cancer gene therapy by viral and non viral vectors translational oncology

#cancer gene therapy #viral vectors #non-viral vectors #translational oncology #cancer treatment research

Explore the forefront of cancer gene therapy, a revolutionary approach employing both viral vectors and non-viral vectors to deliver targeted genetic material for treating malignancies. This critical domain within translational oncology is dedicated to transforming innovative scientific discoveries into effective, patient-centric solutions, paving the way for advanced cancer treatment research and novel therapeutic strategies.

Cancer Gene Therapy by Viral and Non-viral Vectors

Provides expert, state-of-the-art insight into the currentprogress of viral and non-viral gene therapy Translational medicine has opened the gateway to the era ofpersonalized or precision medicine. No longer a one-size-fits-allapproach, the treatment of cancer is now based on an understandingof underlying biologic mechanisms and is increasingly beingtailored to the molecular specificity of a tumor. This book provides a comprehensive overview of the pertinentmolecular discoveries in the cancer field and explains how theseare being used for gene-based cancer therapies. Designed as avolume in the Translational Oncology book series, Cancer GeneTherapy by Viral and Non-viral Vectors deals with the practiceof gene-therapy, with reference to vectors for gene expression andgene transfer, as well as viral therapy. It covers the history andcurrent and future applications of gene transfer in cancer, andprovides expert insight on the progress of viral and non-viral genetherapy with regard to delivery system, vector design, potentialtherapeutic genes, and principles and regulations for cancer genetherapy. Presented in three parts, Cancer Gene Therapy by Viral andNon-viral Vectors covers: Delivery Systems • Translational Cancer Research: Gene Therapy by Viraland Non-viral Vectors • Retroviruses for Cancer Therapy • DNA Plasmids for Non-viral Gene Therapy ofCancer • Cancer Therapy with RNAi delivered by Non-viralMembrane/Core Nanoparticles Targeted Expression • Cancer Gene Therapy by Tissue-specific andCancer-targeting Promptors • MicroRNAs as Drugs and Drug Targets in Cancer Principles of Clinical Trials in Gene Therapy • Regulatory issues for Manufacturers of Viral Vectorsand Vector-transduced Cells for Phase I/II Trials • US Regulations Governing Clinical Trials in GeneTherapy • Remaining Obstacles to the Success of Cancer GeneTherapy Focusing on speeding the process in clinical cancer care bybringing therapies as quickly as possible from bench to bedside,Cancer Gene Therapy by Viral and Non-viral Vectors is anabsolutely vital book for physicians, clinicians, researchers, andstudents involved in this area of medicine.

Gene Therapy of Cancer

Gene therapy as a treatment for cancer is at a critical point in its evolution. Exciting new developments in gene targeting and vector technology, coupled with results from the first generation of preclinical and clinical studies have led to the design and testing of new therapeutic approaches. The Third Edition of Gene Therapy of Cancer provides crucial updates on the basic and applied sciences of gene therapy. It offers a comprehensive assessment of the field including the areas of suicide gene therapy, oncogene and suppressor gene targeting, immunotherapy, drug resistance gene therapy, and the genetic modification of stem cells. Researchers at all levels of development, from basic laboratory investigators to clinical practitioners, will find this book to be instructive. Cancer gene therapy, like cancer therapy in general, is evolving rapidly, testing new concepts, targets and pathways, evoking new technologies, and passing new regulatory hurdles. Its essence, however, has not changed: the hope and challenges of returning altered genes to normal, using targeted gene expression to alter the function of both tumor and microenvironment, and in some cases normal cells, and delivering functionally important genes to specific cell types to increase sensitivity to killing or to protect normal cells from cancer therapies. In some instances, gene therapy for cancer forms a continuum from gene repair through the use of molecularly modified cells; the use of viral and non-viral vector based gene delivery to both tumor and tumor microenvironment; the use of viral and gene based vaccines; and development of new gene-based therapeutics. The unique mechanistically chosen vector platforms are at the heart of this technology because they allow for direct and selective cell death and transient to sustained delivery of vaccine molecules or molecules that affect the microenvironment, vasculature, or the immune response. Explains the underlying cancer biology necessary for understanding proposed therapeutic approaches Presents in-depth description of targeting systems and treatment strategies Covers the breadth of gene therapy approaches including immunotherapeutic, drug resistance,oncolytic viruses, as well as regulatory perspectives from both the NCI and FDA

