Dna Repair Mechanisms Impact On Human Diseases And Cancer Molecular Biology Intelligence Unit

Advances in Mercury ToxicologyPlant GenomesDNA Damage and RepairThe Metabolic and Molecular Bases of Inherited DiseaseBasic Radiotherapy Physics and BiologyDNA Repair MechanismsDNA Repair, Genetic Instability, and CancerDNA Repair MechanismsOxidative Damage to Nucleic AcidsGenomesDNA Damage and RepairUnravelling Complexities in Genetics and GenomicsDNA Repair and MutagenesisMolecular Biology of the CellProton Beam RadiotherapyNew Research Directions in DNA RepairDNA Damage RecognitionDNA Repair Mechanisms and Their Biological Implications in Mammalian CellsDNA Replication, Recombination, and RepairGenome StabilityThe Chemical Biology of DNA DamageMaintenance of Genome Integrity: DNA Damage Sensing, Signaling, Repair and Replication in PlantsStress-Induced MutagenesisReplicating And Repairing The Genome: From Basic Mechanisms To Modern Genetic TechnologiesFundamentals for the Assessment of Risks from Environmental RadiationDNA Repair Mechanisms and Their Biological Implications in Mammalian CellsEncyclopedia of CancerChemically-Induced DNA Damage, Mutagenesis, and CancerHealth Risks from Exposure to Low Levels of Ionizing RadiationDNA Repair in Cancer TherapyMutagenesis: exploring novel genes and pathwaysAdvances in DNA RepairMechanisms of

DNA Damage Recognition in Mammalian CellsMobile DNA IIIDNA Repair of Cancer Stem CellsUbiquitination Governing DNA RepairDNA Repair in Cancer TherapyDNA Repair Enzymes: Structure, Biophysics, and MechanismMolecular Targeted RadiosensitizersTargeting the DNA Damage Response for Anti-Cancer Therapy

Advances in Mercury Toxicology

This volume contains edited contributions from the speakers at the NATO Advanced Research Workshop on "DNA Repair Mechanisms and Their Biological Implications in Mammalian Cells" held October 1-6, 1988, at the Abbaye Royale de Fontevraud, Fontevraud France. The meeting was dedicated to Paul Howard-Flanders (Yale University, New Haven, CT. , 1919-1988), whose seminal con tributions to the DNA repair field include the cO-discovery of the excision repair pathway, the elucidation of post-repli cation repair in E. coli, the isolation of the lexA and recC mutants, and his extensive work on the enzymology of RecA. A plethora of recent developments in DNA repair mechan isms and related processes in mammalian cells have advanced our understanding of this field in a number of different areas and have given new emphasis to the ways these systems both resemble DNA repair processes in other groups of organisms in some respects yet are strikingly different from them in others. Within the past decade there have been a number of international conferences on DNA damage and repair mechanisms but none has been focused on these

processes in mammalian cells.

Plant Genomes

Replicating and Repairing the Genome provides a concise overview of the fields of DNA replication and repair. The book is particularly appropriate for graduate students and advanced undergraduates, and scientists entering the field or working in related fields. The breadth of information regarding DNA replication and repair is vast and often difficult to absorb, with terminology that differs between experimental systems and with complex interconnections of these processes with other cellular pathways. This book provides simple conceptual descriptions of replication and repair pathways using mostly generic protein names, laying out the logic for how the pathways function and highlighting fascinating aspects of the underlying biochemical mechanisms and biology. The book incorporates extensive and informative diagrams and figures, as well as descriptions of a number of carefully chosen experiments that had major influences in the field.The process of DNA replication is explained progressively by starting with the system of a simple bacterial virus that uses only a few proteins, followed by the well-understood bacterial (E coli) system, and then culminating with the more complex eukaryotic systems. In the second half of the book, individual chapters cover key areas of DNA repair — postreplication repair of mismatches and incorporated ribonucleotides, direct damage reversal, excision repair, and DNA break repair, as well as the

related areas of DNA damage tolerance (including translesion DNA polymerases) and DNA damage responses. The book closes with chapters that describe the huge impact of DNA replication and repair on aspects of human health and on modern biotechnology.

