

MOLECULAR BIOLOGY INTELLIGENCE UNIT 22

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Telomerases, Telomeres and Cancer


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Telomeres and Telomerase in Aging, Disease, and Cancer-K. Lenhard Rudolph 2007-11-07 Telomere shortening represents one of the basic aspects of ageing and telomere dysfunction could contribute to the accumulation of DNA damage during ageing. This book summarizes evidence and data indicating that telomere dysfunction influences human ageing, diseases and cancer. The book describes our current knowledge on checkpoints that limit cellular lifespan and survival in response to telomere dysfunction. There is special focus on adult stem cells.

Telomeres and Telomerase in Cancer-Keiko Hiyama 2009-03-18 Telomerase, an enzyme that maintains telomeres and endows eukaryotic cells with immortality, was first discovered in tetrahymena in 1985. In 1990s, it was proven that this enzyme also plays a key role in the infinite proliferation of human cancer cells. Now telomere and telomerase are widely accepted as important factors involved in cancer biology, and as promising diagnostic tools and therapeutic targets. Recently, role of telomerase in "cancer stem cells" has become another attractive story. Until now, there are several good books on telomere and telomerase focusing on biology in ciliates, yeasts, and mouse or basic sciences in human, providing

basic scientists or students with updated knowledge.

Telomere-Marcelo Larramendy 2016-11-23 This book, Telomere - A Complex End of a Chromosome, is organized into nine chapters containing the latest aspects of the current knowledge about the structure of telomeres and the crucial role that telomerase plays not only in maintaining chromosomal stability but also in relation to cell immortality, cell instability, and cancer biology. We now appreciate that these unusual complexes of DNA and proteins we all know as "telomeres" are dynamic and key structures that depend on telomerase and other cellular factors for continuance. Regulation of telomere activity is a dynamic area of current research, and new insights into telomeres and their role in aging and cancer, among other biological functions and pathologies, appear regularly in the scientific world. However, one fact is more than understandable in this difficult biological conundrum: the end of the telomere story is far from being totally unraveled.

Telomerase Inhibition-Lucy Andrews 2007-11-29 Due in part to the selective nature of telomerase inhibition as an anticancer approach, the field has expanded considerably in the past decade. The recent advances in methods of telomerase inhibition encompass many different areas of

research including molecular biology, cell biology, biochemistry, oncology and gerontology. Telomerase Inhibition provides methods and protocols for those researchers. The techniques described in this book should provide the researcher with a diverse and comprehensive set of tools with which to study telomerase inhibition. Leaders in the field provide recently developed methods that have widespread application such as targeting the telomerase holoenzyme, its RNA template and other elements associated with telomerase activity. Additional methods involving the screening of telomerase inhibitors and telomerase inhibition combined with other chemotherapeutic agents are presented. This text, on the cutting edge of the field, will provide investigators with the most recent methods applied to the expanding field of telomerase inhibition.

Neuroblastoma-Chandrika Gowda 2017-10-25 Neuroblastoma (NBL) is the most common extracranial solid tumor of childhood, with about 700 new cases of neuroblastoma seen each year in the United States. The 5-year survival rate for children with high-risk NBL is only 50-60%, and this survival rate has not improved over the last 10 years. High-risk patients receive multimodality treatment, including chemotherapy, surgery, radiation therapy, biologic therapy and immunotherapy, all of which are associated with significant morbidity. Recent years have seen many advances in treatment of neuroblastoma, including therapeutic MIBG, immunotherapy, and personalized targeted therapy based on the genetic alterations seen in the tumor. The primary objective of this book is to provide the readers with a comprehensive review of neuroblastoma, from clinical aspects and the currently available treatment to recent advancements and future directions in the field of NBL treatment. The topics and chapters have been compiled keeping in mind a diverse group of readers in different areas of specialty such as pediatric oncology, surgery, radiation oncology, and immunology, as well as physician scientists and basic researchers working in the field of neuroblastoma.