Gene Therapy and Cancer Research Progress

Genes, which are carried on chromosomes, are the basic physical and functional units of heredity. Genes are specific sequences of bases that encode instructions on how to make proteins. Although genes get a lot of attention, it's the proteins that perform most life functions and even make up the majority of cellular structures. When genes are altered so that the encoded proteins are unable to carry out their normal functions, genetic disorders can result. Gene therapy is an experimental treatment that involves introducing genetic material into a person's cells to fight disease. Gene therapy is being studied in clinical trials for many different types of cancer and for numerous other diseases. This new book presents the latest research in the field from around the world.

Cancer Gene Therapy

A complete introduction and guide to the latest developments in cancer gene therapy-from bench to bedside. The authors comprehensively review the anticancer genes and gene delivery methods currently available for cancer gene therapy, including the transfer of genetic material into the cancer cells, stimulation of the immune system to recognize and eliminate cancer cells, and the targeting of the nonmalignant stromal cells that support their growth. They also thoroughly examine the advantages and limitations of the different therapies and detail strategies to overcome obstacles to their clinical implementation. Topics of special interest include vector-targeting techniques, the lessons learned to date from clinical trials of cancer gene therapy, and the regulatory guidelines for future trials. Noninvasive techniques to monitor the extent of gene transfer and disease regression during the course of treatment are also discussed.

Targeted Therapy in Translational Cancer Research

Targeted Therapy in Translational Cancer Research for the Translational Oncology series provides a comprehensive overview of recent developments in our understanding of tumor biology, elucidates the roles of targets and pathways involved in carcinogenesis, and describes current state-of-the-art anticancer therapy, as well as the most promising areas of translational research and targeted therapy. Introduces cutting-edge ‘bench to bedside and back’ breakthroughs which have transformed the diagnosis, prognosis, and treatment of cancer Covers basic principles of targeted therapy, including immunotherapy and the roles of cancer stem cells, the microenvironment, angiogenesis, epigenetics, microRNAs, and functional imaging in precision medicine Summarises major advances in therapeutic management of hematologic malignancies and solid tumors using conventional therapy, targeted therapy, immunotherapy, or novel treatment modalities

Gene Therapy for Cancer

The three sections of this volume present currently available cancer gene therapy techniques. Part I describes the various aspects of gene delivery. In Part II, the contributors discuss strategies and targets for the treatment of cancer. Finally, in Part III, experts discuss the difficulties inherent in bringing gene therapy treatment for cancer to the clinic. This book will prove valuable as the volume of preclinical and clinical data continues to increase.

Gene-Based Therapies for Cancer

Cancer gene therapy is a novel therapy that targets the underlying genetic defects in the cancer cell. Progress in this field has been rapid and gene therapy promises to further extend personalized cancer treatment. In this volume leading experts have contributed their experience in developing gene therapies for a variety of cancers. Translational gene therapy approaches are emphasized. Chapters include discussions of specific gene delivery technologies as well as their application to various cancers with extensive discussions of ongoing clinical trials. This information should be useful to both students, fellows, and experienced scientists with an interest in this rapidly developing area.

Gene Therapy

Gene therapy is becoming a promising technology for the management of many human diseases. Hereditary and acquired disorders can both be tackled using the technique of gene therapy. This book provides detailed, up-to-date topics addressing basic principles of gene therapy and discussing some of the challenges encountered by scientists in developing this relatively novel technology. The development of new and efficient gene transfer vectors is of utmost importance in the progress of the field of gene therapy. Both viral and non-viral vectors are extensively discussed. A detailed chapter elaborates the problem of host immune rejection of transplanted donor cells or engineered tissue that can be avoided using the encapsulation of transgenic cells, thus avoiding the use of drugs that achieve immunosuppression.