DNA Damage and Repair

The Metabolic and Molecular Bases of Inherited Disease

Basic Radiotherapy Physics and Biology

This book edition is intended to provide a concise summary for select topics in DNA repair, a field that is ever-expanding in complexity and biologic significance. The topics reviewed ranged from fundamental mechanisms of DNA repair to the interface between DNA repair and a spectrum on cellular process to the clinical relevance of DNA repair in oncologic paradigms. The information in this text should provide a foundation from which one can explore the various topics in depth. The book serve as a supplementary text in seminar courses with focus on DNA repair as well as a general reference for scholars with an interest in DNA repair.

DNA Repair Mechanisms

Stands as the most comprehensive guide to the

subject—covering every essential topic related to DNA damage identification and repair. Covering a wide array of topics from bacteria to human cells, this book summarizes recent developments in DNA damage repair and recognition while providing timely reviews on the molecular mechanisms employed by cells to distinguish between damaged and undamaged sites and stimulate the appropriate repair pathways. about the editors WOLFRAM SIEDE is Associate Professor, Department of Cell Biology and Genetics, University of North Texas Health Science Center, Fort Worth. He received the Ph.D. degree (1986) from Johann Wolfgang Goethe University, Frankfurt Germany. YOKE WAH KOW is Professor, Department of Radiation Oncology, Emory University School of Medicine, Atlanta, Georgia. He received the Ph.D. degree (1981) from Brandeis University, Waltham, Massachusetts. PAUL W. DOETSCH is Professor, Departments of Biochemistry, Radiation Oncology, and Hematology and Oncology, and Associate Director for Basic Research, Winship Cancer Institute, Emory University School of Medicine, Atlanta, Georgia. He received the Ph.D. degree (1982) from Temple University School of Medicine, Philadelphia, Pennsylvania.

DNA Repair, Genetic Instability, and Cancer

Unravelling Complexities in Genetics and Genomics: Impact on Diagnosis Counseling and Management reviews recent advances in defining genetic and genomic factors that play important roles in diseases in humans. It includes discussions on new

technologies in DNA and RNA sequencing, genome analysis, and bioinformatics applied to the study of patients with specific disorders and to normal populations, and illustrates how modern molecular techniques can improve diagnoses and enable the design of specific targeted therapies and methods of prevention. Additional emphasis is placed on the genetic variants and genomic risk factors related to the development of complex common disorders, including neurobehavioral and neurocognitive disorders in children and adults and late onset disorders in adults, including atherosclerosis, type 2 diabetes, cancer, and neurodegenerative disorders. Physicians, nurses, genetic counselors, graduate students in genetics and genomics will find this book a valuable read. Contents:Expanding Insights into Genes and ExpressionGenomic Integrity and Relevance to DiseaseEpigenetics and EpigenomicsProteins, Proteomics, Protein Folding and ProteostasisGenotype–Phenotype Correlations and ComplexitiesImmune SystemLipids, Atherosclerosis, Metabolic Syndromes and DiabetesEarly-Onset Neurocognitive and Neurobehavioral DisordersIntegrating Advances in Neurobiology and Genetics into PsychiatryNeurodegenerative DiseasesCancerEpilogue Readership: Physicians, nurses, genetic counselors, graduate students in genetics and genomics.

DNA Repair Mechanisms

An exploration of the raw power of genetic material to refashion itself to any purpose Virtually all organisms

contain multiple mobile DNAs that can move from place to place, and in some organisms, mobile DNA elements make up a significant portion of the genome. Mobile DNA III provides a comprehensive review of recent research, including findings suggesting the important role that mobile elements play in genome evolution and stability. Editor-in-Chief Nancy L. Craig assembled a team of multidisciplinary experts to develop this cutting-edge resource that covers the specific molecular mechanisms involved in recombination, including a detailed structural analysis of the enzymes responsible presents a detailed account of the many different recombination systems that can rearrange genomes examines the tremendous impact of mobile DNA in virtually all organisms Mobile DNA III is valuable as an in-depth supplemental reading for upper level life sciences students and as a reference for investigators exploring new biological systems. Biomedical researchers will find documentation of recent advances in understanding immune-antigen conflict between host and pathogen. It introduces biotechnicians to amazing tools for in vivo control of designer DNAs. It allows specialists to pick and choose advanced reviews of specific elements and to be drawn in by unexpected parallels and contrasts among the elements in diverse organisms. Mobile DNA III provides the most lucid reviews of these complex topics available anywhere.