The Telomere Effect-Dr. Elizabeth Blackburn 2017-01-03 NEW YORK TIMES BESTSELLER The revolutionary book coauthored by the Nobel Prize winner who discovered telomerase and telomeres' role in the aging process and the health psychologist who has done original research into how

specific lifestyle and psychological habits can protect telomeres, slowing disease and improving life. Have you wondered why some sixty-year-olds look and feel like forty-year-olds and why some forty-year-olds look and feel like sixty-year-olds? While many factors contribute to aging and illness, Dr. Elizabeth Blackburn discovered a biological indicator called telomerase, the enzyme that replenishes telomeres, which protect our genetic heritage. Dr. Blackburn and Dr. Elissa Epel's research shows that the length and health of one's telomeres are a biological underpinning of the long-hypothesized mind-body connection. They and other scientists have found that changes we can make to our daily habits can protect our telomeres and increase our health spans (the number of years we remain healthy, active, and disease-free). THE TELOMERE EFFECT reveals how Blackburn and Epel's findings, together with research from colleagues around the world, cumulatively show that sleep quality, exercise, aspects of diet, and even certain chemicals profoundly affect our telomeres, and that chronic stress, negative thoughts, strained relationships, and even the wrong neighborhoods can eat away at them. Drawing from this scientific body of knowledge, they share lists of foods and suggest amounts and types of exercise that are healthy for our telomeres, mind tricks you can use to protect yourself from stress, and information about how to protect your children against developing shorter telomeres, from pregnancy through adolescence. And they describe how we can improve our health spans at the community level, with neighborhoods characterized by trust, green spaces, and safe streets. THE TELOMERE EFFECT will make you reassess how you live your life on a day-to-day basis. It is the first book to explain how we age at a cellular level and how we can make simple changes to keep our chromosomes and cells healthy, allowing us to stay disease-free longer and live more vital and meaningful lives.

Quadruplex Nucleic Acids-Stephen Neidle 2007-10-31 Guanine rich DNA has been known for decades to form unusual structures, although their biological relevance was little understood. Recent advances have demonstrated that quadruplex structures can play a role in gene expression and provide opportunities for a new class of anticancer therapeutics. A number of quadruplex-specific proteins have also been discovered. Quadruplex Nucleic Acids discusses all aspects of the fundamentals of quadruplex structures, including their structure in solution and the crystalline state, the kinetics of quadruplex folding, and the role of cations

in structure and stability. The biology of quadruplexes and G-rich genomic regions and G-quartets in supramolecular chemistry and nanoscience are also considered. Surveying the current state of knowledge, and with contributions from leading experts, this is the first comprehensive review of this rapidly growing area. *Quadruplex Nucleic Acids* is ideal for researchers interested in areas related to chemistry, chemical biology, medicinal chemistry, molecular pharmacology, and structural and molecular biology.

Telomeres, Diet and Human Disease-Amelia Marti 2017-08-30 The maintenance of telomeres—repetitive sequences at the end of chromosome—is essential to health. Dysfunction in telomere maintenance pathways plays a role in aging, cancer, atherosclerosis and other diseases. This has led to telomere maintenance as a prime target for patient therapies. This book describes the advances in telomere research as it applies to human health and especially how lifestyle and dietary factors could modify the telomerase maintenance process. The book examines the mechanisms involved, the primary of which are oxidative stress and the role of sirtuins, and how they can be modified by dietary patterns such as Mediterranean diet.

Enzyme Inhibitors and Activators-Murat Şentürk 2017-03-29 Over the recent years, medicinal chemistry has become responsible for explaining interactions of chemical molecule processes such that many scientists in the life sciences from agronomy to medicine are engaged in medicinal research. This book contains an overview focusing on the research area of enzyme inhibitor and activator, enzyme-catalyzed biotransformation, usage of microbial enzymes, enzymes associated with programmed cell death, natural products as potential enzyme inhibitors, protease inhibitors from plants in insect pest management, peptidases, and renin-angiotensin system. The book provides an overview on basic issues and some of the recent developments in medicinal science and technology. Especially, emphasis is devoted to both experimental and theoretical aspect of modern medicine. The primary target audience for the book includes students, researchers, chemists, molecular biologists, medical doctors, pharmacologists, and professionals who are interested in associated areas. The textbook is written by international scientists with expertise in

biochemistry, enzymology, molecular biology, and genetics, many of which are active in biochemical and pharmacological research. I would like to acknowledge the authors for their contribution to the book. We hope that the textbook will enhance the knowledge of scientists in the complexities of some medical approaches; it will stimulate both professionals and students to dedicate part of their future research in understanding relevant mechanisms and applications of pharmacology.

