemblies that together represent the primary constituents of all cells and all organisms. The subject area of chemical biology bridges many different disciplines and is fast becoming an integral part of academic and commercial research. This textbook is designed specifically as a key teaching resource for chemical biology that is intended to build on foundations lain down by introductory physical and organic chemistry courses. This book is an invaluable text for advanced undergraduates taking biological, bioorganic, organic and structural chemistry courses. It is also of interest to biochemists and molecular biologists, as well as professionals within the medical and pharmaceutical industry. Key Features: A comprehensive introduction to this dynamic area of chemistry, which will equip chemists for the task of understanding and studying the underlying principles behind the functioning of biological macro molecules, macromolecular lipid assemblies and cells. Covers many basic concepts and ideas associated with the study of the interface between chemistry and biology. Includes pedagogical features such as: key examples, glossary of equations, further reading and links to websites. Clearly written and richly illustrated in full colour. Thus far in the history of biology, two, and only two, fundamental principles have come to light that pervade and unify the entire science-the cell theory and the concept of evolution. While it is true that recently opened fields of inves tigation have given rise to several generalizations of wide impact, such as the universality of DNA and the energetic dynamics of ecology, closer inspection reveals them to be part and parcel of either of the first two mentioned. Because in the final analysis energy can act upon an organism solely at the cellular level, its effects may be perceived basically to represent one facet of cell me tabolism. Similarly, because the DNA theory centers upon the means by which cells build proteins and reproduce themselves, it too proves to be only one more, even though an exciting, aspect of the cell theory. In fact, if the matter is given closer scrutiny, evolution itself can be viewed as being a fundamental portion of the cell concept, for its effects arise only as a consequence of changes in the cell's genetic apparatus accumulating over geological time. Or, if one wishes, the diametrically opposite standpoint may be taken. For, if current concepts of the origin of life hold any validity, the evolution of precellular organisms from the primordial biochemicals must have proceeded over many eons of time prior to the advent of even the most primitive cell. The Radiation Chemistry of Macromolecules, Volume II is a collection of papers that discusses radiation chemistry of specific systems. Part 1 deals with radiation chemistry of substituted vinyl polymers, particularly polypropylene (PP) as its structure is intermediate between polyethylene and polyisobutylene. This part also discusses polypropylene oxide (PPOx) for it can be prepared in the atactic, isotactic, and optically active forms. One paper focuses on the fundamental chemical processes and the changes in physical properties that give rise to many different applications of polystyrene. Another paper analyzes poly(methyl methacrylate) and poly(isobutylene)—two important polymers of nongelling substances subject to radiation. Part 2 describes the radiation chemistry of some miscellaneous polymers including the formation of free radicals and their termination. One paper also considers the radiation chemistry of polytetrafluoroethyle (PTFE), which is widely used in industry. Part 3 discusses the effect of radiation on oxidation, mechanical properties, and physical state of polymers. Part 4 addresses macromolecules, particularly the radiation chemistry of biopolymers because of their role in radiation chemistry. The damage done to biopolymers through radiation can affect the responses of living organisms to ionizing radiation. This book can prove valuable to scientists and researchers in the fields of nuclear biology, nuclear science, microchemistry, and cellular biology. This account of information theory, the means by which biological information is transmitted from generation to generation, is written for students of all branches of natural sciences. It gives a comprehensive description and connects the various sciences involved. The argument put forward is that man cannot be the result of some mechanistic coincidence: there must be a plan underlying the evolution of life which extends Darwin's theory of the survival of the fittest and which is reflected by modern ecology. The author intends to persuade the reader to feel respect and admiration for the magnificent world of living beings. Molecular biology has driven a powerful reductionist, or “molecule-c- tric,” approach to biological research in the last half of the 20th century. Red- tionism is the attempt to explain complex phenomena by defining the functional properties of the individual components of the system. Bloom (1) has referred to the post-genome sequencing era as the end of “naïve reductionism. ” Red- tionist methods will continue to be an essential element of all biological research