Oxidative Damage to Nucleic Acids

Environmental stresses and metabolic by-products

can severely affect the integrity of genetic information by inducing DNA damage and impairing genome stability. As a consequence, plant growth and productivity are irreversibly compromised. To overcome genotoxic injury, plants have evolved complex strategies relying on a highly efficient repair machinery that responds to sophisticated damage perception/signaling networks. The DNA damage signaling network contains several key components: DNA damage sensors, signal transducers, mediators, and effectors. Most of these components are common to other eukaryotes but some features are unique to the plant kingdom. ATM and ATR are well-conserved members of PIKK family, which amplify and transduce signals to downstream effectors. ATM primarily responds to DNA double strand breaks while ATR responds to various forms of DNA damage. The signals from the activated transducer kinases are transmitted to the downstream cell-cycle regulators, such as CHK1, CHK2, and p53 in many eukaryotes. However, plants have no homologue of CHK1, CHK2 nor p53. The finding of Arabidopsis transcription factor SOG1 that seems functionally but not structurally similar to p53 suggests that plants have developed unique cell cycle regulation mechanism. The double strand break repair, recombination repair, postreplication repair, and lesion bypass, have been investigated in several plants. The DNA double strand break, a most critical damage for organisms are repaired non-homologous end joining (NHEJ) or homologous recombination (HR) pathway. Damage on template DNA makes replication stall, which is processed by translesion synthesis (TLS) or error-free postreplication repair (PPR) pathway. Deletion of the

error-prone TLS polymerase reduces mutation frequencies, suggesting PPR maintains the stalled replication fork when TLS is not available. Unveiling the regulation networks among these multiple pathways would be the next challenge to be completed. Some intriguing issues have been disclosed such as the cross-talk between DNA repair, senescence and pathogen response and the involvement of non-coding RNAs in global genome stability. Several studies have highlighted the essential contribution of chromatin remodeling in DNA repair DNA damage sensing, signaling and repair have been investigated in relation to environmental stresses, seed quality issues, mutation breeding in both model and crop plants and all these studies strengthen the idea that components of the plant response to genotoxic stress might represent tools to improve stress tolerance and field performance. This focus issue gives researchers the opportunity to gather and interact by providing Mini-Reviews, Commentaries, Opinions, Original Research and Method articles which describe the most recent advances and future perspectives in the field of DNA damage sensing, signaling and repair in plants. A comprehensive overview of the current progresses dealing with the genotoxic stress response in plants will be provided looking at cellular and molecular level with multidisciplinary approaches. This will hopefully bring together valuable information for both plant biotechnologists and breeders.

Genomes

This book offers a comprehensive, practical guide to understanding the physical and biological characteristics of proton beam radiotherapy. The application of proton beams to the treatment of solid cancers has expanded exponentially over the last decade due to their physical properties, which make it possible to administer higher doses of radiation to lesions with only a minimum dose to the surrounding healthy tissues. Accordingly, understanding the basic aspects of proton beam radiotherapy is a primary concern not only for medical physicists and radiation biologists, but also for all physicians involved in cancer treatment using proton beams. The major aspects discussed include the technique's development background, the generation and delivery system for proton beams, physical characteristics, biological consequences, dosimetry, and future prospects in both medical physics and radiation biology in terms of effective cancer treatment. Gathering contributions from experts who provide clear and detailed information on the basics of proton beams, the book will greatly benefit not only radiological technicians, medical physicists, and physicians, but also scientists in cancer radiotherapy.

DNA Damage and Repair

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.

Unravelling Complexities in Genetics and Genomics

Current successes in omics research have accelerated the production of high quality foods. Various mutation methodologies have been developed to achieve this progress, showing the importance of mutagenesis for food security. 'Mutagenesis: exploring novel genes and pathways' describes the latest achievements in induced mutagenesis, with a particular focus on the development of crops. The book details experimental studies on functions of particular genes of interest, the mechanisms involved in physiological processes, and occurring chemical reactions. Also, the creation of new mutants and lines by use of genomic data banks is discussed. The book will be of mutual interest to end-users in modern breeding programs as well as to scientific research.