Apoptosis, Senescence and Cancer-David A. Gewirtz 2007-12-17 Provides insight into established practices and research into apoptosis and senescence by examining techniques and research in the fields of cell death pathways, senescence growth arrest, drugs and resistance, DNA damage response, and other topics which still hold mysteries for researchers. This book concludes with established cancer therapies.

Epigenetics of Aging and Longevity-Alexey Moskalev 2017-11-17 *Epigenetics of Aging and Longevity* provides an in-depth analysis of the epigenetic nature of aging and the role of epigenetic factors in mediating the link between early-life experiences and life-course health and aging. Chapters from leading international contributors explore the effect of adverse conditions in early-life that may result in disrupted epigenetic pathways, as well as the potential to correct these disrupted pathways via targeted therapeutic interventions. Intergenerational epigenetic inheritance, epigenetic drug discovery, and the role of epigenetic mechanisms in regulating specific age-associated illnesses—including cancer and cardiovascular, metabolic, and neurodegenerative diseases—are explored in detail. This book will help researchers in genomic medicine, epigenetics, and biogerontology better understand the epigenetic determinants of aging and longevity, and ultimately aid in developing therapeutics to extend the human life-span and treat age-related disease. Offers a comprehensive overview of the epigenetic nature of aging, as well as the impact of epigenetic factors on longevity and regulating age-related disease Provides readers with clinical and epidemiological evidence for the role of epigenetic mechanisms in mediating the link between early-life experiences, life-course health and aging trajectory Applies current knowledge of epigenetic regulatory pathways towards developing

therapeutic interventions for age-related diseases and extending the human lifespan

Mindfulness-Based Cancer Recovery-Linda Carlson 2011-02-03 A Mind-Body Approach to Healing If you have received a cancer diagnosis, you know that the hundreds of questions and concerns you have about what's to come can be as stressful as the cancer treatment itself. But research shows that if you mentally prepare yourself to handle cancer treatment by getting stress and anxiety under control, you can improve your quality of life and become an active participant in your own recovery. Created by leading psychologists specializing in oncology, the Mindfulness-Based Cancer Recovery program is based on mindfulness-based stress reduction (MBSR), a therapeutic combination of mindfulness meditation and gentle yoga now offered to cancer survivors and their loved ones in hundreds of medical centers, hospitals, and clinics worldwide. Let this book be your guide as you let go of fear and focus on getting well. With this eight-week program, you'll learn to:

- Use proven MBSR skills during your treatment and recovery
- Boost your immune function through meditation and healing yoga
- Calm feelings of fear, uncertainty, and lack of control
- Mindfully manage difficult symptoms and side effects
- Discover your own capacity for healing and thriving after adversity

Human Tumor Viruses-Dennis J. McCance 1998 This valuable new book describes the molecular biology and pathogenesis of certain viruses linked with human cancers. It provides an up-to-date account of the progress in our knowledge of the virus/host interactions which lead to cancer, as well as insights on the complexity of virus/host interactions in general, most of which have yet to be delineated. The volume also offers an historical perspective of cancer viruses as well as an examination of the geographical distribution and prevalence of cancers. Human Tumor Viruses is essential reading for researchers and graduate students in virology, cell biology, pathology, and oncology and for anyone engaged in cancer research.

Telomeres in Health and Disease- 2014-06-26 This special volume of

Progress in Molecular Biology and Translational Science focuses on telomeres in health and disease. This volume covers a variety of topics with reviews written by experts in the field. Contributions from specialists in telomere diseases Informs and updates on how telomere dysfunction may cause disease in humans

Molecular and Cell Biology of Cancer-Rita Fior 2019-06-27 This textbook takes you on a journey to the basic concepts of cancer biology. It combines developmental, evolutionary and cell biology perspectives, to then wrap-up with an integrated clinical approach. The book starts with an introductory chapter, looking at cancer in a nut shell. The subsequent chapters are detailed and the idea of cancer as a mass of somatic cells undergoing a micro-evolutionary Darwinian process is explored. Further, the main Hanahan and Weinberg "Hallmarks of Cancer" are revisited. In most chapters, the fundamental experiments that led to key concepts, connecting basic biology and biomedicine are highlighted. In the book's closing section all of these concepts are integrated in clinical studies, where molecular diagnosis as well as the various classical and modern therapeutic strategies are addressed. The book is written in an easy-to-read language, like a one-on-one conversation between the writer and the reader, without compromising the scientific accuracy. Therefore, this book is suited not only for advanced undergraduates and master students but also for patients or curious lay people looking for a further understanding of this shattering disease