Gene Therapy in Cancer

Genes, which are carried on chromosomes, are the basic physical and functional units of heredity. Genes are specific sequences of bases that encode instructions on how to make proteins. Although genes get a lot of attention, it's the proteins that perform most life functions and even make up the majority of cellular structures. When genes are altered so that the encoded proteins are unable to carry out their normal functions, genetic disorders can result. Gene therapy is an experimental treatment that involves introducing genetic material into a person's cells to fight disease. Gene therapy is being studied in clinical trials for many different types of cancer and for numerous other diseases. This new book offers the latest research in a field bursting with new developments, hope and expectations.

New Gene Therapy and Cancer Research

Gene therapy is an experimental treatment that involves introducing genetic material into a person's cells to fight disease. Gene therapy is being studied in clinical trials for many different types of cancer and for numerous other diseases. This book offers research from around the globe dedicated to this subject.

Nonviral Vectors for Gene Therapy

The field of non-viral vector research has rapidly progressed since the publication of the first edition. This new edition is expanded to two separate volumes that contain in-depth discussions of different non-viral approaches, including cationic liposomes and polymers, naked DNA and various physical methods of delivery, as well as a comprehensive coverage of the molecular biological designs of the plasmid DNA for reduced toxicity, prolonged expression and tissue or disease specific genes. New developments such as the toxicity of the non-viral vectors and recent advances in nucleic acid therapeutics are fully covered in these volumes.

Gene Therapy

With advances in our understanding of the molecular biology of human diseases and the development of efficient gene transfer techniques, the treatment of such diseases as cancer and infectious disease using gene therapy has progressed from a distant prospect to a distinct possibility in a very short time. The development of gene transfer methods which are suitable for different forms of therapy has been

a major topic of research over the past several years. A common goal of this research has been to achieve the efficient delivery of genes into cells. The successful implementation of gene transfer as a cure for diseases, however, will continue to require the translation of preclinical studies in gene therapy into effective clinical protocols. This volume outlines the latest developments in cancer treatment using various gene delivery systems, which include cytokine gene transfer, the delivery of anti-ras DNA by retroviral vector and the injection of allogeneic HLA DNA via liposomes. Several of these molecular approaches have recently been approved by the US FDA as human clinical trial protocols in order to assess their therapeutic efficiency and safety for cancer treatment. Further developments in recombinant DNA technology within this field should ultimately lead to dramatic improvements in the practice of medicine.

Cancer Gene Therapy

With the coming of the new millennium we are witnessing a revolution in our understanding of cancer genetics. These are very exciting times. Today we have at our disposal the technology to diagnose abnormalities in our cancer genes and the means to correct the deficit and very soon we will have the complete sequence of the human genome. With the use of gene chip technology the way doctors will be able to assess patients will change completely. Today we can diagnose abnormalities in ten thousand genes and within a short period of time we will be able to screen through our genome and discover potential abnormalities in our proto-oncogenes, tumour suppressor genes, differentiating genes, apoptotic genes and pro-inflammatory genes. In this book various authors have highlighted specific genes that could be expressed, overexpressed, neutralised or h- nessed to achieve cancer control. The problem of transferring the therapeutic gene into the cancer cell has been partly addressed with major developments in the field of naked plasmid DNA, adenovirus, retrovirus and adeno-associated viruses. However, further improvements are yet to be made to achieve significant gene transfer. Gene expression, in particular specificity of gene transfer, is obviously an important issue and one which is highlighted in this book by the use of specific promoter.

Replication-competent Viruses for Cancer Therapy

This book is the first to summarize the molecular principles of modern viral therapy for cancer. It reviews many of the replication-competent viruses currently being investigated for therapeutic use including herpes simplex virus, adenovirus, reovirus, parvovirus, vaccinia virus and Newcastle disease virus, and demonstrates how this approach is being translated to the clinic. Illustrating how virus-host interactions can be exploited for therapy, this book opens up new and promising perspectives for the treatment of cancer. It is therefore recommended reading for clinical investigators in the field of oncology, virologists, cancer immunologists and scientists working in regulatory agencies.

