Gene Therapy For Autoimmune And Inflammatory Diseases Milestones In Drug Therapy

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Conquering Rheumatoid Arthritis Thomas F. Lee . . . A splendid book. Literate and endlessly interesting. It is perhaps the best detailed explanation of rheumatoid arthritis [RA] and its treatment in existence. I highly recommend it to patients with this illness who really want to know more about RA. And it is not only for patients: nurses, physical and occupational therapists, and many physicians could read this book with much profit. Highly recommeded.--Frederick Wolfe, M.D., Director, National Data Bank for Rheumatic Diseases, Arthritis Research Center FoundationAs a biologist with more than thirty years of experience teaching a wide range of complex biomedical subjects and a person who suffers from rheumatoid arthritis (RA) himself, Dr. Thomas F. Lee is ideally suited to write a book that addresses the vital questions about the nature of the disease and the rationale behind its treatment. This is the only book that explains in layperson's terms the newest available therapies and the latest advances in our understanding of this often debilitating disease. These new insights have led to many molecular-based approaches already in clinical trial, and many more are waiting in the wings. All of these exciting developments are the result of the ongoing biotechnological revolution and a new understanding of the immune system aided by genetic research.Over two million people in this country suffer from rheumatoid arthritis (RA), a debilitating autoimmune disease that ravages the delicate lining of the joints. As in other autoimmune diseases, instead of defending against foreign invaders, the immune system inexplicably attacks healthy tissue. RA causes systemic effects as well; not only are joints painful, through the destruction of bone and cartilage, but there is often accompanying fatigue, decreased appetite, depression, and muscle pain.Dr. Lee not only supplies you with the latest facts on the discoveries about the disease, but he also provides numerous Web sites so that readers can follow this important story as it unfolds.Thomas F. Lee (Goffstown, NH) is professor of microbiology and biotechnology at St. Anselm College and the author of the critically acclaimed The Human Genome Project: Cracking the Genetic Code of Life and Gene Future: The Promise and Perils of the New Biology.

Stem Cell Transplantation Carlos López-Larrea 2012-03-28 Organ transplantation has been the most important therapeutic advance in the last third of the 20th century. Its development has revolutionized medicine, as demonstrated by the fact that a large number of researchers in this field have been awarded Nobel Prizes. In the beginning of this century, we are witnessing with great expectations the emergence of a new field

of medicine related to the arrival of a new player on the scene: “stem cells” and their potential use in regenerative medicine. This volume aims to cover important aspects of the various facets of organ transplantation and regenerative medicine, with leading specialists in these fields setting out their vision. We try to rigorously explain current and novel scientific research in these fields—areas which arouse great interest from society in general, due to their potential use in modern medicine for the treatment of a great number of diseases.

Immunogenetics: A Molecular and Clinical Overview Muneeb U. Rehman 2021-11-30 A Molecular Approach to Immunogenetics, Immunogenetics: A Molecular and Clinical Overview, Volume One provides readers with an exclusive, updated overview on the scientific knowledge, achievements and findings in the field of immunogenetics. The book presents readily available, updated information on the molecular and clinical aspects of immunogenetics, from origin and development to clinical applications and future prospects. The breadth of information goes from basics to developments, clinical applications and future prospects. The book's most attractive attribute is its academic and clinical amalgamation that covers both the theoretical and practical aspects of immunogenetics. An additional feature of the book is a special chapter on viral genetics that covers COVID-19. Above all, the book contains chapters that discuss immunogenetics in relation to pharmaco-genomics and immune-toxicology. Contains exclusive information about research on immunogenetics from around the globe Includes minute and recent details that will be the prerequisite requirement for any researcher who wants to work on immunogenetics and its applications Comes fully-equipped with pictures, illustrations and tables that deliver information in a meticulous manner

Gene Therapy for Autoimmune and Inflammatory Diseases Yuti Chernajovsky 2011-01-28 In this monograph about gene therapy of autoimmune and inflammatory d- orders we have gathered international experts and leaders from different fields to review the state of the art advances on topics ranging from disease entities to vectors and engineered cells. The different approaches described in each chapter take into consideration the biomedical knowledge of these diseases and address the complexities of delivering long-term genetic interventions. Gene therapy also serves as a testing ground for new therapeutic entities and helps provide proof of principle for their potential therapeutic role in animal models of disease. Scaling up from mice to men still remains an important h- dle not only from the quantitative point of view, but also for currently unknown and unexpected secondary effects of the vector or the transgene. Some of these approaches have already been tested in the clinic, but much more needs to be done to understand the human conditions treated and the n- ural history of their pathology. We are indebted to the secretarial assistance of Ms. Lin Wells (Bone and Joint Research Unit, London, UK) and the help of Hans Detlef Klüber for his help in getting this book published. We hope this book will be of interest to c- nicians and scientists and inspiring to students of the subject who will use their own ingenuity and knowledge to further forward this discipline into clinical use.

Sjogren's Syndrome Alessia Alunno 2016-06-07 Sjogren's Syndrome: Novel Insights in Pathogenic, Clinical and Therapeutic Aspects provides the reader with an overview of current knowledge about Sjogren's Syndrome. The book summarizes the huge amount of literature concerning related advances in genetic background, pathogenesis, clinical picture, and therapeutic approaches. It integrates basic immunology concepts, clinical aspects, and pharmacological issues. Scientific progress has allowed us to unmask novel pathogenic mechanisms, to perform genome wide studies, and to identify clinical and serological features associated with different disease subsets and, eventually, different disease prognoses. In addition, the increasing knowledge about SS pathogenesis provides the rationale to employ targeted therapies in SS as has already occurred in rheumatoid arthritis and systemic lupus erythematosus. Discusses heterogeneity of topics and audience, from basic immunology to clinical aspects and therapeutics Provides novel lines of investigation and supports the management of patients requiring novel therapeutic approaches Presents a deeper knowledge on SS clinical management as well as on immunological

aspects possibly leading to new lines of investigation Offers a bridge between the clinician and the scientist, and vice versa Provides the reader with most recent and relevant updates due to the novelty of topics