Telomeres and Telomerase-John A. Double 2004 The enzyme telomerase provides a mechanism that ensures chromosome stability in both normal and neoplastic cells. This reference covers methods of central importance in the analysis of telomerase function and activity for all cell and molecular biologists. These range from the standard telomerase activity (TRAP) assay through to many more novel approaches such as the use of real-time PCR, in-situ PCR and non-PCR based assays of telomerase activity. Also included are protocols for the study of telomeres themselves and methods for the identification of regulators of telomerase function.

Sphingolipids in Cancer- 2018-07-27 Sphingolipids in Cancer, Volume 140, the latest release in the Advances in Cancer Research series, provides invaluable information on the exciting and fast-moving field of cancer research. Topics discussed in this updated volume include Mechanisms of ceramide-dependent cancer cell death, Sphingolipids as regulators of autophagy and endocytic trafficking, The role and function of sphingomyelin biosynthesis in the development of cancer, Neutral sphingomyelinases in cancer: Friend or foe?, Sphingolipid rendezvous at the crossroad of NAFLD and senescence, Ceramide signaling and p53 pathways, Sphingolipid regulation of RNA Biology in cancer phenotypes, The role of ceramide-1-phosphate in tumor cell survival and dissemination, and more. Provides information on cancer research, with this release focusing on sphingolipids Offers outstanding and original reviews on a range of cancer research topics Serves as an indispensable reference for researchers and students alike

New Research Directions in DNA Repair-Clark Chen 2013-05-22 This book is intended for students and scientists working in the field of DNA repair. Select topics are presented here to illustrate novel concepts in DNA repair, the cross-talks between DNA repair and other fundamental cellular processes, and clinical translational efforts based on paradigms established in DNA repair. The book should serve as a supplementary text in courses and seminars as well as a general reference for biologists with an interest in DNA repair.

Elizabeth Blackburn and the Story of Telomeres-Catherine Brady 2009-02-13 The story of molecular biologist Elizabeth Blackburn and her groundbreaking research on telomeres and what it reveals about the resourceful opportunism that characterizes the best scientific thinking. Molecular biologist Elizabeth Blackburn—one of Time magazine's 100 "Most Influential People in the World" in 2007—made headlines in 2004 when she was dismissed from the President's Council on Bioethics after objecting to the council's call for a moratorium on stem cell research and protesting the suppression of relevant scientific evidence in its final report. But it is Blackburn's groundbreaking work on telomeric DNA, which launched the

field of telomere research, that will have the more profound and long-lasting effect on science and society. In this compelling biography, Catherine Brady tells the story of Elizabeth Blackburn's life and work and the emergence of a new field of scientific research on the specialized ends of chromosomes and the enzyme, telomerase, that extends them. In the early stages of telomere research, telomerase, heralded as a potential cure for cancer and diseases related to aging, attracted the voracious interest of biotech companies. The surrounding hype succeeded in confusing the role of telomerase in extending the life of a cell with a mechanism that might extend the lifespan of an entire organism. In Brady's hands, Blackburn's story reveals much about the tension between pure and applied science, the politicking that makes research science such a competitive field, and the resourceful opportunism that characterizes the best scientific thinking. Brady describes the science accessibly and compellingly. She explores Blackburn's struggle to break down barriers in an elite, male-dominated profession, her role as a mentor to other women scientists (many of whom have made their mark in telomere research), and the collaborative nature of scientific work. This book gives us a vivid portrait of an exceptional woman and a new understanding of the combination of curiosity, imaginative speculation, and aesthetic delight that powers scientific discovery.