A Guide to Human Gene Therapy

1. Non-viral gene therapy / Sean M. Sullivan -- 2. Adenoviral vectors / Stuart A. Nicklin and Andrew H. Baker -- 3. Retroviral vectors and integration analysis / Cynthia C. Bartholomae [und weitere] -- 4. Lentiviral vectors / Janka Matrai, Marinee K.L. Chuah and Thierry VandenDriessche -- 5. Herpes simplex virus vectors / William F. Goins [und weitere] -- 6. Adeno-Associated Viral (AAV) vectors / Nicholas Muzyczka -- 7. Regulatory RNA in gene therapy / Alfred. S. Lewin -- 8. DNA integrating vectors (Transposon, Integrase) / Lauren E. Woodard and Michele P. Calos -- 9. Homologous recombination and targeted gene modification for gene therapy / Matthew Porteus -- 10. Gene switches for pre-clinical studies in gene therapy / Caroline Le Guiner [und weitere] -- 11. Gene therapy for central nervous system disorders / Deborah Young and Patricia A. Lawlor -- 12. Gene therapy of hemoglobinopathies / Angela E. Rivers and Arun Srivastava -- 13. Gene therapy for primary immunodeficiencies / Aisha Sauer, Barbara Cassani and Alessandro Aiuti -- 14. Gene therapy for hemophilia / David Markusic, Babak Moghimi and Roland Herzog -- 15. Gene therapy for obesity and diabetes / Sergei Zolotukhin and Clive H. Wasserfall -- 16. Gene therapy for Duchenne muscular dystrophy / Takashi Okada and Shin'ichi Takeda -- 17. Cancer gene therapy / Kirsten A.K. Weigel-Van Aken -- 18. Gene therapy for autoimmune disorders / Daniel F. Gaddy, Melanie A. Ruffner and Paul D. Robbins -- 19. Gene therapy for inherited metabolic storage diseases / Cathryn Mah -- 20. Retinal diseases / Shannon E. Boye, Sanford L. Boye and William W. Hauswirth -- 21. A brief guide to gene therapy treatments for pulmonary diseases / Ashley T. Martino, Christian Mueller and Terence R. Flotte -- 22. Cardiovascular disease / Darin J. Falk, Cathryn S. Mah and Barry J. Byrne

Gene Therapy and Cancer Research Focus

Genes, which are carried on chromosomes, are the basic physical and functional units of heredity. Genes are specific sequences of bases that encode instructions on how to make proteins. Although genes get a lot of attention, it's the proteins that perform most life functions and even make up the majority of cellular structures. When genes are altered so that the encoded proteins are unable to carry out their normal functions, genetic disorders can result. Gene therapy is an experimental treatment that involves introducing genetic material into a person's cells to fight disease. Gene therapy is being studied in clinical trials for many different types of cancer and for numerous other diseases. The volume presents significant new research results in this promising field.

In Vivo and Ex Vivo Gene Therapy for Inherited and Non-Inherited Disorders

Ongoing advances in pharmaceutical biotechnology have paved the way to ground-breaking new biological therapeutic modalities, offering the possibility of a durable curative approach for a number of life-threatening diseases, for which the medical need is as yet unmet. Over the past decades, gene therapy has seen a massive transformation from a proof-of-concept approach to a clinical reality culminating in the regulatory approval of state-of-the-art products in the European Union and in the United States. This book captures some of the scientific progresses notably in gene transfer technologies and translational development of in vivo and ex vivo gene therapy interventions in the treatment of a broad range of complex and debilitating non-inherited and inherited disorders such as: human immunodeficiency virus 1 (HIV-1) infection, cancer, cystic fibrosis, hereditary retinopathies, haemophilia B, cardiac diseases, and chronic liver fibrosis.

Current Strategies in Cancer Gene Therapy

This book describes important developments and emerging trends in experimental and clinical cancer gene therapy. It reflects the tremendous advances made over recent years with respect to immuno-genes, suicide genes and gene correction therapies, as well as in gene suppression and miRNA therapies. Many of the described strategies focus on the generation of more efficient and specific means of attack at known and novel cellular targets associated with tumor development and progression. The book also details parallel improvements in vector design, vector delivery, and therapeutic efficacy. It offers readers a stimulating, broad overview of advances in the field, linking experimental strategies to their clinical applications.