Translational Studies on Inflammation Ane C.F. Nunes 2020-01-08 Inflammation is known worldwide, from the bench to the bedside, but it is a hard theme to approach with one single point of view.In this sense, a selection of translational studies would support the medical-scientific community to better understand the complex network of the inflammatory process, its maintenance, and potential treatment targets. The eleven chapters that compose this book present interesting insights into inflammation and its mechanisms, merging classic background with innovative approaches. From the molecular basis to experimental models, the chapters selected for this book bring to readers at different academic levels updated and practical data on inflammation. Find out what drives interdisciplinary medical research on inflammation and enjoy this informative collection.

Monoclonal Antibodies Kresina 1991-03-29 Presents a sampling of new and novel approaches to the amelioration of musculoskeletal disease pathology, emphasizing prevention and therapy. Where applicable, these new technologies are focused on their application to human autoimmune diseases, but the volume mainly discusses and details the use of

Moderate to Severe Psoriasis, Fourth Edition John Y. M. Koo 2014-03-18 Written by experts in the dermatology field, this new fourth edition of Moderate-to-Severe Psoriasis discusses the current use of biologics and other pharmacologic and phototherapy treatments for moderate-to-severe psoriasis. Illustrated with high quality color figures, this standalone text emphasizes safe and effective treatments for the psoriasis patient that are perfect for the dermatologist in daily practice. New to this edition are chapters on day treatment programs, new agents, erythrodermic and pustular psoriasis, special populations, and pharmacogenetics.

Gene Therapy of Autoimmune Disease Gerald J. Prud'homme 2008-11-01 Autoimmune diseases are diverse and responsible for considerable morbidity. Their etiology remains largely unknown, and current therapy with anti-inflammatory drugs is prone to adverse effects, and rarely curative. New therapies with anti-cytokine antibodies or receptors are promising, but require frequent administration of expensive protein drugs. Gene Therapy of Autoimmune Diseases comprehensively reviews research in gene therapy for autoimmune diseases with viral or non-viral vectors. Gene therapy offers the possibility of long-term, continuous delivery of a wide variety of immunosuppressive, anti-inflammatory, or tolerance-inducing agents. Moreover, highly specific genetically modified cells can be produced. This book discusses the most promising avenues in this exciting new field.

Monoclonal Antibodies Thomas F. Kresina 2020-08-26 Presents a sampling of new and novel approaches to the amelioration of musculoskeletal disease pathology, emphasizing prevention and therapy. Where applicable, these new technologies are focused on their application to human autoimmune diseases, but the volume mainly discusses and details the use of

Novel Therapeutic Agents for the Treatment of Autoimmune Diseases Vibeke Strand 1996-09-19 Provides a detailed survey of therapies for autoimmune diseases, exploring the rationale for their use and clinical data regarding their potential benefit.

Stem Cell Therapy for Autoimmune Disease Richard K. Burt 2019-11-11 Stem cell transplantation may be complicated by treatment-related mortality and like the immune system that it regenerates has equal potential to either create and preserve or destroy. The dual nature that defines stem cells is differentiation that ultimately leads to death and self-renewal, which leads to immortality. What types of stem cells are there? How are they collected? What are their attributes and characteristics? This textbook devotes many chapters to familiarize the reader with the basic science, clinical aspects, and new questions being raised in the field of stem cell biology. Blood stem cells for tolerance and tissue regeneration are a rapidly developing research and clinical field that is being applied to autoimmune diseases. In clinical trials, autologous hematopoietic (blood) stem cells are being used to reduce the cytopenic interval

following intense immune suppressive transplant regimens. While as yet not delineated, some possible mechanisms and pathways leading to tolerance after hematopoietic stem cell transplantation are suggested in these chapters. Tissue regeneration from blood stem cells is also suggested by animal experiments on stem cell plasticity or metamoirosis (i.e., change in fate) as described within this textbook. Ongoing early clinical trials on tissue regeneration from blood stem cells are described in the chapter on stem cell therapy for cardiac and peripheral vascular disease. Whether autologous hematopoietic stem cells, through the process of mobilization and reinfusion, may be manipulated to contribute to tissue repair in autoimmune diseases is a future area for translational research.

Metagenomics of the Human Body Karen E. Nelson 2010-11-16 The book brings a completely different perspective than available books by combining the information gained from the human genome with that derived from parallel metagenomic studies, and new results from investigating the effects of these microbes on the host immune system. Although there are a number of books that focus on the human genome that are currently available, there are no books that bring to the forefront the mix of the human genome and the genomes and metagenomes of the microbial species that live within and on us.