DNA Repair and Mutagenesis

Over the past decade a complex role for DNA damage response (DDR) in tumorigenesis has emerged. A proficient DDR has been shown to be a primary cause for cellular resistance to the very many DNA damaging drugs, and IR, that are widely used as standard-of-care across multiple cancer types. It has also been shown that defects in this network,

predominantly within the ATM mediated signaling pathway, are commonly observed in cancers and may be a primary event during tumorigenesis. Such defects may promote a genomically unstable environment, facilitating the persistence of mutations, any of which may provide a growth or survival advantage to the developing tumor. In addition, these somatic defects provide opportunities to exploit a reliance on remaining repair pathways for survival, a process which has been termed synthetic lethality. As a result of all these observations there has been a great interest in targeting the DDR to provide anti-cancer agents that may have benefit as monotherapy in cancers with high background DNA damage levels or as a means to increase the efficacy of DNA damaging drugs and IR. In this book we will review a series of important topics that are of great interest to a broad range of academic, industrial and clinical researchers, including the basic science of the DDR, its role in tumorigenesis and in dictating response to DNA damaging drugs and IR. Additionally, we will focus on the several proteins that have been targeted in attempts to provide drug candidates, each of which appear to have quite distinct profiles and could represent very different opportunities to provide patient benefit.

Molecular Biology of the Cell

An essential resource for all scientists researching cellular responses to DNA damage. • Introduces important new material reflective of the major changes and developments that have occurred in the

field over the last decade. • Discussed the field within a strong historical framework, and all aspects of biological responses to DNA damage are detailed. • Provides information on covering sources and consequences of DNA damage; correcting altered bases in DNA: DNA repair; DNA damage tolerance and mutagenesis; regulatory responses to DNA damage in eukaryotes; and disease states associated with defective biological responses to DNA damage.

Proton Beam Radiotherapy

New Research Directions in DNA Repair

The existence of ‘cancer stem cells’ (CSCs) has been a topic of heated debate for the last few years within the field of cancer biology. Their continuous characterization in a variety of solid tumors has lead to an abundance of evidence supporting their existence. CSCs are believed to be responsible for resistance against conventional treatment regimes of chemotherapy and radiation, ultimately, leading to metastasis and patient demise. To help aid clinicians, pharmaceutical companies and academic labs investigating how to better kill these highly aggressive cells we have summarized the DNA repair mechanism(s) and their role in the maintenance and regulation of both normal and cancer stem cells. Our book represents a comprehensive investigation into the highly effective DNA repair mechanisms of CSCs and what we need to understand in order to develop more advanced therapies to eradicate them from

patients. Currently, there are no other published works entirely on DNA repair and Cancer Stem Cells. In addition, our book provides a comprehensive overview of CSC isolation and characterization from a variety of solid tumor types.

DNA Damage Recognition

This comprehensive encyclopedic reference provides rapid access to focused information on topics of cancer research for clinicians, research scientists and advanced students. Given the overwhelming success of the first edition, which appeared in 2001, and fast development in the different fields of cancer research, it has been decided to publish a second fully revised and expanded edition. With an A-Z format of over 7,000 entries, more than 1,000 contributing authors provide a complete reference to cancer. The merging of different basic and clinical scientific disciplines towards the common goal of fighting cancer makes such a comprehensive reference source all the more timely.

DNA Repair Mechanisms and Their Biological Implications in Mammalian Cells

This book is a concise and well-illustrated review of the physics and biology of radiation therapy intended for radiation therapists, dosimetrists, radiation oncology residents, and physicists. It presents topics that are included on the radiation therapy physics and biology board examinations and is designed with the

intent of presenting information in an easily digestible format with maximum retention in mind. The inclusion of mnemonics, rules of thumb, and reader-friendly illustrations throughout the book help to make difficult concepts easier to grasp. This new edition is updated throughout with the latest information and applications of radiation oncology physics and biology and includes four new chapters. New topics include: MRI linac, proton beam radiotherapy, chemomodulation and immunomodulation of radiation in vitro and in vivo, and stochastic and deterministic late effects. Basic Radiotherapy Physics and Biology is a valuable reference for radiation oncologists, medical professionals in the field, residents, and all students interested in radiation oncology.

DNA Replication, Recombination, and Repair

Recent major advances in the field of comparative genomics and cytogenomics of plants, particularly associated with the completion of ambitious genome projects, have uncovered astonishing facets of the architecture and evolutionary history of plant genomes. The aim of this book was to review these recent developments as well as their implications in our understanding of the mechanisms which drive plant diversity. New insights into the evolution of gene functions, gene families and genome size are presented, with particular emphasis on the evolutionary impact of polyploidization and transposable elements. Knowledge on the structure and evolution of plant sex chromosomes, centromeres

and microRNAs is reviewed and updated. Taken together, the contributions by internationally recognized experts present a panoramic overview of the structural features and evolutionary dynamics of plant genomes.This volume of Genome Dynamics will provide researchers, teachers and students in the fields of biology and agronomy with a valuable source of current knowledge on plant genomes.