Gene Therapy of Cancer

Despite various difficulties, the field of gene therapy, particularly with regard to cancer, has accumulated a tremendous amount of vital pre-clinical and clinical data. "Gene Therapy of Cancer: Methods and Protocols, Second Edition" fully updates the first edition with expert coverage of established and novel protocols involving both experimental and clinical approaches to cancer gene therapy. This state-of-the-art volume contains overviews of new concepts and strategies with chapters on regulatory and ethical issues, developments, problems and possible limitations of design and production of gene therapeutics as well as translational issues. Written in the highly successful Methods in Molecular BiologyTM series format, chapters include introductions to their respective topics, lists of the necessary materials and reagents, step-by-step, readily reproducible protocols, and notes on troubleshooting and avoiding known pitfalls. Cutting edge and authoritative, "Gene Therapy of Cancer: Methods and Protocols, Second Edition" is an ideal guide for all those who wish to explore the fast-paced and critical study of nonviral, viral, experimental and clinical cancer gene therapy.

Nonviral Vectors for Gene Therapy, Part 1

The field of non-viral vector research has rapidly progressed since the publication of the first edition. This new edition is expanded to two separate volumes that contain in-depth discussions of different non-viral approaches, including cationic liposomes and polymers, naked DNA and various physical methods of delivery, as well as a comprehensive coverage of the molecular biological designs of the plasmid DNA for reduced toxicity, prolonged expression and tissue or disease specific genes. New developments such as the toxicity of the non-viral vectors and recent advances in nucleic acid therapeutics are fully covered in these volumes.

Viral Vectors in Cancer Immunotherapy

Viral Vectors in Cancer Immunotherapy, Volume 379 in the International Review of Cell and Molecular Biology presents the latest on cancer immunotherapy and how it has transformed cancer treatment through advances in immune checkpoint inhibitors and adoptive cell therapy. Chapters in this new release include Past, present and future of viral vectors in cancer immunotherapy, Alphaviruses in cancer immunotherapy, Adenoviral-based cancer gene therapy, Armored modified vaccinia Ankara in cancer immunotherapy, Strategies of Semliki Forest virus in immuno-oncology, Maraba virus in cancer immunotherapy, Oncolytic viruses in hematological malignancies, Oncolytic virus for cancer therapies: Overview and future directions, and more. The use of genetically modified viruses allows the expression of pro-inflammatory molecules, while the immune system receives danger signals from the viruses themselves. In some cases, the virus can also induce tumor cell death. This book will review advances in virus-based cancer immunotherapy in both solid tumors and hematologic malignancies. Provides an overview of the landscape of virotherapy for solid tumors and hematologic malignancies Reviews advances in alphaviruses, adenoviruses, vaccinia viruses and Maraba virus Presents lessons on how to improve viruses to enhance immune responses

Nonviral Vectors for Gene Therapy

The field of genetics is rapidly evolving, and new medical breakthroughs are occurring as a result of advances in our knowledge of genetics. Advances in Genetics continually publishes important reviews of the broadest interest to geneticists and their colleagues in affiliated disciplines. Includes methods for testing with ethical, legal, and social implications Critically analyzes future directions Written and edited by recognized leaders in the field

Gene Therapy and Gene Delivery Systems

1 D.V. Schaffer, W. Zhou: Gene Therapy as Future Human Therapeutics.- 2 J. Heidel, S. Mishra, M.E. Davis: Molecular Conjugates.- 3 M. Manthorpe, P. Hobart, G. Hermanson, M. Ferrari, A. Geall, B. Goff, A. Rolland: Plasmid Vaccines and Therapeutics: From Design to Applications.- 4 S.R. Little, R. Langer: Non-Viral Delivery of Cancer Genetic Vaccines.- 5 J.C. Grieger, R.J. Samulski: Adeno-Associated Virus as a Gene Therapy Vector: Vector Development, Production and Clinical Applications.- 6 J.H. Yu, D.V. Schaffer: Advanced Targeting Strategies for Murine Retroviral and Adeno-Associated Viral Vectors.- 7 N. Loewen, E.M. Poeschla: Lentiviral Vectors.- 8 N.E. Altaras, J.G. Aunins, R.K. Evans, A. Kamen, J.O. Konz, J.J. Wolf: Production and Formulation of Adenovirus Vectors.-