Telomeres and Telomerase-Derek J. Chadwick 2008-04-30 Telomeres and Telomerase Chairman: Sydney Brenner, 1997 Telomeres are the protective genetic elements located at the ends of chromosomes and are essential for correct chromosomal structure and function. They are not fully replicated by the conventional DNA polymerase system because DNA synthesis occurs only in the 5' to 3' direction and requires an RNA primer for initiation. Consequently, cells require a special enzyme to maintain the telomeric ends of chromosomes during each round of replication. This enzyme, telomerase, is a ribonucleoprotein that extends chromosome ends by adding short stretches of nucleotide repeats using a portion of its integral RNA component as the template. Recently, much excitement has been generated by the suggestion that telomerase, or rather the absence of telomerase and the resultant loss of terminal DNA, is a cause of human ageing. The evidence for this is twofold: the telomeres of certain cells in culture shorten during their lifespan; and immortalization of cells is associated, at least in some cases, with the maintenance of telomeres and telomerase activity. The

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latter observation prompted the analysis of clinical samples from patients with cancer and the demonstration that, in contrast to normal somatic cells, malignant cells possess telomerase activity. This is a unique book. Not only does it contain the latest experimental results from an international group of experts, but it also includes critical examinations of the current evidence, and discussions that attempt to identify the central and underlying concepts of this rapidly expanding field.

The Cell Biology of Stem Cells-Eran Meshorer 2011-01-11 Stem cells have been gaining a lot of attention in recent years. Their unique potential to self-renew and differentiate has turned them into an attractive model for the study of basic biological questions such as cell division, replication, transcription, cell fate decisions, and more. With embryonic stem (ES) cells that can generate each cell type in the mammalian body and adult stem cells that are able to give rise to the cells within a given lineage, basic questions at different developmental stages can be addressed. Importantly, both adult and embryonic stem cells provide an excellent tool for cell therapy, making stem cell research ever more pertinent to regenerative medicine. As the title *The Cell Biology of Stem Cells* suggests, our book deals with multiple aspects of stem cell biology, ranging from their basic molecular characteristics to the in vivo stem cell trafficking of adult stem cells and the adult stem-cell niche, and ends with a visit to regeneration and cell fate reprogramming. In the first chapter, "Early embryonic cell fate decisions in the mouse", Amy Ralson and Yojiro Yamanaka describe the mechanisms that support early developmental decisions in the mouse pre-implantation embryo and the current understanding of the source of the most immature stem cell types, which includes ES cells, trophoblast stem (TS) cells and extraembryonic endoderm stem (XEN) cells.

Telomeres and Telomerase-Zhou Songyang 2011-04-07 New and rapid advances in technology have equipped us with a variety of tools and platforms to ask fundamental questions of telomere regulation and have allowed investigators to carry out experiments using diverse model systems. For example, proteomic, genomic, and molecular approaches have afforded us unprecedented insight into the complex protein interaction networks at work on the telomere chromatin and the detailed information regarding

telomere dynamics in response to stress or stimuli. *Telomeres and Telomerase: Methods and Protocols, Second Edition* builds upon the telomerase assays featured in the popular first edition to encompass many different assays that allow investigators to query the function of telomere proteins and the responses of the telomere DNA, including detailed examinations of biochemical, molecular, and proteomic approaches. Written in the highly successful *Methods in Molecular Biology*TM series format, chapters include introductions to their respective topics, lists of the necessary materials and reagents, step-by-step, readily reproducible laboratory protocols, and expert tips on troubleshooting and avoiding known pitfalls. Authoritative and practical, *Telomeres and Telomerase: Methods and Protocols, Second Edition* serves as an ideal, up-to-date guide for investigators further pursuing this vital field of study.

Oxidative Damage to Nucleic Acids-Mark D. Evans 2009-06-11 This book provides up-to-date coverage of selected topics in nucleic acid oxidation. The topics have been selected to cover everything from basic chemical mechanisms, repair of damage and the biological and pathological meaning of DNA oxidation. The chapters are authored by leading, research active, international experts in the respective topics.

Small Molecules in Oncology-Uwe M. Martens 2010-01-14 Extensive research into the molecular mechanisms of cancer disease has heralded a new age of targeted therapy. In malignant cells, key proteins that are crucial to tumor growth and survival are now being targeted directly with rationally designed inhibitors. Apart from monoclonal antibodies, small molecule therapeutics such as oncogenic protein kinase inhibitors are attracting a vast amount of investigational attention. This textbook, written by acknowledged experts, provides a broad overview of the small molecules currently used for the treatment of malignant diseases and discusses interesting novel compounds that are in the process of clinical development to combat cancer.