Genome Stability

Every species has to preserve the integrity of its genome to ensure faithful passage of genetic information to the progeny. At the same time, there are times during the life of the organism and population in general when a fine balance in genome stability and diversification has to be made to benefit the survival of the species. Genome Stability teaches the reader how various species maintain this fine balance in genome stability and genome diversification in response to their environments. Genome Stability covers a wide range of topics, including the genome stability of DNA/RNA viruses, prokaryotes, single cell eukaryotes, lower multicellular eukaryotes and mammals. Topics also include major DNA repair mechanisms, the role of chromatin in genome stability, human diseases associated with genome instability as well as changes in genome stability in response to aging. Finally, Genome Stability covers how epigenetic factors contribute to genome stability and how the species pass the memory of the encounters to the progeny, thus influencing the genome of the progeny in an

indirect manner. This volume is an essential resource for geneticists, epigeneticists, and molecular biologists who are looking to gain a deeper understanding of this rapidly-expanding field, and can also be of great use to advanced students who are looking to gain additional expertise in genome stability. Includes a collection of chapters on genome stability research from various kingdoms, including topics such as epigenetics and transgenerational effects Provides the first comprehensive coverage of the differences in the mechanisms utilized by different organisms to maintain genomic stability Contains applications of genome instability and its effect on human diseases Explains how various species maintain the fine balance in genome stability and genome diversification in response to their environments

The Chemical Biology of DNA Damage

DNA Repair Mechanisms is an account of the proceedings at a major international conference on DNA Repair Mechanisms held at Keystone, Colorado on February 1978. The conference discusses through plenary sessions the overall standpoint of DNA repair. The papers presented and other important documents, such as short summaries by the workshop session conveners, comprise this book. The compilation describes the opposing views, those that agree and dispute about certain topic areas. This book, divided into 15 parts, is arranged according to the proceedings in the conference. The plenary sessions are grouped with the related workshop and

poster manuscripts. The first two parts generally tackle repair in terms of its identification and quantification, as well as the models, systems, and perspectives it utilizes. The following parts discuss the various types of repair including base excision, nucleotide excision repair in bacteria, excision repair in mammalian cells, inducible/error-prone repair in prokaryotes, and strand break repair in mammalian cells among others. This reference material looks into the replicative bypass mechanisms in mammalian cells, viral probes, and hereditary repair defects. It explains repair deficiency and human disease, as well as mutagenesis and carcinogenesis. The last part of this book deals with the consequences and effects of DNA repair. This volume is a helpful source of reference for students, teachers, scientists, and researchers in the different fields of genetics, radiology, biochemistry, and environmental biology.

Maintenance of Genome Integrity: DNA Damage Sensing, Signaling, Repair and Replication in Plants

Cutting edge reviews by leading researchers illuminate key aspects of DNA repair in mammalian systems and its relationship to human genetic disease and cancer. Major topics include UV and X-Ray repair, repair of chemical damage, recombinational repair, mismatch repair, transcription-repair coupling, and the role of DNA repair in disease prevention. Extensive up-to-date references and rigorous peer-review of each chapter make this volume definitive and bring it to the active frontiers of research.

Stress-Induced Mutagenesis

Bringing the power of biochemical analysis to toxicology, this modern reference explains genotoxicity at the molecular level, showing the links between a DNA lesion and the resulting cellular or organismic response. Clearly divided into two main sections, Part 1 focuses on selected examples of important DNA lesions and their biological impact, while the second part covers current advances in assessing and predicting the genotoxic effects of chemicals, taking into account the biological responses mediated by the DNA repair, replication and transcription machineries. A ready reference for biochemists, toxicologists, molecular and cell biologists, and geneticists seeking a better understanding of the impact of chemicals on human health.

Replicating And Repairing The Genome: From Basic Mechanisms To Modern Genetic Technologies

This volume contains edited contributions from the speakers at the NATO Advanced Research Workshop on "DNA Repair Mechanisms and Their Biological Implications in Mammalian Cells" held October 1-6, 1988, at the Abbaye Royale de Fontevraud, Fontevraud France. The meeting was dedicated to Paul Howard-Flanders (Yale University, New Haven, CT. , 1919-1988), whose seminal con tributions to the DNA repair field include the cO-discovery of the excision repair pathway, the elucidation of post-repli

cation repair in E. coli, the isolation of the lexA and recC mutants, and his extensive work on the enzymology of RecA. A plethora of recent developments in DNA repair mechan isms and related processes in mammalian cells have advanced our understanding of this field in a number of different areas and have given new emphasis to the ways these systems both resemble DNA repair processes in other groups of organisms in some respects yet are strikingly different from them in others. Within the past decade there have been a number of international conferences on DNA damage and repair mechanisms but none has been focused on these processes in mammalian cells.