Viral Therapy of Cancer

In the last decade there has been an explosion of interest in viral therapies for cancer. Viral agents have been developed that are harmless to normal tissues but selectively able to kill cancer cells. These agents have been endowed with additional selectivity and potency through genetic manipulation. Increasingly these viruses are undergoing evaluation in clinical trials, both as single agents and in combination with standard chemotherapy and radiotherapy. This book provides a comprehensive yet succinct overview of the current status of viral therapy of cancer. Chapters coherently present the advances made with individual agents and review the biological and clinical background to a range of viral therapies: structured to proceed from basic science at the bench to the patient’s bedside, they give an up-to-date and realistic evaluation of a therapy’s potential utility for the cancer patient. Presents state of the art knowledge on how viruses can be, and have been, used in novel therapeutic approaches for the treatment of cancer Describes the use of viruses as oncolytic agents, killing cells directly Editors are experts in the field, with experience of both laboratory and clinical research Viral Therapy of Cancer is essential reading for both basic scientists and clinicians with an interest in viral therapy and gene therapy.

Gene Therapy

This book is a collection of preclinical and clinical reports on the application of gene therapy to human disease. The two methods available for delivering therapeutic genes to diseased cells, viral and non-viral vector systems, are detailed and characterized. Several reports describe both approaches currently used in gene therapy: the introduction of a wild-type gene to restore normal gene function in diseased cells, and the use of antisense molecules to hinder abnormal gene expression. Clinical studies detail several different strategies for the treatment of cancer and cardiovascular diseases, using genetic material as therapeutic agents. The regulatory issues governing the use of gene therapy in

Europe and the United States are also presented. This book highlights the range of applications and demonstrates the rapid progress being made in the field of gene therapy.

Non-Viral Gene Therapy

This book focuses on recent advancement of gene delivery systems research. With the multidisciplinary contribution in gene delivery, the book covers several aspects in the gene therapy development: various gene delivery systems, methods to enhance delivery, materials with modification and multifunction for the tumor or tissue targeting. This book will help molecular biologists gain a basic knowledge of gene delivery vehicles, while drug delivery scientist will better understand DNA, molecular biology, and DNA manipulation.

Gene Therapy, An Issue of Hematology/Oncology Clinics of North America, E-Book

This issue of Hematology/Oncology Clinics will focus on Gene Therapy. Topics include, but are not limited to Historical Perspective and Current Renaissance, Integrating Vectors, Nonintegrating Vectors, Gene Editing, Conditioning Therapies for Autologous HSCT, Approaches to Immunodeficiency, Approaches to Hemoglobinopathy, Approaches to Hemophilia, Hematopoietic Gene Therapies for Neurologic and Metabolic Disease, Gene Therapy Approaches to HIV and other Infectious Diseases, HSC Approaches to Cancer, and Gene Modified T Cell Therapies for Cancer.

Translating Gene Therapy to the Clinic

Translating Gene Therapy to the Clinic, edited by Dr. Jeffrey Laurence and Michael Franklin, follows the recent, much-lauded special issue of Translational Research in emphasizing clinical milestones and critical barriers to further progress in the clinic. This comprehensive text provides a background for understanding the techniques involved in human gene therapy trials, and expands upon the disease-specific situations in which these new approaches currently have the greatest therapeutic application or potential, and those areas most in need of future research. It emphasizes methods, tools, and experimental approaches used by leaders in the field of translational gene therapy. The book promotes cross-disciplinary communication between the sub-specialties of medicine, and remains unified in theme. Presents impactful and widely supported research across the spectrum of science, method, implementation and clinical application Offers disease-based coverage from expert clinician-scientists, covering everything from arthritis to congestive heart failure, as it details specific progress and barriers for current translational use Provides key background information from immune response through genome engineering and gene transfer, relevant information for practicing clinicians contemplating enrolling patients in gene therapy trials

Gene Therapy Protocols

In this book internationally recognized investigators describe cutting-edge laboratory techniques for the study of Production and In Vivo Applications of Gene Transfer Vectors and Design and Characterization of Gene Transfer Vectors. Readers will find a comprehensive resource of current and emerging methods for the production of viral and non-viral gene transfer vectors, as well as detailed protocols for applications in stem cell biology, cancer research and infectious disease.