Therapeutic Immunosuppression A.W. Thomson 2012-12-06 Therapeutic immunosuppression has very broad applications in clinical medicine, ranging from prevention and treatment of organ and bone marrow transplant rejection, management of various autoimmune disorders (e.g., rheumatoid arthritis), skin disease, and asthma. Whereas traditionally only a small repertoire of immunosuppressive agents was available for clinical use, recent discoveries have significantly increased the number of approved agents, resulting in numerous trials to further evaluate their potential. In addition, products of the biotechnology industry - monoclonal antibodies, cytokines, cytokine antagonists, and other products of genetic engineering that target key molecular pathways in disease pathogenesis - have either already made, or are on the verge of making an important impact on treatment. There is also considerable interest in the potential of cell-based therapies (particularly hematopoietic stem and dendritic cell therapy) of allo- and autoimmunity. Important recent advances in the immunotherapy of allergic diseases are also covered in this book. Gene therapy offers considerable promise for suppressing pathogenic processes in either transplantation or autoimmune disorders. The possibility of combining these important new advances to maximize benefit to the patient, and to minimize possible untoward effects (which are also given extensive coverage in this book), is one of the most exciting challenges of contemporary medicine. This volume is intended both for practising physicians and surgeons and for biomedical scientists at the graduate/postdoctoral levels, and is designed to provide the theory behind these various approaches to immunosuppression, and to provide state-of-the-art reviews of current developments in each area. Each chapter is contributed by one or more experts in the field. There was a need to bring this information together in a single volume, as much of the key recent developments have been dispersed throughout the biomedical literature, largely in specialized journals. Since, as in the past, important developments in immunosuppressive therapy in one branch of medicine (i.e. transplantation) are likely to benefit another (e.g., dermatology, rheumatology, gastroenterology), cross-disciplinary coverage of the mechanistic basis of the various therapeutic strategies in a single volume is likely to convey the potential of advances in therapy in the most coherent manner possible.

Innate Immunity in Health and Disease Shailendra K. Saxena 2021-08-25 The book focuses on various aspects and properties of innate immunity, whose deep understanding is integral for safeguarding the human race from further loss of resources and economies due to innate immune response-mediated diseases. Throughout this book, we examine the individual mechanisms by which the innate immune response acts to protect the host from pathogenic infectious agents and other non-communicable diseases. Written by experts in the field, the volume discusses the significance of macrophages in infectious disease, tumor

metabolism, and muscular disorders. Chapters cover such topics as the fate of differentiated macrophages and the molecular pathways that are important for the pathologic role of macrophages.

Immunotherapy Krassimir Metodiev 2017-04-26 This is another attempt of InTechOpen to continue the dissemination of international knowledge and experience in the field of immunology. The present book includes a number of modern concepts of specialists and experts in the field of immunotherapy, covering the major topics and analyzing the history, current stage, and future ideas of application of modern immunomodulation. It is always a benefit, but also a compliment, to gather a team of internationally distinguished authors and to motivate them to reveal their expertise for the benefit of medical science and health practice. On behalf of all readers, immunologists, immunogeneticists, biologists, oncologists, microbiologists, virologists, hematologists, chemotherapists, health-care experts, as well as students and medical specialists, also on my personal behalf, I would like to extend my gratitude and highest appreciation to InTechOpen for giving me the unique chance to be the editor of this exclusive book.

Handbook Of Immunological Properties Of Engineered Nanomaterials (Second Edition) (In 3 Volumes) Dobrovolskaia Marina A 2016-01-28 This unique book provides comprehensive overview of the field of immunology related to engineered nanomaterials used for biomedical applications. It contains literature review, case studies and protocols. The book can serve as a source of information about nanoimmunotoxicology for both junior scientists and experts in the field. The authors have more than 10 years of experience with preclinical characterization of engineered nanomaterials used for medical applications, and they share their experience with the readers. In addition, the international team of experts in the field provides the opinion and share the expertise on individual topics related to nanoparticle physicochemical characterization, hematocompatibility, and effects on the immune cell function . The second edition contains updated chapters from the first edition plus new chapters covering areas of tumor immunology, nanoparticle interaction with lymphatic system, mathematical modeling of protein corona, utilization of nanoparticles for the delivery of antiviral drugs, extensive analysis of nanoparticle anti-inflammatory and immunosuppressive properties, novel ways of protecting therapeutic nanoparticles from the immune recognition, as well as case studies regarding nanoparticle sterilization, complement activation, protein binding and immunotherapy of cancer. The second edition comes in 3 volumes. Volume 1 is focused on nanoparticle characterization, sterility and sterilization, pyrogen contamination and depyrigenation. It also contains overview of regulatory guidelines, protocols for in vitro and in vivo immunotoxicity studies, and correlation between in vitro and in vivo immunoassays. Volume 2 is focused on hematocompatibility of nanomaterials. It provides comprehensive review and protocols for investigating nanoparticle interaction with erythrocytes, platelets, endothelial cells, plasma coagulation factors and plasma proteins forming so called 'corona' around nanoparticles. Volume 3 is dedicated to nanoparticle interaction with and effects on the immune cell function. It also contains examples of nanoparticle use for delivery of antiviral and anti-inflammatory drugs.

Therapeutic Targets of the TNF Superfamily Iqbal S. Grewal 2009-09-17 Tumor necrosis factor (TNF) superfamily is a rapidly growing family of cytokines that interacts with a corresponding superfamily of receptors. Liga- receptor interactions of this superfamily are involved in numerous biological processes ranging from hematopoiesis to pleiotropic cellular responses, including activation, proliferation, differentiation, and apoptosis. The particular response depends on the receptor, the cell type, and the concurrent signals received by the cell. Worldwide interest in the TNF field surged dramatically early in 1984 with the cloning and defining of the profound cellular effects of the first member of this family, TNF . Subsequently, the major influence of TNF on the development and functioning of the immune system was established. Today, over 20 human TNF ligands and their more than 30 corresponding receptors have been identified. Few receptors still remain orphans. What has emerged over the years is that most TNF ligands bind to one distinct receptor and some of the TNF ligands are able to bind to multiple TNF

receptors, explaining to some extent the apparent disparity in the number of TNF receptors and ligands. Yet, in spite of some redundancy in TNF ligand/receptor interactions, it is clear that in vivo spatial, temporal, and indeed cell- and tissue-specific expression of both ligands and their receptors are important factors in determining the precise nature of cellular, physiological and pathological processes they control. TNF superfamily has been the most highly investigated area of basic medical research for over two decades.

