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An Introduction to Biological

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Membranes: From Bilayers to Rafts covers many aspects of membrane structure/function that bridges membrane biophysics and cell biology. Offering cohesive, foundational information, this publication is valuable for advanced

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**undergraduate students, graduate students and membranologists who seek a broad overview of membrane science. Brings together different facets of membrane research in a universally understandable manner
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development of the field Topics include membrane sugars, membrane models, membrane isolation methods, and membrane transport.

Advances in Marine Biology was first published in 1963. Now edited

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by A.J. Southward (Marine Biological Association, UK), P.A. Tyler (Southampton Oceanography Association, UK), C.M. Young (Harbor Branch Oceanographic Institution, USA) and L.A. Fuiman (University of Texas, USA), the

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serial publishes in-depth and up-to-date reviews on a wide range of topics which will appeal to postgraduates and researchers in marine biology, fisheries science, ecology, zoology, oceanography. Eclectic volumes in the series are

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4 reviews authored by experts in their relevant fields of study
Biological research and recent technological advances have resulted in an enormous increase in research data that require large storage capacities, powerful computing

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resources, and accurate data analysis algorithms. Bioinformatics is the field that provides these resources to life science researchers. The Swiss Institute of Bioinformatics (SIB), which has celebrated its 10th anniversary in 2008, is an institution

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of national importance, recognized worldwide for its state-of-the-art work. Organized as a federation of bioinformatics research groups from Swiss universities and research institutes, the SIB provides services to the life science community that

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are highly appreciated worldwide, and coordinates research and education in bioinformatics nationwide. The SIB plays a central role in life science research both in Switzerland and abroad by developing extensive and high-

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quality bioinformatics resources that are essential for all life scientists.

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contributions from SIB members, it covers both research work and major infrastructure efforts in genome and gene expression analysis, investigations on proteins and proteomes, evolutionary bioinformatics, and modeling of

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biological systems.

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Environmental Contaminants and
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understanding of this area for
students and professionals in**

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ecotoxicology, ecology, conservation, chemistry, public health, wildlife management, fisheries, and many other disciplines. Although new chemicals and potential problems are developed every year, a basic education is essential to address

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these new challenges, and this work gives such training. Written with the regulatory framework in mind, the material guides readers on modelling, how to conduct assessments, and human and wildlife risk, focusing on effects on animals

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rather than transport of chemicals. Simple discussions of chemistry are complemented by coverage on the behavior of the animal, dynamics of the ecosystem, real-life situations like drought, and predators in the system – i.e., the natural system

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versus the lab setting. The book's first section contains chapters on the principles of contaminant toxicology including a brief history of the science of ecotoxicology, basic principles of the science, testing methods, and ways of determining if

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animals have been exposed to either acute or chronic concentrations of contaminants. The second section deals with the primary classes of contaminants including their chemical characteristics, sources, uses, and effects on organisms. The

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third section focuses on more complex issues such as the regulation of pollution, population and community effects, risk assessment and modelling. Uses examples from both aquatic and terrestrial environments and species Includes a

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Terms to Know section and a list of study questions in each chapter, fostering a greater understanding of the issues Focuses on the effects of contaminants on wildlife while providing enough chemistry to allow a detailed understanding of the

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various contaminant groups

Emphasizes natural examples and 'real' species, rather than laboratory studies on only a handful of organisms Features case histories, detailing actual events that include aspects of how the contamination

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**occurred and its effects on wildlife
Provides material from a wide
variety of international sources
Ecotoxicology Essentials
Biology 211, 212, and 213
Metals in Cells
Practices, Crosscutting Concepts,**

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and Core Ideas

With Clinical Cases

*In this new edition of *The Membranes of Cells*, all of the chapters have been updated, some have been completely rewritten, and a new chapter on receptors has been added. The book*

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has been designed to provide both the student and researcher with a synthesis of information from a number of scientific disciplines to create a comprehensive view of the structure and function of the membranes of cells. The topics are

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treated in sufficient depth to provide an entry point to the more detailed literature needed by the researcher.