Biomarkers in Cancer-Victor R. Preedy 2015-08-14 In the past decade

there has been a major sea change in the way disease is diagnosed and investigated due to the advent of high throughput technologies, such as microarrays, lab on a chip, proteomics, genomics, lipomics, metabolomics etc. These advances have enabled the discovery of new and novel markers of disease relating to autoimmune disorders, cancers, endocrine diseases, genetic disorders, sensory damage, intestinal diseases etc. In many instances these developments have gone hand in hand with the discovery of biomarkers elucidated via traditional or conventional methods, such as histopathology or clinical biochemistry. Together with microprocessor-based data analysis, advanced statistics and bioinformatics these markers have been used to identify individuals with active disease or pathology as well as those who are refractory or have distinguishing pathologies. New analytical methods that have been used to identify markers of disease and is suggested that there may be as many as 40 different platforms. Unfortunately techniques and methods have not been readily transferable to other disease states and sometimes diagnosis still relies on single analytes rather than a cohort of markers. There is thus a demand for a comprehensive and focused evidenced-based text and scientific literature that addresses these issues. Hence the formulation of Biomarkers in Disease. The series covers a wide number of areas including for example, nutrition, cancer, endocrinology, cardiology, addictions, immunology, birth defects, genetics, and so on. The chapters are written by national or international experts and specialists.

Cancer Cell Lines-John Masters 2006-04-11 Continuous cell lines derived from human cancers are the most widely used resource in laboratory-based cancer research. The first 3 volumes of this series on Human Cell Culture are devoted to these cancer cell lines. The chapters in these first 3 volumes have a common aim. Their purpose is to address 3 questions of fundamental importance to the relevance of human cancer cell lines as model systems of each type of cancer: 1. Do the cell lines available accurately represent the clinical presentation? 2. Do the cell lines accurately represent the histopathology of the original tumors? 3. Do the cell lines accurately represent the molecular genetics of this type of cancer? The cancer cell lines available are derived, in most cases, from the more aggressive and advanced cancers. There are few cell lines derived from low grade organ-confined cancers. This gap can be filled with conditionally immortalized

human cancer cell lines. We do not know why the success rate for establishing cell lines is so low for some types of cancer and so high for others. The histopathology of the tumor of origin and the extent to which the derived cell line retains the differentiated features of that tumor are critical. The concept that a single cell line derived from a tumor at a particular site is representative of tumors at that site is naïve and misleading.

Molecular Genetics of Cancer-John K. Cowell 2001 Since the first volume was published, there has been significant success in isolating genes responsible for particular cancers as well as a major improvement in our understanding of the molecular events leading to tumors. This book explores possible genetic treatments that can suppress cancer cells that have formed tumors and it presents the details of the isolation and characterization of new human cancer genes that have recently been identified. *Molecular Genetics of Cancer, 2E* is an essential book for anyone involved in cancer research and the search for a cure.

Telomerases-Neal F. Lue 2012-06-26 This book is a comprehensive and up-to-date review and evaluation of the contemporary status of telomerase research. Chapters in this volume cover the basic structure, mechanisms, and diversity of the essential and regulatory subunits of telomerase. Other topics include telomerase biogenesis, transcriptional and post-translational regulation, off-telomere functions of telomerase and the role of telomerase in cellular senescence, aging and cancer. Its relationship to retrotransposons, a class of mobile genetic elements that shares similarities with telomerase and serves as telomeres in selected organisms, are also reviewed.

Telomeres and Telomerase-Predrag Slijepcevic 2008-01-01 Telomeres are essential functional elements of eukaryotic chromosomes. Their fundamental biological role as protectors of chromosome stability was identified for the first time in the 1930s by Hermann Muller and Barbara McClintock based on pioneering cytological experiments. Modern molecular

research carried out more recently revealed that telomeres and telomerase play important roles in processes such as carcinogenesis and cellular senescence. This special issue presents the most recent developments in this highly active field of research. It is becoming increasingly clear that molecular pathways involved in regulation of telomere length and structure are functionally linked with pathways involved in DNA damage response, cellular stress response, chromatin organization and perhaps even pathways that regulate evolutionary chromosome rearrangements. The above functional link is explored by the leading experts in the field of telomere biology. Cell biologists, molecular biologists, oncologists, gerontologists, and radiobiologists with an interest in the role of telomeres/telomerase will appreciate the up-to-date information in this publication.