efforts, but “naïve reductionism,” the belief that reductionism alone can lead to a complete understanding of living organisms, is not tenable. Organisms are clearly much more than the sum of their parts, and the behavior of complex physiological processes cannot be understood simply by knowing how the parts work in isolation. Systems biology has emerged in the wake of genome sequencing as the s- cessor to reductionism (2–5). The “systems” of systems biology are defined over a wide span of complexity ranging from two macromolecules that interact to carry out a specific task to whole organisms. Systems biology is integrative and seeks to understand and predict the behavior or “emergent” properties of complex, multicomponent biological processes. A systems-level characteri- tion of a biological process addresses the following three main questions: (1) What are the parts of the system (i. e. This book provides an accessible introduction to an exciting new field of life science in which the focus is on small numbers of molecules and minorities within cell populations and their significance for the understanding of biological phenomena. Numbers, or quantitative data, are attracting more attention in cell biology following, for example, determination of the absolute copy number of each protein species in each bacterial cell and the recognition of leader cells that drive collective cell migration. Within this context, the authors present recent advances in experimental techniques, biological findings, and theories. A variety of cutting-edge topics and issues are addressed, with explanation of the ways in which recent developments in the field cast light on seemingly straightforward but difficult-to-answer questions. Readers will learn that we are on the verge of a paradigm shift as the importance of cooperation among groups of molecules in live cells is acknowledged. The book is designed to be enjoyable to read and easy to understand. It will be of interest for a wide range of readers, including young researchers and undergraduate/high school students. acids. The achievements of molecular biology testify to the success of material science in a realm which, until recently, appeared totally enig matic and mysterious. Further scientific developments should bring to mankind vast developments both in theoretical knowledge and in practical applications, namely, in agriculture, medicine, and technology. The purpose of this book is to explain molecular biophysics to all who might wish to learn about it, to biologists, to physicists, to chemists. This book contains descriptive sections, as well as sections devoted to rigorous mathematical treatment of a number of problems, some of which have been studied by the author and his collaborators. These sections may be omitted during a first reading. Each chapter has a selected bibliography. This book is far from an exhaustive treatise on molecular biophysics. It deals principally with questions related to the structures and functions of proteins and nucleic acids. M. V. Vol'kenshtein Leningrad, September, 1964 CONTENTS

. . . . . 123 . . . . . The use of Compound-specific Stable Isotope Analysis (CSIA) is increasing in many areas of science and technology for source allocation, authentication, and characterization of transformation reactions. Until now, there have been no textbooks available for students with an analytical chemical background or basic introductory books emphasising the instrumentation and theory. This book is the first to focus solely on stable isotope analysis of individual compounds in sometimes complex mixtures. It acts as both a lecture companion for students and a consultant for advanced scientists in fields including forensic and environmental science. The book starts with a brief history of the field before going on to explain stable isotopes from scratch. The different ways to express isotope abundances are introduced together with isotope effects and isotopic fractionation. A detailed account of the required technical equipment and general procedures for CSIA is provided. This includes sections on derivatization and the use of microextraction techniques in GC-IRMS. The very important topic of referencing and calibration in CSIA is clearly described. This differs from approaches used in quantitative analysis and is often difficult for the newcomer to comprehend. Examples of successful applications of CSIA in food authenticity, forensics, archaeology, doping control, environmental science, and extraterrestrial materials are included. Applications in isotope data treatment and presentation are also discussed and emphasis is placed on the general conclusions that can be drawn from the uses of CSIA. Further instrumental developments in the field are highlighted and selected experiments are introduced that may act as a basis for a short practical course at graduate level. The DNA sequencing of a series of living organisms has elucidated many biological problems. But the internal atomic and electronic evolution of DNA remains to be mapped in detail. RNA and DNA now appear to be the prime determinants of biological evolution leading to the sudden appearance of novel organism structures and functions that