*Key Features * Introduces biologists to membrane structure and physical chemistry * Introduces biophysicists to biological membrane function **

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*Provides a comprehensive view of cell membranes to students, either as a necessary background for other specialized disciplines or as an entry into the field of biological membrane research * Clarifies ambiguities in the field*

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Scores of talented and dedicated people serve the forensic science community, performing vitally important work. However, they are often constrained by lack of adequate resources, sound policies, and national support. It is clear that

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change and advancements, both systematic and scientific, are needed in a number of forensic science disciplines to ensure the reliability of work, establish enforceable standards, and promote best practices with consistent application.

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Strengthening Forensic Science in the United States: A Path Forward provides a detailed plan for addressing these needs and suggests the creation of a new government entity, the National Institute of Forensic Science, to establish and

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enforce standards within the forensic science community. The benefits of improving and regulating the forensic science disciplines are clear: assisting law enforcement officials, enhancing homeland security, and reducing the risk of wrongful conviction and

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exoneration. Strengthening Forensic Science in the United States gives a full account of what is needed to advance the forensic science disciplines, including upgrading of systems and organizational structures, better training, widespread adoption

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of uniform and enforceable best practices, and mandatory certification and accreditation programs. While this book provides an essential call-to-action for congress and policy makers, it also serves as a vital tool for law

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chapters) "

Written by practising teachers, the best-selling authors of New Understanding Biology fourth edition, this text aims to increase the self-reliance of the senior secondary student. This book is fully accessible

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to students of all abilities and is clearly laid out in double page spreads, each one flagged for the specification it is relevant to, with sample exam questions.

Molecular Biology of the Cell

Essential Cell Biology

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Campbell Essential Biology

*Impact on Materials Chemistry and
Life Sciences*

Halogen Bonding I

**Over the last three decades
a lot of research on the role
of metals in biochemistry**

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and medicine has been done. As a result many structures of biomolecules with metals have been characterized and medicinal chemistry studied the effects of metal

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containing drugs. This new book (from the EIBC Book Series) covers recent advances made by top researchers in the field of metals in cells [the “metallome”] and include:

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regulated metal ion uptake and trafficking, sensing of metals within cells and across tissues, and identification of the vast cellular factors designed to orchestrate assembly of

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metal cofactor sites while minimizing toxic side reactions of metals. In addition, it features aspects of metals in disease, including the role of metals in neuro-degeneration, liver

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disease, and inflammation, as a way to highlight the detrimental effects of mishandling of metal trafficking and response to "foreign" metals. With the breadth of our recently

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acquired understanding of metals in cells, a book that features key aspects of cellular handling of inorganic elements is both timely and important. At this point in our

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understanding, it is worthwhile to step back and take an expansive view of how far our understanding has come, while also highlighting how much we still do not know. The

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**content from this book will
publish online, as part of
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find out more about the
Encyclopedia of Inorganic
and Bioinorganic
Chemistry, the essential**

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Hobza, Kevin Riley

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specialized cellular functions, exocytosis and endocytosis remain among the most popular subjects in biology and biomedical sciences. Tremendous progress in understanding

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these complex intracellular processes has been achieved by employing a wide array of research tools ranging from classical biochemical methods to modern imaging

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A large number of newly-synthesized polypeptides must cross one or several intracellular membranes to reach their functional locations in the eukaryotic cell. The mechanisms of protein

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trafficking, in particular the post-translational targeting and membrane translocation of proteins, are of fundamental biological importance and are the focus of intensive research world-wide. For more than 15 years, mitochondria have served as the

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paradigm organelle system to study these processes. Although key questions, such as how precisely proteins cross a membrane, still remain to be answered, exciting progress has been made in understanding the basic pathways of protein import into

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mitochondria and the components involved. In addition to a fascinating richness and complexity in detail, the analysis of mitochondrial protein import has revealed mechanistic principles of general significance: Major discoveries include the

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demonstration of the requirement of an unfolded state for translocation and of the essential role of molecular chaperones on both sides of the membranes in maintaining a translocation-competent conformation and in protein folding after import. It is

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becoming clear how a polypeptide chain is "reeled" across the membrane in an ATP-dependent process by the functional cooperation of membrane proteins, presumably constituting part of a transmembrane channel, with peripheral components at the trans-side

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of the membrane. In this volume, eminent experts in the field take the time to review the central aspects of mitochondrial biogenesis. The logical order of the 16 chapters is determined by the sequence of steps during protein import, starting with the events taking

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place in the cytosol, followed by the recognition of targeting signals, the translocation of precursor proteins across the outer and inner membranes, their proteolytic processing and intramitochondrial sorting, and finally their folding and oligomeric assembly.