Principles of Regenerative Medicine-Anthony Atala 2010-12-16 Virtually any disease that results from malfunctioning, damaged, or failing tissues may be potentially cured through regenerative medicine therapies, by either regenerating the damaged tissues in vivo, or by growing the tissues and organs in vitro and implanting them into the patient. Principles of Regenerative Medicine discusses the latest advances in technology and medicine for replacing tissues and organs damaged by disease and of developing therapies for previously untreatable conditions, such as diabetes, heart disease, liver disease, and renal failure. Key for all researchers and institutions in Stem Cell Biology, Bioengineering, and Developmental Biology The first of its kind to offer an advanced understanding of the latest technologies in regenerative medicine New discoveries from leading researchers on restoration of diseased tissues and organs

Molecular Mechanisms of the Aging Process and Rejuvenation-Naofumi Shiomi 2016-08-31 Numerous studies had been performed to elucidate the mechanisms of aging and to achieve rejuvenation, with some success reported in recent years. However, at present, the findings from those studies are not sufficient to resolve the issue of aging. This book presents an overview of recent topics on cellular aging and rejuvenation. In the early chapters, the molecular mechanisms of aging via the activities of clock and ion channel proteins, in addition to overall aspects, are discussed.

In the latter part, the aging of the skin, immune system, and brain is discussed. This book will prove useful for those studying or developing new drugs to counter the aging process and will encourage the development of novel ideas for rejuvenation.

The P53 Protein-Arnold J. Levine 2016-03-31 Decades of research on the tumor suppressor p53 have revealed that it plays a significant role as a "guardian of the genome," protecting cells against genotoxic stress. In recent years, p53 research has begun to move into the clinic in attempts to understand how p53 is frequently inactivated in-and sometimes even promotes-human cancer. Written and edited by experts in the field, this collection from Cold Spring Harbor Perspectives in Medicine covers the rapid progress that has recently been made in basic and clinical research on p53. The contributors review new observations about its basic biology, providing updates on the functions of its isoforms and domains, the myriad stresses and signals that trigger its activation or repression, and its downstream effects on genome stability and the cell cycle that enforce tumor suppression in different cell and tissue types. They also discuss how p53 dysfunction contributes to cancer, exploring the various inherited and somatic mutations in the human TP53 gene, the impact of mutant p53 proteins on tumorigenesis, and the prognostic value and clinical outcomes of these mutations. Drugs that are being developed to respond to tumors harboring aberrant p53 are also described. This book is therefore essential reading for all cancer biologists, cell and molecular biologists, and pharmacologists concerned with the treatment of this disease.

New Aspects in Molecular and Cellular Mechanisms of Human Carcinogenesis-Dmitry Bulgin 2016-03-02 Written by an international team of experts in the field of human carcinogenesis, this book discusses recent advances in cancer research, which include the following topics: basic molecular and cellular mechanisms behind cancer growth, new approaches in cancer therapy, and cancer diagnostic. The book serves as a useful source of reference for cancer biologists, medical doctors, and clinical researchers in the fields of cancer diagnosis, prevention, and treatment.

Calorie Restriction, Aging and Longevity-Arthur V. Everitt 2010-06-14 Food or calorie restriction has been shown in many short-lived animals and the rhesus monkey to prolong life-span. Life-long nutrition studies are not possible in humans because of their long survival. Studies over two to six years in healthy adult humans have, however, shown that a 20% reduction in food or calorie intake slows many indices of normal and disease-related aging. Thus, it is widely believed that long-term reduction in calorie or food intake will delay the onset of age-related diseases such as heart disease, diabetes and cancer, and so prolong life. Over the last 20 or more years there has been a progressive rise in food intake in many countries of the world, accompanied by a rising incidence of obesity. Thus our increasing food and calorie intake has been linked to the rising incidence of cardiovascular disease and diabetes in early adult life. It is accepted that overeating, accompanied by reduced physical exercise, will lead to more age-related diseases and shortening of life-span. The answer is to reduce our calorie intake, improve our diet, and exercise more. But calorie restriction is extremely difficult to maintain for long periods. How then can we solve this problem? Edited by a team of highly distinguished academics, this book provides the latest information on the beneficial effects of calorie restriction on health and life-span. This book brings us closer to an understanding at the molecular, cellular and whole organism level of the way forward.