Fundamentals for the Assessment of Risks from Environmental Radiation

DNA Repair Mechanisms and Their Biological Implications in Mammalian Cells

Cancer therapeutics include an ever-increasing array of tools at the disposal of clinicians in their treatment of this disease. However, cancer is a tough opponent in this battle, and current treatments, which typically include radiotherapy, chemotherapy and surgery, are not often enough to rid the patient of his or her cancer. Cancer cells can become resistant to the treatments directed at them, and overcoming this drug resistance is an important research focus. Additionally, increasing discussion and research is

centering on targeted and individualized therapy. While a number of approaches have undergone intensive and close scrutiny as potential approaches to treat and kill cancer (signaling pathways, multidrug resistance, cell cycle checkpoints, anti-angiogenesis, etc.), other approaches have focused on blocking the ability of a cancer cell to recognize and repair the damaged DNA that primarily results from the front-line cancer treatments; chemotherapy and radiation. This comprehensive and timely reference focuses on the translational and clinical use of DNA repair as a target area for the development of diagnostic biomarkers and the enhancement of cancer treatment. Saves academic, medical, and pharmaceutical researchers time in quickly accessing the very latest details on DNA repair and cancer therapy, as opposed to searching through thousands of journal articles Provides a common language for cancer researchers, oncologists, and radiation oncologists to discuss their understanding of new molecular pathways, clinical targets, and anti-cancer drug development Provides content for researchers and research clinicians to understand the importance of the breakthroughs that are contributing to advances in disease-specific research

Encyclopedia of Cancer

Chemically-Induced DNA Damage, Mutagenesis, and Cancer

Human health as well as aquatic and terrestrial

ecosystems are threatened from increa sing levels of environmental radiation of various sources, many of them of anthropoge nic causality: large areas of the former Soviet Union suffer from radioactive pollution, in particular after the Chemobyl accident; the increase in the incidence of UVB radiati on at the Earth's surface as a result of a progressive depletion of stratospheric ozone is a global problem that requires international concerted actions; in areas of former uranium mining the natural radiation level is substantially increased due to elevated radon levels; a growing portion of the population involved in air traffic is exposed to increased levels of natural radiation; and with the International Space Station an increasing number of astronauts will be exposed to the complex field of cosmic radiation. To estimate the corresponding risks, a better knowledge of the underlying radiobiological mechanisms at the molecular, cellular and system level is required. This book is the result of a multidisciplinary effort to discuss the current state of knowledge of the fundamental processes that result from interactions of environmental radiation -ionizing as well as UV radiation -with living matter and the existing radiati on protection concepts, and then to define future research work needed as fundamental information for the assessment of risks from increased levels of environmental radiation to human health and ecosystem balance. It comprises the key lectures and statements presented at the NATO Advanced Research Workshop.

Health Risks from Exposure to Low

Levels of Ionizing Radiation

This book is the seventh in a series of titles from the National Research Council that addresses the effects of exposure to low dose LET (Linear Energy Transfer) ionizing radiation and human health. Updating information previously presented in the 1990 publication, Health Effects of Exposure to Low Levels of Ionizing Radiation: BEIR V, this book draws upon new data in both epidemiologic and experimental research. Ionizing radiation arises from both natural and man-made sources and at very high doses can produce damaging effects in human tissue that can be evident within days after exposure. However, it is the low-dose exposures that are the focus of this book. So-called “late” effects, such as cancer, are produced many years after the initial exposure. This book is among the first of its kind to include detailed risk estimates for cancer incidence in addition to cancer mortality. BEIR VII offers a full review of the available biological, biophysical, and epidemiological literature since the last BEIR report on the subject and develops the most up-to-date and comprehensive risk estimates for cancer and other health effects from exposure to low-level ionizing radiation.