emerge "ready made" as a surprise to the organism. This has been demonstrated by the manipulation of genes that led to the sudden production of additional complete wings and legs in flies and birds. The study of this internal atomic construction of macromolecules is being investigated at the large electron accelerators such as the MAX IV Synchrotron Radiation Laboratory, Lund University, Sweden. The periodicity of the chemical elements is well known from its iconic Table. Significantly, this periodicity can now be seen to extend to the properties of living organisms. Biological properties as different as: flight, vision, luminescence and regeneration, as well as others, show unexpectedly periodic emergence. They resurface, without previous announcement, in most unrelated plant and animal families and they emerge irrespective of whether the organism is a simple invertebrate or a most complex mammal. Moreover, this periodicity does not necessarily start at the cell or DNA levels but appears initially in crystals and minerals, where it is shown to be a pure atomic and electronic process, e.g. in luminescence and regeneration. The assembled molecular evidence led to the construction of Periodic Tables of living organisms, placing them in a position comparable to the periodicity of the chemical elements. Surprisingly, there are striking resemblances between the periodicities of the chemical elements and those of living organisms. In addition, the two types of Tables increase our insight into the events directing atomic evolution since the periodic law established in chemical elements turns out to be applicable to the periodicity of living organisms. The new Periodic Tables introduce a predictive capacity in biological evolution that before was hardly contemplated. Contents: Biological Evolution is Now Being Studied at the Level of Elementary ParticlesThe Unexpected Surge of Periodicity Among Plants and Animals is Anchored to that of Elementary Particles and Chemical ElementsCarnivory in Plants is Not a "Paradoxical Event" but is Due to the Expression of Specific Genes and Chemical Modifications of DNALuminescence Occurs from Minerals to Fish but not Beyond. It is Both an Electronic and a Genetic EventPlacenta in Plants and in Animals. Its Punctuated Emergence is Decided by Common GenesPenis Evolution from Worms to Humans — A Double Penis Occurs in Most Unrelated SpeciesRegeneration Starts in Crystals, Expands in Plants, but Slows Down in Higher VertebratesThe Eye, the Main Organ of Vision, has had an Ordered Evolution Guided By Self-AssemblyFlight in Air, an Explosive Event Throughout Invertebrates and VertebratesHigh Mental Ability has Resurged Without Previous AnnouncementThe Structural and Functional Similarity Between Marsupials and Placentals has Its Roots in the Plant and Mineral WorldsThe Periodic Tables Lead to a Law of Biological Periodicity which has Predictive Power Readership: Researchers in life science, general public. Keywords: Chemical Periodicity;Biological Periodicity;DNA EvolutionReview: Key Features: This book contains a unique treatment of periodicity at the biological level and of DNA's own atomic evolution The Sixth Edition of BIOLOGY TODAY AND TOMORROW WITHOUT PHYSIOLOGY helps students build critical-thinking skills they will use as responsible, science-literate citizens. Packed with beautiful art and current applications, the book’s straightforward writing style and chunked content help students grasp the fundamentals of biology without overwhelming them with detail. Content updates reflect current research, new technology and the social implications of both, while active learning tools are woven into the narrative and art. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version. Cryoelectron microscopy of biological molecules is among the hottest growth areas in biophysics and structural biology at present, and Frank is arguably the most distinguished practitioner of this art. CryoEM is likely over the next few years to take over much of the structural approaches currently requiring X-ray crystallography, because one can now get good and finely detailed images of single molecules down to as little as 200,000 MW, covering a substantial share of the molecules of greatest biomedical research interest. This book, the successor to an earlier work published in 1996 with Academic Press, is a natural companion work to our forthcoming book on electron crystallography by Robert Glaeser, with contributions by six others, including Frank. A growing number of workers will employ CryoEM for structural studies in their own research, and a large proportion of biomedical researchers will have a growing interest in understanding what the capabilities and limits of this approach are. This book discusses the emergence of life, the development of the individual, and the study of the interaction between individuals and species. It gives the student of theoretical biology some idea of the flavor of current research in the field. After the great achievements in the field of molecular foundations of genetics and protein synthesis, molecular biology undertook the successful deciphering of a number of other important biological problems. By this time ecology