Gene Therapy in the Treatment of Cancer

Reviews progress and considers future developments in the fast-evolving field of gene therapy in oncology.

Viral Vectors for Targeted Gene Therapy of Cancer

This book deals with current developments in the study of gene delivery structures. With interdisciplinary inputs in gene delivery, the book covers a number of aspects in the gene therapy enhancement, covering nanoparticles for gene therapy, nanomedicine based approaches to cancer diagnosis and therapy. This book will assist experts in comprehending the fundamental knowledge of gene delivery vehicles, DNA molecular biology and DNA management.

Non-Viral Gene Therapy: Volume II

In the first volume, readers will find a comprehensive resource of current and emerging methods for the production of viral and non-viral gene transfer vectors, as well as detailed protocols for critical applications in stem cell biology, cancer, diabetes, HIV and tissue engineering. In the second volume, readers will find a comprehensive resource of current and emerging methods for the processing and characterization of viral and non-viral gene transfer vectors, as well as promising approaches to design vectors for efficient, targeted and regulated gene delivery and expression.

Gene Therapy Protocols

The field of non-viral vector research has rapidly progressed since the publication of the first edition. This new edition is expanded to two separate volumes that contain in-depth discussions of different non-viral approaches, including cationic liposomes and polymers, naked DNA and various physical methods of delivery, as well as a comprehensive coverage of the molecular biological designs of the plasmid DNA for reduced toxicity, prolonged expression and tissue or disease specific genes. New developments such as the toxicity of the non-viral vectors and recent advances in nucleic acid therapeutics are fully covered in these volumes.

Nonviral Vectors for Gene Therapy, Part 1

We are producing a gene delivery vehicle that uses unique features of viral proteins in a targeted, non-viral gene delivery system. The key features of this system that will lend themselves to gene therapy are: 1) the missile-like targeting capacity; 2) the capacity to transport DNA, and therefore, therapeutic genes; 3) the lack of size restriction, and therefore, the potential capacity to carry any size gene; 4) the lack of viral genes, and therefore, virulence; and, 5) the enhanced ability to enter cells and deliver therapeutic genes. While we expect this system to retain some of the best properties of viral vectors while taking advantage of mechanisms that viruses have evolved to efficiently enter cells, we also expect this system to improve on these mechanisms by introducing cell type-specific targeting capabilities. Because this system is non-viral in nature, it avoids problems inherent in biologic agents, thus enabling pharmaceutical quality control over the final preparations. Potential application of this system includes, but is not limited to, the targeted delivery of therapeutic genes or drugs for cancer treatment or gene replacement therapy.

A Novel Gene Delivery System Targeted to Breast Cancer Cells

Adenoviral Vectors for Gene Therapy, Second Edition provides detailed, comprehensive coverage of the gene delivery vehicles that are based on the adenovirus that is emerging as an important tool in gene therapy. These exciting new therapeutic agents have great potential for the treatment of disease, making gene therapy a fast-growing field for research. This book presents topics ranging from the basic biology of adenoviruses, through the construction and purification of adenoviral vectors, cutting-edge vectorology, and the use of adenoviral vectors in preclinical animal models, with final consideration of the regulatory issues surrounding human clinical gene therapy trials. This broad scope of information provides a solid overview of the field, allowing the reader to gain a complete understanding of the development and use of adenoviral vectors. Provides complete coverage of the basic biology of adenoviruses, as well as their construction, propagation, and purification of adenoviral vectors Introduces common strategies for the development of adenoviral vectors, along with cut-ting-edge methods for their improvement Demonstrates noninvasive imaging of adenovirus-mediated gene transfer Discusses utility of adenoviral vectors in animal disease models Considers Federal Drug Administration regulations for human clinical trials

Adenoviral Vectors for Gene Therapy

As human gene therapy becomes a clinical reality, a new era in medicine dawns. Novel and innovative developments in molecular genetics now provide opportunities to treat the genetic bases of diseases often untreatable before. Somatic Gene Therapy documents these historical clinical trials, reviews current advances in the field, evaluates the use of the many different cell types and organs amenable to gene transfer, and examines the prospects of various exciting strategies for gene therapy.