DNA Repair in Cancer Therapy

DNA Repair Enzymes, Part B, Volume 592 is the latest volume in the Methods in Enzymology series and the first part of a thematic that focuses on DNA Repair Enzymes. Topics in this updated volume include MacroBac: New Technologies for Robust and Efficient

Large-Scale Production of Recombinant Multiprotein Complexes, Production and Assay of Recombinant Multisubunit Chromatin Remodeling Complexes, Analysis of Functional Dynamics of Modular Multidomain Proteins by SAXS and NMR, the Use of Single-Cysteine Variants for Trapping Transient States in DNA Mismatch Repair, and Structural Studies of RNases H2 as an Example of Crystal Structure Determination of Protein-Nucleic Acid Complexes. Includes contributions from leading authorities working in enzymology Focuses on DNA repair enzymes Informs and updates on all the latest developments in the field of enzymology

Mutagenesis: exploring novel genes and pathways

Advances in DNA Repair

This text provides a new approach to the subject of genomes and redefines how molecular genetics should be taught. Covering all aspects, it includes key research findings and focuses on the changes of the last five years.

Mechanisms of DNA Damage Recognition in Mammalian Cells

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.

Mobile DNA III

The First International Congress on DNA Damage and Repair was held in Rome, Italy, July 12-17, 1987. It was organized by the Italian Com mission for Nuclear Alternative Energy Sources. The subject of DNA damage and repair involves almost all the fields ofbidogical sciences. Some of the more prominent ones include carcino genesis, photobiology, radiation biology, aging, enzymology, genetics, and molecular biology. These individual fields have their own interna tional meetings and although the meetings often have sessions devoted to DNA repair, they do not bring together a wide diversity of international workers in the field to exchange ideas. The purpose of the Congress was to facilitate such an exchange among scientists representing many fields of endeavor and many countries. The 37 manuscripts in this volume, presented by the invited spea kers during the four and half days of the Congress, encompass the field of DNA damage and repair. They cover biological systems ranging from mo lecules to humans and deal with damages and repair after treatment of cells with various types of radiations, chemicals, and exogenous and en dogenous oxidative damages. The Congress and its Proceedings are dedicated to two international leaders in the field of DNA damage and repair, Alexander Hollaender of the United States and Adriano Buzzati Traverso of Italy. Hollaender, who

died in December 1986, was one of the first investigators to recognize the damage to DNA was important in cell killing and mutagenesis. His early work indicated that cells could recover from radiation injury.

DNA Repair of Cancer Stem Cells

This book is a comprehensive review of the detailed molecular mechanisms of and functional crosstalk among the replication, recombination, and repair of DNA (collectively called the "3Rs") and the related processes, with special consciousness of their biological and clinical consequences. The 3Rs are fundamental molecular mechanisms for organisms to maintain and sometimes intentionally alter genetic information. DNA replication, recombination, and repair, individually, have been important subjects of molecular biology since its emergence, but we have recently become aware that the 3Rs are actually much more intimately related to one another than we used to realize. Furthermore, the 3R research fields have been growing even more interdisciplinary, with better understanding of molecular mechanisms underlying other important processes, such as chromosome structures and functions, cell cycle and checkpoints, transcriptional and epigenetic regulation, and so on. This book comprises 7 parts and 21 chapters: Part 1 (Chapters 1–3), DNA Replication; Part 2 (Chapters 4–6), DNA Recombination; Part 3 (Chapters 7–9), DNA Repair; Part 4 (Chapters 10–13), Genome Instability and Mutagenesis; Part 5 (Chapters 14–15), Chromosome Dynamics and Functions; Part 6

(Chapters 16–18), Cell Cycle and Checkpoints; Part 7 (Chapters 19–21), Interplay with Transcription and Epigenetic Regulation. This volume should attract the great interest of graduate students, postdoctoral fellows, and senior scientists in broad research fields of basic molecular biology, not only the core 3Rs, but also the various related fields (chromosome, cell cycle, transcription, epigenetics, and similar areas). Additionally, researchers in neurological sciences, developmental biology, immunology, evolutionary biology, and many other fields will find this book valuable.