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movement into and across the cell membranes. Other chapters focus on the existence of pores in the red cell membranes and the ion movement across the erythrocyte membranes. The book's final chapter considers the four classifications of membrane-based models, which include the mobile carrier model,

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the pore model, and the two classes of enzyme models. This book is intended for research students, research workers, biochemists, biophysicists, and physiologists. Pharmacologists in the clinical field, as well as research workers in agriculture, will also find this book invaluable.

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Chapter 15: The Plasma Membrane: The Gatekeeper of the Cell
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Chapter 18: Bulk Transport of Molecules Across a Membrane
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role in the evolution of life,
cyanobacterial diversity and
classification, isolation, and
characterization of
cyanobacteria through
biochemical and molecular
approaches, phylogeny and

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biogeography of cyanobacteria, symbiosis, Cyanobacterial photosynthesis, morphological and physiological adaptation to abiotic stresses, stress-tolerant cyanobacterium, biological nitrogen fixation. Other topics

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include circadian rhythms,
genetics and molecular biology
of abiotic stress responses,
application of cyanobacteria
and cyanobacterial mats in
wastewater treatments, use as
a source of novel stress-

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responsive genes for development of stress tolerance and as a source of biofuels, industrial application, as biofertilizer, cyanobacterial blooms, use in Nano-technology and nanomedicines as well as

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This textbook describes the biology of different adult stem

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Molecular and Developmental Stem Cell Biology taught at Ruhr-University Bochum and Tongji University Shanghai, the book is a valuable source for postdocs and researchers working with stems cells and

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also offers essential insights for physicians and dentists wishing to expand their knowledge. This textbook is a valuable complement to Concepts and Applications of Stem Cell Biology, also published in the

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and future challenges. The United States' position in the global economy is declining, in part because U.S. workers lack fundamental knowledge in these fields. To address the critical issues of U.S. competitiveness

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and to better prepare the workforce, A Framework for K-12 Science Education proposes a new approach to K-12 science education that will capture students' interest and provide them with the necessary

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foundational knowledge in the field. A Framework for K-12 Science Education outlines a broad set of expectations for students in science and engineering in grades K-12. These expectations will inform

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the development of new standards for K-12 science education and, subsequently, revisions to curriculum, instruction, assessment, and professional development for educators. This book identifies

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three dimensions that convey the core ideas and practices around which science and engineering education in these grades should be built. These three dimensions are: crosscutting concepts that unify the study of science

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through their common application across science and engineering; scientific and engineering practices; and disciplinary core ideas in the physical sciences, life sciences, and earth and space sciences

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and for engineering, technology, and the applications of science. The overarching goal is for all high school graduates to have sufficient knowledge of science and engineering to engage in public discussions on science-

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related issues, be careful consumers of scientific and technical information, and enter the careers of their choice. A Framework for K-12 Science Education is the first step in a process that can inform state-

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level decisions and achieve a research-grounded basis for improving science instruction and learning across the country. The book will guide standards developers, teachers, curriculum designers, assessment

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developers, state and district science administrators, and educators who teach science in informal environments.

Molecular Biology of the Cell Principles of Biology Biology 211, 212, and 213

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Recent advances in our understanding of cells have put cell biology at the centre of biological and medical research. Covers traditional and recently developed techniques and includes the detail necessary for

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immediate application in the laboratory.