in its various branches was far enough advanced to tackle the problems arising at the level of molecular biology. The monograph of Professor Alexandrov, which takes as an example the adaptation of organisms to habitat temperatures, presents a vivid picture of this major ecological problem as viewed at the cellular and molecular levels. As main theme of the book the author advances a hypothesis on a correlation between the level of conformational flexibility of protein molecules and the temperature ecology of a species, as a result of which the protein molecules are maintained in a semilabile state. This principle may also be applied to other factors of the environment which affect the level of flexibility of protein macro molecules. The principle of semistability is shown to be applicable also to the nucleic and fatty acids. Engage your students and strike the perfect balance between level of detail and accessibility! Written for a one-semester, non-Biology majors course, BIOLOGY TODAY AND TOMORROW is packed with applications that are relevant to a student's daily life. The clear, straightforward writing style, in-text learning support, and trendsetting art help students understand key concepts. The accompanying MindTap for Biology further improves comprehension and outcomes by increasing student effort engagement and retention. Overall, this accessible and engaging introduction to biology provides an understanding of biology and the process of science while developing the critical-thinking skills students need to become responsible citizens of the world. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version. Fundamentals of Molecular Structural Biology reviews the mathematical and physical foundations of molecular structural biology. Based on these fundamental concepts, it then describes molecular structure and explains basic genetic mechanisms. Given the increasingly interdisciplinary nature of research, early career researchers and those shifting into an adjacent field often require a "fundamentals" book to get them up-to-speed on the foundations of a particular field. This book fills that niche. Provides a current and easily digestible resource on molecular structural biology, discussing both foundations and the latest advances Addresses critical issues surrounding macromolecular structures, such as structure-based drug discovery, single-particle analysis, computational molecular biology/molecular dynamic simulation, cell signaling and immune response, macromolecular assemblies, and systems biology Presents discussions that ultimately lead the reader toward a more detailed understanding of the basis and origin of disease From the foundations of a living cell to the complex mechanisms of gene expression, this clearly explained text is a perfect guide for anyone who wants to be

knowledgeable about cell and molecular biology. This book is aimed at providing readers with the information necessary to make them better equipped for navigating these multifaceted biology topics. This book was designed for those who want to develop a better understanding of cell structure and function, cell metabolism, DNA and genetics, as well as the technological and ethical challenges of modern science. The content is focused on an essential review of all the important processes and mechanisms affecting organisms on the cellular and molecular levels. You will learn about macromolecules, enzymes, cell cycle, photosynthesis, the significance of the various DNA mutations and heredity, as well as how different cell processes affect the overall well-being of an organism. Created by highly qualified science teachers, researchers, and education specialists, this book educates and empowers both the average and the well- informed readers, helping them develop and increase their understanding of biology. From within complex structures of organisms and cells down to the molecular level, biological processes all involve movement. Muscular fibers slide on each other to activate the muscle, as polymerases do along nucleic acids for replicating and transcribing the genetic material. Cells move and organize themselves into organs by recognizing each other through macromolecular surface-specific interactions. These recognition processes involve the mu tual adaptation of structures that rely on their flexibility. All sorts of conformational changes occur in proteins involved in through-membrane signal transmission, showing another aspect of the flexibility of these macromolecules. The movement and flexibility are inscribed in the polymeric nature of essential biological macromolecules such as proteins and nucleic acids. For instance, the well-defined structures formed by the long protein chain are held together by weak noncovalent interac tions that design a complex potential well in which the protein floats, permanently fluctuating between several micro- or macroconformations in a wide range of frequencies and ampli tudes. The inherent mobility of biomolecular edifices may be crucial to the adaptation of their structures to particular functions. Progress in methods for investigating macromolecular structures and dynamics make this hypothesis not only attractive but more and more