Multiple Sclerosis Richard Spilsbury 2018-07-15 Multiple sclerosis, a progressive autoimmune disorder that affects the central nervous system, usually develops between the ages of twenty and fifty. This guide to multiple sclerosis describes the difference between the four types of the disease and how sufferers can manage their symptoms through medications such as corticosteroids. Though scientists are unsure what causes MS or how to prevent it from flaring up, readers will learn about new research into the genetic factors of the disease that could lead to new gene therapy treatments.

Mosaic of Autoimmunity Carlo Perricone 2019-02-15 The Mosaic of Autoimmunity: The Novel Factors of Autoimmune Diseases describes the multifactorial origin and diversity of expression of autoimmune diseases in humans. The term implies that different combinations of factors in autoimmunity produce varying and unique clinical pictures in a wide spectrum of autoimmune diseases. Most of the factors involved in autoimmunity can be categorized into four groups: genetic, immune defects, hormonal and environmental factors. In this book, the environmental factors are reviewed, including infectious agents, vaccines as triggers of autoimmunity, smoking and its relationship with rheumatoid arthritis, systemic lupus erythematosus, thyroid disease, multiple sclerosis and inflammatory bowel diseases. An entirely new syndrome, the autoimmune/inflammatory syndrome induced by adjuvants (ASIA), is also included, along with other diseases that are now recognized as having an autoimmune etiopathogenesis. Highlights the concept of the mosaic of autoimmune manifestations Includes new visions on unsuspected molecules Provides updated knowledge to physicians helping patients with autoimmune diseases Presents thorough, up-to-date information on specific diseases, along with clinical applications

Th 17 Cells: Role in Inflammation and Autoimmune Disease Valérie Quesniaux 2009-03-12 The IL-17 cytokines represent a novel family of cytokines, which defines a new effector T cell, the Th17 cell, and extend the Th1-Th2 paradigm. Th17 cells in part co-express at least IL-17A and IL-17F, IL-21 and IL-22. IL-17 A/F are produced by T cells (and), iNKT cells, and possibly neutrophils, dendritic cells and Paneth cells. The regulation of IL-17 family member's expression, and the identification of effector mechanisms are an area of intense current research. Recognized regulators of IL-17A expression include the nuclear receptor ROR t, proinflammatory cyt- ines such as IL-1, IL-6 with TGF- , IL-21, IL-23 IL-25 in the absence of IFN- and IL-4, which are discussed. Recent data suggest that IL-17A may have a dual fu- tion – pro-inflammatory and anti-inflammatory- suggesting that IL-17A may also contribute to terminate inflammation. Further, a reciprocal regulation of Th17 and regulatory T cells including the role of retinoic acid and TGF- is discussed. The discovery that patients with rheumatoid arthritis, allergic disorders, psor- sis and inflammatory bowel disease express IL-17A generated interest in the medical community and instigated a flurry of experimental research on the potential role of Th17 in inflammatory diseases. Experimental studies confirmed that IL-17A is induced and is critical for the development of allergic lung inflammation, arthritis, bacterial sepsis, experimental allergic encephalomyelitis and myocarditis, as well as other inflammatory con- tions including organ transplantation. The role of IL-17F and IL-22 is still poorly defined and is only slowly emerging.

Innovative Medicine Kazuwa Nakao 2015-10-13 This book is devoted to innovative medicine, comprising the proceedings of the Uehara Memorial Foundation Symposium 2014. It remains extremely rare for the findings of basic research to be developed into clinical applications, and it takes a long time for the process to be achieved. The task of advancing the development of basic research into clinical reality lies with translational science, yet the field

seems to struggle to find a way to move forward. To create innovative medical technology, many steps need to be taken: development and analysis of optimal animal models of human diseases, elucidation of genomic and epidemiological data, and establishment of “proof of concept”. There is also considerable demand for progress in drug research, new surgical procedures, and new clinical devices and equipment. While the original research target may be rare diseases, it is also important to apply those findings more broadly to common diseases. The book covers a wide range of topics and is organized into three complementary parts. The first part is basic research for innovative medicine, the second is translational research for innovative medicine, and the third is new technology for innovative medicine. This book helps to understand innovative medicine and to make progress in its realization.

Gene Therapy in Inflammatory Diseases Christopher H. Evans 2012-12-06 Gene therapy for inflammatory diseases is a new , burgeoning field of medicine. Edited by the undisputed pioneers of this area of research, this volume is the first devoted to its topic. It contains thirteen chapters, each written by leaders in their respective fields, that summarize the state of the art in developing novel, gene based treatments for inflammatory diseases. As well as providing an introduction to the basic concepts of gene therapy and the use of naked DNA approaches, the book describes the advances that have been made in applying them to arthritis, lupus, multiple sclerosis, diabetes, Sjogren`s syndrome and transplantation.One chapter is devoted to discussing the first human clinical trials that apply gene therapy to the treatment of an inflammatory disease. As well as providing novel therapeutic approaches, gene therapy facilitates the development of new and improved animal models of disease; a chapter describing these advances is also included. As an up-to-date, timely book written by th