This new account of the pathogenesis of essential hypertension (EH) represents a detailed analysis of the main components of the circulatory

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control system. The latter's properties resemble those of man-made adaptive control systems in which regulatory parameters are altered when operating conditions exceed certain limits, often through

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neural mechanisms. Inheritance of EH depends on both genes and environment. The high blood pressure (BP) genes have not yet been definitively identified, whilst the main environmental causes are mental stress, high

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dietary salt intake and obesity. EH occurs as two major syndromes, each initiated by chronic stress: 1) Stress-and-salt related EH, and 2) Hypertensive obesity. Stress is perceived by the cortex, from which increased

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dopaminergic (DA) neuron activity stimulates the hypothalamic defense area, raising sympathetic neural activity (SNA) and BP. Normally these subside quickly when the stress is over, but in those

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susceptible to EH the DA synapses become sensitized so that the defense response is evoked by ever lower levels of stress. Sensitization is common in memory circuits, but not in autonomic neurons, so that this

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property in EH may be genetically determined. Stress-related hypertension increases hypothalamic responsiveness to high salt, resulting in further rises in SNA and BP. Later, non-neural functional changes (e.g.

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reduction in nitric oxide) and the structural remodeling of resistance vessels further enhance the vasoconstriction. In contrast, in those developing hypertensive obesity food consumption is excessive, which

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transiently alleviates stress-related anxiety. The brain ignores the leptin-mediated signals that normally curb appetite, contrasting with normal energy regulation in SSR-EH. In hypertensive obesity, the SNA

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pattern is similar to that in SSR-EH, but vasoconstriction is masked by vasodilatation and fluid retention due to hyperinsulinemia. This syndrome is a volume overload hypertension, where high cardiac

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output, renal impairment and other non-neural factors contribute to the elevation of BP. Other topics include the role of various transmitters in autonomic regulation; the place of baroreflexes in the intact

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organism; why exercise training lowers resting BP; obstructive sleep apnea; non-pharmacological and drug treatment of EH; the role of the kidney in EH and in different types of renal hypertension and

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the pathogenesis of the Japanese spontaneously hypertensive rat, which provides a valuable animal model for EH. The work suggests that physiological systems analysis in a complex disorder like EH is a

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valuable tool for using the great advances in molecular biology to best advantage.

From Bilayers to Rafts

A Framework for K-12 Science

Education

Protein Targeting to

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Mitochondria

Advances in Cyanobacterial
Biology

Environmental Contaminants
and Their Biological Effects on
Animals and Plants

World-renowned economist Klaus

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Schwab, Founder and Executive Chairman of the World Economic Forum, explains that we have an opportunity to shape the fourth industrial revolution, which will fundamentally alter how we live and work. Schwab argues that this revolution is different in scale, scope

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and complexity from any that have come before. Characterized by a range of new technologies that are fusing the physical, digital and biological worlds, the developments are affecting all disciplines, economies, industries and governments, and even challenging

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ideas about what it means to be human. Artificial intelligence is already all around us, from supercomputers, drones and virtual assistants to 3D printing, DNA sequencing, smart thermostats, wearable sensors and microchips smaller than a grain of sand. But this is just

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the beginning: nanomaterials 200 times stronger than steel and a million times thinner than a strand of hair and the first transplant of a 3D printed liver are already in development. Imagine “smart factories” in which global systems of manufacturing are coordinated

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virtually, or implantable mobile phones made of biosynthetic materials. The fourth industrial revolution, says Schwab, is more significant, and its ramifications more profound, than in any prior period of human history. He outlines the key technologies driving this revolution

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and discusses the major impacts expected on government, business, civil society and individuals. Schwab also offers bold ideas on how to harness these changes and shape a better future—one in which technology empowers people rather than replaces them; progress serves

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society rather than disrupts it; and in which innovators respect moral and ethical boundaries rather than cross them. We all have the opportunity to contribute to developing new frameworks that advance progress.