testable. Guide to Biochemistry provides a comprehensive account of the essential aspects of biochemistry. This book discusses a variety of topics, including biological molecules, enzymes, amino acids, nucleic acids, and eukaryotic cellular organizations. Organized into 19 chapters, this book begins with an overview of the construction of macromolecules from building-block molecules. This text then discusses the strengths of some weak acids and bases and explains the interaction of acids and bases involving the transfer of a proton from an acid to a base. Other chapters consider the effectiveness of enzymes, which can be appreciated through the comparison of spontaneous chemical reactions and enzyme-catalyzed reactions. This book discusses as well structure and function of lipids. The final chapter deals with the importance and applications of gene cloning in the fundamental biological research, which lies in the preparation of DNA fragments containing a specific gene. This book is a valuable resource for biochemists and students. This book is a unique synthesis of the latest findings in the quantum physics and chemistry of water that will tell you why it is so remarkably fit for life. It offers a novel panoramic perspective of cell biology based on water as OC means, medium, and messageOCO of life. This book is a sequel to The Rainbow and The Worm, The Physics of Organisms, which has remained in a class of its own for nearly 20 years since the publication of the first edition. Living Rainbow H2O continues the fascinating journey in the author''s quest for the meaning of life, in science and beyond. Like The Rainbow and The Worm, the present book will appeal to readers in the arts and humanities as well as scientists; not least because the author herself is an occasional artist and poet. Great care has been taken to explain terms and concepts for the benefit of the general reader. At the same time, sufficient scientific details are provided in text boxes for the advanced reader and researcher without interrupting the main story. Biological Macromolecules: Bioactivity and Biomedical Applications presents a comprehensive study of biomacromolecules and their potential use in various biomedical applications. Consisting of four sections, the book begins with an overview of the key sources, properties and functions of biomacromolecules, covering the foundational knowledge required for study on the topic. It then progresses to a discussion of the various bioactive components of biomacromolecules. Individual chapters explore a range of potential bioactivities, considering the use of biomacromolecules as nutraceuticals, antioxidants, antimicrobials, anticancer agents, and antidiabetics, among others. The third section of the book focuses on specific applications of biomacromolecules, ranging from drug delivery and wound management to tissue engineering and enzyme immobilization. This focus on the various practical uses of biological macromolecules provide an interdisciplinary assessment of their function in practice. The final section explores the key challenges and future perspectives on biological macromolecules in biomedicine. Covers a variety of different biomacromolecules, including carbohydrates, lipids, proteins, and nucleic acids in plants, fungi, animals, and microbiological resources Discusses a range of applicable areas where biomacromolecules play a significant role, such as drug delivery, wound management, and regenerative medicine Includes a detailed overview of biomacromolecule bioactivity and properties Features chapters on research challenges, evolving applications, and future perspectives A Top 25 CHOICE 2016 Title, and recipient of the CHOICE Outstanding Academic Title (OAT) Award. How much energy is released in ATP hydrolysis? How many mRNAs are in a cell? How genetically similar are two random people? What is faster, transcription or translation?Cell Biology by the Numbers explores these questions and dozens of others provid Biology has entered an era in which interdisciplinary cooperation is at an all-time high, practical applications follow basic discoveries more quickly than ever before, and new technologiesâ€"recombinant DNA, scanning tunneling microscopes, and moreâ€"are revolutionizing the way science is conducted. The potential for scientific breakthroughs with significant implications for society has never been greater. Opportunities in Biology reports on the state of the new biology, taking a detailed look at the disciplines of biology; examining the advances made in medicine, agriculture, and other fields; and pointing out promising research opportunities. Authored by an expert panel representing a variety of viewpoints, this volume also offers recommendations on how to meet the infrastructure needsâ€"for funding, effective information systems, and other supportâ€"of future biology research. Exploring what has been accomplished and what is on the horizon, Opportunities in Biology is an indispensable resource for students, teachers, and researchers in all subdisciplines of biology as well as for research administrators and those in funding agencies.

- Essentials Of Chemical Biology
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