Somatic Gene Therapy

This book aims at providing an up-to-date report to cover key aspects of existing problems in the emerging field of targets in gene therapy. With the contributions in various disciplines of gene therapy,

the book brings together major approaches: Target Strategy in Gene Therapy, Gene Therapy of Cancer and Gene Therapy of Other Diseases. This source enables clinicians and researchers to select and effectively utilize new translational approaches in gene therapy and analyze the developments in target strategy in gene therapy.

Targets in Gene Therapy

GLOBAL EPIDEMIOLOGY OF CANCER Cancer is the second highest cause of death in the United States, and a leading cause of death globally. Our goals are to discuss the global epidemiology of various cancers, with detailed information on their prevalence, incidence, and clinical considerations. Epidemiology is the key to understanding the mortality and morbidity of cancer, and how we can prevent, diagnose, and treat the disease. Prevention of cancer is essential for saving lives. Prevalence and incidence of cancer are key factors that each government and population must be aware of. Advances in the study of cancer occur on a regular basis, and this book provides the latest insights about relationships between the disease and stem cells, tumorigenesis, molecular interactions, pathways, channels, and immunity. Global Epidemiology of Cancer: Diagnosis and Treatment meets the needs of readers by providing current information about epidemiology (including molecular epidemiology), diagnosis, and treatment. Providing logical, step-by-step information on various cancers, this book consolidates all of the most up-to-date information and data from verified studies on all different types of cancers in the United States and throughout the world. Chapters are presented so that each includes an overview, clinical manifestations, epidemiology, pathophysiology, etiology and risk factors, diagnosis, treatment, prevention, and prognosis. Global Epidemiology of Cancer: Diagnosis and Treatment will be invaluable to graduate and postgraduate students, including medical students; nurses; physician assistants; residents in oncology; public health students and allied health students.

Global Epidemiology of Cancer

NANOTECHNOLOGY IN MEDICINE Discover thorough insights into the toxicology of nanomaterials used in medicine In Nanotechnology in Medicine: Toxicity and Safety, an expert team of nanotechnologists delivers a robust and up-to-date review of current and future applications of nanotechnology in medicine with a special focus on neurodegenerative diseases, cancer, diagnostics, nano-nutraceuticals, dermatology, and gene therapy. The editors offer resources that address nanomaterial safety, which tends to be the greatest hurdle to obtaining the benefits of nanomedicine in healthcare. The book is a one-stop resource for recent and comprehensive information on the toxico logical and safety aspects of nanotechnology used in human health and medicine. It provides readers with cutting-edge techniques for delivering therapeutic agents into targeted cellular compartments, cells, tissues, and organs by using nanoparticulate carriers. The book also offers methodological considerations for toxicity, safety, and risk assessment. Nanotechnology in Medicine: Toxicity and Safety also provides readers with: A thorough introduction to the nanotoxicological aspects of nanomedicine, including translational nanomedicine and nanomedicine personalization Comprehensive introductions to nanoparticle toxicity and safety, including selenium nanoparticles and metallic nanoparticles Practical discussions of nanotoxicology and drug delivery, including gene delivery using nanocarriers and the use of nanomaterials for ocular delivery applications In-depth examinations of nanotechnology ethics and the regulatory framework of nanotechnology and medicine Perfect for researchers, post-doctoral candidates, and specialists in the fields of nanotechnology, nanomaterials, and nanocarriers, Nanotechnology in Medicine: Toxicity and Safety will also prove to be an indispensable part of the libraries of nanoengineering, nanomedicine, and biopharmaceutical professionals and nanobiotechnologists.

Nanotechnology in Medicine