The Telomere-David Kipling 1995 Telomeres--specialized structures at ends of linear chromosomes--serve a fascinating range of functions that molecular biologists and geneticists are only beginning to understand and exploit. For example, telomeres distinguish the natural end of a chromosome from a simple double-strand break, stabilize chromosomes by protecting them from fusion or activating cell cycle checkpoints, and provide mechanisms to compensate for the loss of terminal DNA sequence that occurs when linear DNA molecules are replicated. This book--the first to cover this exciting and rapidly expanding field--integrates the increasingly disparate strands of telomere research to provide an invaluable survey of the subject. Topics include the role of telomeres in nuclear organization; telomere DNA sequence and unusual structures formed by

telomeric sequences in vitro; replication of telomeric sequences by telomerase and how this relates to various DNA sequence features; proteins that bind or interact with telomeres; the role of telomeres in programmed and spontaneous chromosome breakage; recent speculation on the relationship between human telomere loss, aging, and cancer; telomere position effects on replication and transcription; *Drosophila* telomere function; and the relationships between human telomere structure, genome analysis, and genetic disease. In a discipline as rapidly developing as telomere research, this book will serve as a user-friendly and much-needed resource for students and researchers in molecular biology and molecular genetics.

Mitochondrial DNA-Herve Seligmann 2018-10-31 The very short genomes of mitochondria summarize the complexity of molecular biology and its interactions with cellular and whole organism biology. Studies of mitogenomes contribute to the understanding of molecular biology and evolution, and to health management. Despite or even due to their small sizes, mitogenomes continue to surprise us. Studies of mitogenomes reveal the details of molecular organization and its evolution under constraints for miniaturization.

Genome and Disease-Jean-Nicolas Volff 2006-01-01 Cancer and other genetic human diseases are caused by a variety of mutations, ranging from subtle sequence changes to larger genomic rearrangements and alterations in chromosome number (aneuploidy). With contributions by reputed experts, this book aims to update the knowledge on the multiple mechanisms of genomic instability leading to human disease. Emphasis is given to the different types of genomic sequences involved in disease-related genomic rearrangements as well as to the various exogenous factors increasing the frequency of mutations. Several chapters are dedicated to the dysfunction of important cellular mechanisms like DNA repair and chromosome segregation, which may cause genomic instability and result in tumorigenesis. Important 'caretaker' genes controlling the stability of our genome have been identified through their defect in genomic instability syndromes, which are also extensively reviewed in this volume. This book provides an important update not only for investigators in biology and

medicine, but also for physicians and anyone interested in the molecular basis of human disease.

Encyclopedia of Genetics, Genomics, Proteomics, and Informatics-

George P. Rédei 2008-04-25 This new third edition updates a best-selling encyclopedia. It includes about 56% more words than the 1,392-page second edition of 2003. The number of illustrations increased to almost 2,000 and their quality has improved by design and four colors. It includes approximately 1,800 current databases and web servers. This encyclopedia covers the basics and the latest in genomics, proteomics, genetic engineering, small RNAs, transcription factories, chromosome territories, stem cells, genetic networks, epigenetics, prions, hereditary diseases, and patents. Similar integrated information is not available in textbooks or on the Internet.

G-Quadruplex Nucleic Acids-Danzhou Yang 2020-09-07 This volume covers the structures, properties, and functions of G-quadruplexes in a wide range of biological disciplines, including therapeutic intervention and biomaterial application. The chapters in this book explore a wide range of vital and new experimental techniques used in the study of G-quadruplexes. Written in the highly successful Methods in Molecular Biology series format, chapters include introductions to their respective topics, lists of the

necessary materials and reagents, step-by-step, readily reproducible laboratory protocols, and tips on troubleshooting and avoiding known pitfalls. Practical and cutting-edge, G-Quadruplex DNA: Methods and Protocols is a valuable resource for both novice and experienced researchers who work in biophysics, structural biology, computational biology, biochemistry, and molecular and cell biology, and who want to learn more about the potential roles and effects of G-quadruplex in these fields.

Genetics of Focal Epilepsies-Samuel F. Berkovic 1999 Genetic studies of the epilepsies are essential for clinical diagnosis, family counselling and as a critical route to understanding the basic biology of epilepsies at a molecular level. The focal epilepsies have been traditionally regarded as predominantly acquired disorders. This perception has now changed and there has been an explosion of interest in inherited forms of focal epilepsy that are emerging as being surprisingly common. This book describes the clinical features of the enlarging group of familial focal epilepsies and highlights recent molecular biological knowledge in understanding these disorders.