Ubiquitination Governing DNA Repair

DNA damage response (DDR) and lesion repair are vital processes ensuring genome integrity through various pathways depending mainly on the nature of DNA injury and cell cycle stage. DDR is finely regulated at many levels in co-ordination with other ongoing processes as is genome replication and cell cycle progression. Posttranslational modifications (PTMs), affecting both protein-protein and protein-DNA interactions, play a crucial role in finely tuning all processes involved in the restoration of genome lesions. Regarding damaged chromatin, PTMs serve in many cases as recruitment platforms for DNA repair mechanisms by facilitating binding sites or regulating interactions between involved proteins. Ubiquitination, the addition of ubiquitin moieties on a target protein, apart from controlling protein availability through degradation, is also involved, together with partner small ubiquitin-like modifier

(SUMO), in controlling many pathways involved in DDR by modifying the structure-function relationship and thus interacting with partner molecules. The aim of this book is to cover a broad spectrum of current topics in ubiquitination and to a lesser extent SUMOylation involvement in regulation of DDR and repair in health and disease. This book is intended for pre- and postgraduate students and young scientists in this field. Members of both academic and research institutions, actively involved in the field, have described their current understanding of major mechanisms involved, highlighted key events, described ongoing applications in both developmental diseases and cancer and provided hints for future potential applications.

DNA Repair in Cancer Therapy

The discovery of stress-induced mutagenesis has changed ideas about mutation and evolution, and revealed mutagenic programs that differ from standard spontaneous mutagenesis in rapidly proliferating cells. The stress-induced mutations occur during growth-limiting stress, and can include adaptive mutations that allow growth in the otherwise growth-limiting environment. The stress responses increase mutagenesis specifically when cells are maladapted to their environments, i.e. are stressed, potentially accelerating evolution then. The mutation mechanism also includes temporary suspension of post-synthesis mismatch repair, resembling mutagenesis characteristic of some cancers. Stress-induced mutation mechanisms may provide important

models for genome instability underlying some cancers and genetic diseases, resistance to chemotherapeutic and antibiotic drugs, pathogenicity of microbes, and many other important evolutionary processes. This book covers pathways of stress-induced mutagenesis in all systems. The principle focus is mammalian systems, but much of what is known of these pathways comes from non-mammalian systems.

DNA Repair Enzymes: Structure, Biophysics, and Mechanism

This book is based on an international meeting organized by the University of Tokyo and the University of Rochester, and is published as one belonging to the series of Rochester International Conferences in Environmental Toxicity. The meeting on "Advances in Mercury Toxicology" was held at the University of Tokyo on August 1 to 3, 1990. The invited papers are published in this book along with an "Overview" chapter that was written by the editors at a meeting held at the University of Rochester on August 1 to 2, 1991. The purpose of the meeting was to assemble leading scientists to discuss their most recent findings on the toxicology of mercury. The time was opportune. Considerable progress has been made on the environmental fate and toxicology of mercury. Recent findings have given new insight into the global model for mercury. Transport in the atmosphere extends great distances resulting in pollution of lakes and rivers far distant from the source of mercury release. The process of methylation leads to

accumulation of methylmercury in fish and thus in the human diet. New evidence indicates that acid rain and the impoundment of water for hydroelectric purposes affects the methylation and bioaccumulation processes resulting in higher levels of methylmercury in fish.

Molecular Targeted Radiosensitizers

This book is a printed edition of the Special Issue " Chemically-Induced DNA Damage, Mutagenesis, and Cancer" that was published in IJMS

Targeting the DNA Damage Response for Anti-Cancer Therapy

DNA Repair and Cancer Therapy: Molecular Targets and Clinical Applications, Second Edition provides a comprehensive and timely reference that focuses on the translational and clinical use of DNA repair as a target area for the development of diagnostic biomarkers and the enhancement of cancer treatment. Experts on DNA repair proteins from all areas of cancer biology research take readers from bench research to new therapeutic approaches. This book provides a detailed discussion of combination therapies, in other words, how the inhibition of repair pathways can be coupled with chemotherapy, radiation, or DNA damaging drugs. Newer areas in this edition include the role of DNA repair in chemotherapy induced peripheral neuropathy, radiation DNA damage, Fanconi anemia cross-link repair, translesion DNA polymerases, BRCA1-BRCA2

pathway for HR and synthetic lethality, and mechanisms of resistance to clinical PARP inhibitors. Provides a comprehensive overview of the basic and translational research in DNA repair as a cancer therapeutic target Includes timely updates from the earlier edition, including Fanconi Anemia cross-link repair, translesion DNA polymerases, chemotherapy induced peripheral neuropathy, and many other new areas within DNA repair and cancer therapy Saves academic, medical, and pharma researchers time by allowing them to quickly access the very latest details on DNA repair and cancer therapy Assists researchers and research clinicians in understanding the importance of the breakthroughs that are contributing to advances in disease-specific research