Opportunities and Challenges of the Therapies Targeting CNS Regeneration H.D. Perez 2005-05-06 Today combined oral contraceptives are the most convenient and accepted way of hormonal contraception. Nevertheless, there is a constant demand in the medical community and consumer market for innovation, additional benefits during use and lower hormonal load despite the high safety profile of available products. At the Ernst Schering Research Foundation Workshop 52 new perspectives and mechanisms for tissue-selective, estrogen-free contraception were discussed. The aim of the workshop was to bring together experts in the field of molecular and pharmacodynamic action of progestins with clinicians and medical experts to discuss potential medical endpoints, physiological reactions and (bio)marker useful to describe the tissue selectivity and the contraceptive action of new progestins in different target organs. A major success factor for the realization of these new concepts is a deeper understanding of local pharmacological responses to progestins in general and to new progestins in particular. TOC:New Strategies for CNS Repair; Heterogeneity of Multiple Sclerosis: Implications for Therapy Targeting Regeneration; The Neuroprotective Effect of Inflammation: Implications for the Therapy of Multiple Sclerosis; Fibroblast Growth Factors in Oligodendrocyte Physiology and Myelin Repair; White Matter Progenitor Cells Reside in an Oligodendrogenic Niche; At the Interface of the Immune System and the Nervous System: How Neuroinflammation Modulates the Fate of Neural Progenitors in vivo; Remyelination and Restoration of Axonal Function by Glial Cell Transplantation; Gene and Stemm Cell Therapy for Autoimmune Demyelination; Novel Gene Therapeutic Strategies for Neurodegenerative Diseases; Measuring Injury and Repair of Myelin and Neurons in Multiple Sclerosis; The Role of Polypeptide Growth Factors in Recovery from Stroke

Primary Immunodeficiency Disorders Amos Etzioni 2014-09-13 Primary Immunodeficiency Disorders: A Historic and Scientific Perspective provides a complete historical context that is crucial for students and researchers concerned with primary immunodeficiency. When researchers have a poor understanding of the way we arrived where we are in research, they can miss important points about a disease, or miss out on how to approach new diseases. This historical knowledge of research can assist greatly by showing how it was done in the past, demonstrating the successes and failures, so that it can be done better in the future. This book

provides an understanding of the process going from clinical problem to lab and back to the clinic, based on historical experiences. Its chapters proceed from the discovery of the T and B cell lineages through the first BMT for immunodeficiency disorder; lab investigation and gene therapy for PID; the discovery of the gene for AT and its function; understanding cytokine defects; and many other stops along the way. Facilitates communication among physicians and other investigators concerned with immunological and inflammatory diseases Summarizes for the first time all the known facts from 60 years of primary immunodeficiency research, and teaches how an important field in medicine was established Provides stimulating discussions on developing new medical therapies Highlights the importance of studying humans to understand mechanisms of disease that affect humans

The Heart in Rheumatic, Autoimmune and Inflammatory Diseases Udi Nussinovitch 2017-02-10 The prevalence of autoimmune diseases and rheumatic conditions is constantly increasing. Autoimmune diseases affect approximately 7-10% of the population of the United States, while more than 50,000,000 American adults suffer from some type of arthritis. The Heart in Rheumatic, Autoimmune and Inflammatory Diseases examines the complex mechanisms relating to cardiac diseases from a pathophysiological and clinical point of view. Autoimmune rheumatic diseases can affect the coronary vessels, myocardium, pericardium, heart valves and the conduction system. The diagnosis of these unique cardiac complications necessitates medical awareness and a high index of suspicion. Increased risk of advanced atherosclerosis plays a pivotal role in the development of cardiac diseases in systemic, rheumatic and autoimmune illnesses. Yet, other complex immune medicated mechanisms may contribute to the pathogenesis. Patients' optimal care requires coordination between the primary caregiver, the rheumatologist, immunologist and cardiologist. Screening for cardiovascular risk factors, recognition of high-risk patients and identification of subclinical cardiac conditions are of great importance. Moreover, regulation of inflammation, as well as abnormal immune responses and the initiation of early treatments should be the focus of patient management. A continuous attempt to identify novel therapeutic targets and change the natural history of the underlying disease and its cardiac manifestations is in progress. The book aims at providing the readers with a state of the art collection of up to date information regarding clinically important topics based on experts' perspectives. This book was a result of an extended coordinated collaboration of one-hundred and fifty-four distinguished scientists from thirty-one countries around the globe. A review of common, as well as unusual (yet clinically significant) medical cardiac complications of prevalent rheumatic, autoimmune and inflammatory diseases. Focuses on aspects of pathophysiological processes, clinical presentations, screening tests, prognostic implications and novel therapeutic approaches. Presents an up-to-date “level of evidence and “strengths of recommendations for suggested therapies and reviews all randomized clinical trials, meta-analyses and other supporting published clinical findings.

Genetic and Functional Approaches to Understanding Autoimmune and Inflammatory Pathologies Abbas Raza 2020 Our understanding of genetic predisposition to inflammatory and autoimmune diseases has been enhanced by large scale quantitative trait loci (QTL) linkage mapping and genome-wide association studies (GWAS). However, the resolution and interpretation of QTL linkage mapping or GWAS findings are limited. In this work, we complement genetic predictions for several human diseases including multiple sclerosis (MS) and systemic capillary leakage syndrome (SCLS) with genetic and functional data in model organisms to associate genes with phenotypes and diseases. Focusing on MS, an autoimmune inflammatory disease of the central nervous system (CNS), we experimentally tested the effect of three of the GWAS candidate genes (SLAMF1, SLAMF2 and SLAMF7) in the experimental autoimmune encephalomyelitis (EAE) mouse model and found a male-specific locus distal to these loci regulating CNS autoimmune disease. Functional data in mouse suggests this male-specific locus modulates the frequency of immune cells including CD11b+, TCR[alpha beta]+CD4+Foxp3+, and TCR[alpha beta]+CD8+IL-17+ cells during EAE disease.