This book provides a comprehensive overview of the basic principles,

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concepts, techniques and latest advances in the field of biomembranes and membrane-associated processes. With new emerging technologies and bioinformatics tools, this is a promising area for future study and research. The book discusses the

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composition, fluidity and dynamic nature of phospholipid bilayers, which vary with cell/organelle type and function. It describes the various types of transport proteins that facilitate the transport of polar and nonpolar molecules across the membrane actively or passively via

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ion-channels or through porins. It also explores the many cellular functions membranes participate in: (1) energy transduction, which includes the electron transport chain in inner membrane of mitochondria and bacterial cytoplasmic membrane and photosynthetic electron transport in

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thylakoid membranes in chloroplast and photosynthetic bacterial membranes; (2) cell-cell communication involving various signal transduction pathways triggered by activated membrane receptors; (3) cell-cell interactions involving various types of adhesion

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and receptor proteins; (4) nerve transmission involving opening and closing of voltage gated ionic channels; and (5) intracellular transport involving the processes of endocytosis, exocytosis, vesicular transport of solutes between intracellular compartments,

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membrane fusion and membrane biogenesis.

Essential Cell Biology provides a readily accessible introduction to the central concepts of cell biology, and its lively, clear writing and exceptional illustrations make it the ideal textbook for a first course in

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both cell and molecular biology. The text and figures are easy-to-follow, accurate, clear, and engaging for the introductory student. Molecular detail has been kept to a minimum in order to provide the reader with a cohesive conceptual framework for the basic science that underlies our current

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address students' needs precisely and efficiently. For more information and sample material, visit <http://garlandscience.rocketmix.com/>. Free Radicals in Biology and Medicine has become a classic text in the field of free radical and antioxidant research. Now in its fifth edition, the

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book has been comprehensively rewritten and updated whilst maintaining the clarity of its predecessors. Two new chapters discuss 'in vivo' and 'dietary' antioxidants, the first emphasising the role of peroxiredoxins and integrated defence mechanisms

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which allow useful roles for ROS, and the second containing new information on the role of fruits, vegetables, and vitamins in health and disease. This new edition also contains expanded coverage of the mechanisms of oxidative damage to lipids, DNA, and proteins (and the

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repair of such damage), and the roles played by reactive species in signal transduction, cell survival, death, human reproduction, defence mechanisms of animals and plants against pathogens, and other important biological events. The methodologies available to measure

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reactive species and oxidative damage (and their potential pitfalls) have been fully updated, as have the topics of phagocyte ROS production, NADPH oxidase enzymes, and toxicology. There is a detailed and critical evaluation of the role of free radicals and other reactive species in

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human diseases, especially cancer, cardiovascular, chronic inflammatory and neurodegenerative diseases. New aspects of ageing are discussed in the context of the free radical theory of ageing. This book is recommended as a comprehensive introduction to the field for students,

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educators, clinicians, and researchers. It will also be an invaluable companion to all those interested in the role of free radicals in the life and biomedical sciences.

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Advances in Marine Biology

The Movement Of Molecules Across

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The compartmentation of genetic information is a fundamental feature of the eukaryotic cell. The metabolic

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capacity of a eukaryotic (plant) cell and the steps leading to it are overwhelmingly an endeavour of a joint genetic cooperation between nucleus/cytosol, plastids, and mitochondria. Alter ation of the

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genetic material in anyone of these compartments or exchange of organelles between species can seriously affect harmoniously balanced growth of an organism. Although the biological significance of this

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genetic design has been vividly evident since the discovery of non-Mendelian inheritance by Baur and Correns at the beginning of this century, and became indisputable in principle after Renner's work on

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interspecific nuclear/plastid hybrids (summarized in his classical article in 1934), studies on the genetics of organelles have long suffered from the lack of respectability. Non-Mendelian inheritance was

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considered a research
sideline~ifnot a freak~by most
geneticists, which becomes
evident when one consults
common textbooks. For instance,
these have usually impeccable
accounts of photosynthetic and

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respiratory energy conversion in chloroplasts and mitochondria, of metabolism and global circulation of the biological key elements C, N, and S, as well as of the organization, maintenance, and function of

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nuclear genetic information. In contrast, the heredity and molecular biology of organelles are generally treated as an adjunct, and neither goes as far as to describe the impact of the integrated genetic system.

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