Orchiectomy experiments demonstrate that this male specific phenotype is dependent on testis but not testosterone (T) or 5[alpha]-dihydrotestosterone (DHT). Using a bioinformatic approach, we identified SLAMF8 and SLAMF9 along with other differentially expressed genes in linkage with MS-GWAS predictions whose expression is testis-dependent, but not directly regulated by T or DHT, as potential positional candidates regulating CNS autoimmune disease. Further refinement of this locus is required to identify the causal gene(s) that may be targeted for prevention and/or treatment of MS in men. Using SCLS, an extremely rare disorder of unknown etiology characterized by recurrent episodes of vascular leakage, we identified and modeled this disease in an inbred mouse strain, SJL, using susceptibility to histamine- and infection-triggered vascular leak as the major phenotypic readout. This trait "Histamine hypersensitivity" (Histh/Histh) was mapped to a region on Chr 6. Remarkably, Histh is syntenic to the genomic locus most strongly associated with SCLS in humans (3p25.3). Subsequent studies found that the Histh locus is not unique to SJL but additional mouse strains also exhibit Histh phenotype. Considering GWAS studies in SCLS are limited by the small number of patients, we utilized interval-specific SNP-based association testing among Histh phenotyped mouse strains to predict Histh candidates. Furthermore, to dissect the complexity of Histh QTL, we developed network-based functional prediction methods to rank genes in this locus by predicting functional association with multiple Histh-related processes. The top-ranked genes include Cxcl12, Ret, Cacna1c, and Cntn3, all of which have strong functional associations and are proximal to SNPs segregating with Histh. Lastly, we utilized the power of integrating genetic and functional approaches to understand susceptibility to Bordetella pertussis and pertussis toxin (PTX) induced histamine sensitization (Bphs/Bphs), a sub-phenotype with an established role in autoimmunity. Congenic mapping in mice had earlier linked Bphs to histamine H1 receptor gene (Hrh1/H1R) and demonstrated that H1R differs at three amino acid residues in Bphs-susceptible and -resistant mice. Our subsequent studies identified eight inbred mouse strains that were susceptible to Bphs despite carrying a resistant H1R allele. Genetic analyses mapped the locus complementing Bphs to mouse Chr 6, in linkage disequilibrium with Hrh1; we have designated this Bphs-enhancer (Bphse). Similar to the approaches used for Histh, we utilized interval-specific SNP based association testing and network-based functional enrichment to predict nine candidate loci for Bphse including Atp2b2, Atg7, Pparg, Syn2, Ift122, Raf1, Mkrn2, Timp4 and Gt(ROSA)26Sor. Overall, these studies demonstrate the power of integrating genetic and functional methods in humans and animal models to predict highly plausible loci underlying QTL/GWAS data.

Next-Generation Therapies and Technologies for Immune-Mediated Inflammatory Diseases Paola Mina-Osorio 2017-01-21 As our understanding of immune mediated chronic inflammatory diseases (IMIDs) grows, it becomes more and more clear that these conditions result from the convergence of a multitude of pathogenic mechanisms whose relative individual contribution is different in different patient subsets. Promising new technologies have been conceived that address the hypotheses that targeting multiple pathways simultaneously, selectively delivering therapeutics to areas of inflammation and/or resetting the immune system, could take efficacy to new levels. However, we have long waited for the arrival of some of these technologies to the bedside, or even far enough in the drug development process in spite of the initial enthusiasm. Some of the examples covered in this book include bispecific antibodies and genomic medicines, microparticles and targeted delivery of drugs to inflamed vasculature. Most published reviews and book chapters on novel therapies for inflammatory diseases describe positive attributes of molecules or technologies under investigation and the rationale for developing them into therapeutics. The originality and potential value of this book is not in the description of these targets or technologies from the point of view of their structure or mechanism of action exclusively, but rather, in making an effort to critically address the question of what is needed to move these technologies into the clinic. Has the technology not made it past the preclinical stage and why? Has it already been

tested in humans and failed? What are the potential reasons behind those failures? What do experts in each field believe can be done better to increase the probabilities of success? In addition, the authors address the competitive landscape and summarize clinical studies that have failed in the respective area. They talk about the patient populations that would be required for the successful conduction of a clinical trial to test certain molecules, and they proactively share their views regarding both the potential and the drawbacks of targets or methodologies.

The Autoimmune Diseases Noel R. Rose 2019-10-15 The Autoimmune Diseases, Sixth Edition, emphasizes the "3 P's" of 21st Century medicine: precision, prediction and prevention. Topics cover the modern systems approach to biology that involves large amounts of personalized, ongoing physiologic data ("omics") coupled with advanced methods of analysis, new tests of genetic engineering, such as CRISPR, auto inflammatory diseases, autoimmune responses to tumor immunotherapy, and information on normal immune response and disorders. Each of the major autoimmune disorders is discussed by researchers and clinical investigators experienced in dealing with patients. Chapters emphasize the immunologic basis of the disease as well as the use of immunologic diagnostic methods and treatments. The book also covers several cross-cutting issues related to the recognition and treatment of autoimmune diseases, including chapters on the measurement of autoantibodies and T cells, the use of biomarkers as early predictors of disease, and new methods of treatment. Gives a thorough and important overview on the entire field, framing individual disease chapters with information that compares and contrasts each disorder and its therapy Provides thorough, up-to-date information on specific diseases, along with clinical applications in an easily found reference for clinicians and researchers interested in certain diseases Keeps readers abreast of current trends and emerging areas in the field Ensures that content is not only up-to-date, but applicable and relevant Includes new, updated chapters that emphasize hot topics in the field, e.g., research on auto inflammatory diseases and autoimmune responses following cancer immunotherapy

Gene Therapy of Autoimmune Disease Gerald J. Prud'homme 2007-02-26 Autoimmune diseases are diverse and responsible for considerable morbidity. Their etiology remains largely unknown, and current therapy with anti-inflammatory drugs is prone to adverse effects, and rarely curative. New therapies with anti-cytokine antibodies or receptors are promising, but require frequent administration of expensive protein drugs. Gene Therapy of Autoimmune Diseases comprehensively reviews research in gene therapy for autoimmune diseases with viral or non-viral vectors. Gene therapy offers the possibility of long-term, continuous delivery of a wide variety of immunosuppressive, anti-inflammatory, or tolerance-inducing agents. Moreover, highly specific genetically modified cells can be produced. This book discusses the most promising avenues in this exciting new field.

Emerging Therapeutics for Immune Tolerance Hyewon Phee 2021-11-30

New Concepts in Pathology and Treatment of Autoimmune Disorders C. Pozzilli 2013-06-29 Autoimmunity, characterized by autoreactive lymphocytes and autoantibodies, is the consequence of a failure to discriminate between self and non-self, and autoimmune diseases are an increasing threat to people living in the industrialized countries. Autoimmune disorders are treatable, but not curable, and patients can face disability at later stages of the disease. Thus, there is a medical and economic need for new concepts and treatments in autoimmune disorders. New concepts and treatments can only be achieved by an interdisciplinary approach bringing together expertise, technologies, and clinical experience. The workshop focused on multiple sclerosis, rheumatoid arthritis and type I diabetes, and discussed conventional drug therapies, gene therapy, cell and tissue transplantation therapies, and first treatments using blood stem cells for reprogramming the patients' immune system.

Modern Therapeutics in Rheumatic Diseases George C. Tsokos 2001-11-08 Leading clinicians and clinical researchers discuss in practical detail the newest treatments used in rheumatic diseases, emphasizing-without neglecting current standard treatments-those experimental

therapies now undergoing clinical trials and poised for early introduction into the rheumatology armamentarium. The diseases and therapeutic regimes examined here range from rheumatoid arthritis and its treatment by gene therapy, to osteoarthritis and systemic autoimmune diseases. Each chapter is organized so that the busy clinician can quickly obtain all the information needed optimal patient treatment. This includes an analysis of the pathogenic mechanisms that explain the molecular basis of the newer therapeutics, reviews of animal data and the results of clinical trials, and recommendations concerning use, side effects, and precautions.

The Establishment of Immune Tolerance Through Genetic Manipulation of Haematopoietic Stem Cells Zeyad Nasa 2014 Autoimmune diseases are incurable and affect about 6-9 % of the population. Treatments of autoimmune diseases include the use of monoclonal antibodies, anti-inflammatory and immunosuppressive drugs, or replacement therapy like insulin for type 1 diabetes. Not all these treatments address the cause, but only aim to reduce symptoms. Autologous bone marrow transplantation (BMT) is currently being trialled to treat autoimmune diseases, however it is associated with high relapse rates. Multiple Sclerosis (MS) and its animal model, experimental autoimmune encephalomyelitis (EAE), are autoimmune diseases of the central nervous system. T regulatory cells (Tregs) have the capacity to supress a wide range of immune responses and play a key role in controlling autoreactive reactions in the periphery, making them an ideal candidate for cellular treatment of autoimmune diseases. They are mainly taken to represent the CD4+ CD25high FoxP3+ T-cells. Their developments happen naturally in the thymus from a separate lineage and their TCR repertoire is mainly self-reactive. The transcription factor Foxp3 is crucial for Tregs development and function. It has been demonstrated that antigen specific T cells transduced with Foxp3 gene have the capability to reduce the symptoms of autoimmune disease. Bone marrow gene modification and subsequent transplantation can be used as a method to express genes, such as T cell receptors linked to Foxp3 gene, in self-renewing BM derived cells.My hypothesis is induce tolerance to autoimmune diseases by the transfer of bone marrow (BM) stem cells, that have been genetically engineered to express self-antigen, into preconditioned mice using a less toxic non-myeloablative chemotherapy regime.In this study I have examined this hypothesis in EAE induced by the self-antigen myelin oligodendrocyte glycoprotein (MOG) and by substituting irradiation which is highly toxic with less toxic non myeloablative regimen drug Treosulfan, as a proof-of-principle that tolerance can be generated with less toxic conditioning. I have shown that when mice are conditioned with a non-myeloablative dose of Treosulfan and received BM cells that have been retrovirally transduced with the autoantigen MOG, they remained EAE free. Furthermore, through this study I have found that using a chemotherapy drug, such as Treosulfan, conditioning promoting a low degree of chimerism at non-myeloablative dose was adequate to promote antigen specific tolerance and protect mice from EAE. In a more clinically relevant scenario, when Treosulfan at non-myeloablative dose was included into a curative protocol for treating mice with established EAE, it resulted in complete remission and proved to be efficient in maintaining disease resistance following subsequent challenge. Taking a different approach but still aimed at promoting tolerance, I have developed a retroviral vector designed to generate antigen specific Tregs. This vector was encoding the V[alpha]3.2 and V[beta]11 TCR chains (2D2-TCR) specific for the autoantigen MOG35-55 peptide linked to Foxp3 gene. Therefore, I hypothesized that the introduction of the 2D2-TCR plus Foxp3 into BM stem cells would lead to the generation of T regulatory cells specific for EAE autoantigen, which would impose immune regulation and prevent EAE induction. The generated retroviral constructs were tested in vitro in various cell lines including isolated mouse splenic naïve CD4 cells and found to be able to produce cells expressing 2D2-TCR and Foxp3 as well as other Tregs markers such as CD25, GITR and CTLA-4. Generated retroviruses were also used to transduce BM and create chimeric mice with a quantifiable subpopulation of T cells with MOG35-55 TCR specificity and Foxp3 driven Treg phenotype. However, mice generated were not efficiently tolerant to the

induction of EAE. Flow cytometry analysis revealed that a significant population of 2D2-TCR-Foxp3-GFP cells were detected in the thymus but far less in the periphery with lesser Foxp3 expression than that seen in the thymus. This finding suggests that Foxp3 expression alone is not enough to confer Treg cell features and that other epigenetic and transcriptional factors are likely to be involved to ensure their stability and function.

The Autoimmune Brain David S. Younger 2019-11-10 There are millions of people who experience issues related to brain health--depression, attention issues, anxiety, forgetfulness, fatigue, and even chronic pain--yet can't figure out what's causing their problems and can't find any relief. They may have seen a myriad of doctors, many of whom do not take their complaints seriously, or worse, turn to the easy, often inappropriate fix of antidepressants or antianxiety medications. Traditional medications, supplements, or other therapies haven't worked. No matter what their age--from children to teens or seniors--people and their loved ones are frustrated, scared, and confused by their continued poor health. Countless others display severe psychiatric symptoms that seem to come out of nowhere, ranging from tics, obsessive-compulsive behaviors and anxiety, to depression, bipolar-like mood swings, and even borderline personality disorder and suicidal ideas. . Sometimes, the people affected are the only ones that notices a change to the way they think or feel, and they suffer in silence. Or, they reach out to try to get help, and are all too frequently misdiagnosed. Now, Dr. David Younger, a world-renowned physician, provides relief to these patients and their families. His diagnostic techniques and treatment protocols will help readers identify the true cause of their symptoms and put them on a clear path to healing so they no longer feel unbalanced, out of control, forgetful, and exhausted. THE AUTOIMMUNE BRAIN connects common brain health symptoms to the changes in the immune system, and particularly bacterial, viral, and parasitic infections. In this book, Dr. Younger explains his groundbreaking research and adds a new component: how traumatic stress (whether physical or emotional) and genetics affects this same triad as inextricable factors in initiating disease and brain health symptoms. In fact, a change in personality, behavior, coping style, and one's emotional state may be the first clue that there is a health problem brewing somewhere else in the body. Readers will find new answers to troubling conditions, including: Alzheimer's disease Anxiety Arthritis Autism Autonomic disturbances Bacterial and viral infections Bipolar Disorder Cancer Celiac disease and gluten intolerances Chronic Fatigue Syndrome (now referred to as Systemic Exertion Intolerance Disease) Chronic Pain Dementia Depression Endocrine Disorders Immune modulatory therapy using IVIg Lyme disease and co-infections Mast cell activation syndrome Medical cannabis Obsessive Compulsive Disorder Orthostatic hypotension Peripheral Neuropathy Porphyria Post-Traumatic Stress Disorder Postural orthostatic tachycardia

Biologic and Gene Therapy of Autoimmune Disease C. Garrison Fathman 2000-01-01 The clinical management of autoimmune diseases has proven to be extremely difficult. Current therapies focus on trying to alleviate symptoms, but fail to correct the fundamental immune defects that lead to pathology. To achieve this goal, it is necessary to understand much of the biology of antigen presentation, lymphocyte activation and the effects of cytokines. The articles in this book provide an up-to-date review of current innovative therapies using both biologic and gene therapy for the treatment of selected autoimmune diseases. Therapeutical approaches discussed include oral tolerance, the use of anti-CD4 monoclonal antibodies, IL-10 and anti-TNFa antibodies, DNA vaccination, and gene therapy applied to organ-specific autoimmune disease. Although some of these techniques are still in their infancy, their potential efficacy has been demonstrated in several animal models of autoimmune disease, holding great promise for the future development of treatments. Written by recognized experts in the field, the chapters in this book illustrate the concept of technology transfer from bench to bedside and provide a valuable update for clinicians and scientists in clinical immunology.

Genetics of Autoimmunity Gregory R. Bock 2005-05-27 This title provides an extremely helpful analysis of genes that may be associated with autoimmunity, and answers questions such

as how these genes can be identified, and how the functions of the gene products can be elucidated. Incorporating data on disease-associated chromosomal loci that has been accumulated from inbred mice, the title: descibes how some susceptibility loci may be common to many diseases, whereas others are relatively disease specific discusses the importance of developing criteria for establishing the significance of these different categories of disease-associated loci.

Cytokine Gene Therapy of Autoimmune Disease 1998

Stem Cell-Dependent Therapies Gerhard Gross 2013-10-29 Multipotent mesenchymal stem cells (MSCs) are a heterogeneous population of cells which reside in a variety of tissues. They differentiate into several mesodermal lineages, secrete a multitude of trophic factors and contribute to tissue homeostasis. MSCs are able to exert immunosuppressive activities by interfering with inflammatory cytokine production and with T- and B-cell proliferation. These immunomodulating properties make MSCs promising candidates for the treatment of chronic inflammatory and autoimmune disorders. There are, however, certain caveats involved including inappropriate migration of cells in the body, immune rejection, tumor formation, or graft versus host disease (GvHD). This book investigates the current state of the MSC-dependent therapy of chronic inflammatory disorders and autoimmune diseases. Among the covered topics are GvHD, chronic kidney, liver and lung disease, ischemic heart and inflammatory bowel disease, diabetes, osteoarthritis, various rheumatic and neurological disorders and, lastly, tumors and solid organ transplantations. This book also questions the immunoprivileged status of MSCs, discusses the therapeutic role of MSCs in experimental animal disease models and their translation to the corresponding human disorders, envisions a role for MSCs in tumor interventions and, lastly, describes a systems biology approach for stem cells and inflammation.

Gene Therapy of Autoimmune Disease Gerald J. Prud'homme 2005-07-13 Autoimmune diseases are diverse and responsible for considerable morbidity. Their etiology remains largely unknown, and current therapy with anti-inflammatory drugs is prone to adverse effects, and rarely curative. New therapies with anti-cytokine antibodies or receptors are promising, but require frequent administration of expensive protein drugs. Gene Therapy of Autoimmune Diseases comprehensively reviews research in gene therapy for autoimmune diseases with viral or non-viral vectors. Gene therapy offers the possibility of long-term, continuous delivery of a wide variety of immunosuppressive, anti-inflammatory, or tolerance-inducing agents. Moreover, highly specific genetically modified cells can be produced. This book discusses the most promising avenues in this exciting new field.