

Bioinformatics For Vaccinology

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Cancer Vaccines and Immunotherapy
Encyclopedia of Bioinformatics and Computational Biology
Human Vaccines
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Recent Advances in Animal Virology
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Vaccine Design: Methods and Protocols: Volume 1: Vaccines for Human Diseases
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Infectious Disease Informatics
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Advanced Vaccine Research Methods for the Decade of Vaccines
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Virus Bioinformatics

This book provides a comprehensive overview of the concepts and approaches used for sequence, structure, and phylogenetic analysis. Starting with an introduction to the subject and intellectual property protection for bioinformatics, it guides readers through the latest sequencing technologies, sequence analysis, genomic variations, metagenomics, epigenomics, molecular evolution and phylogenetics, structural bioinformatics, protein folding, structure analysis and validation, drug discovery, reverse vaccinology, machine learning, application of R programming in biological data analysis, and the use of Linux in handling large data files.

Cancer Vaccines and Immunotherapy

Virus bioinformatics is evolving and succeeding as an area of research in its own right, representing the interface of virology and computer science. Bioinformatic approaches to investigate viral infections and outbreaks have become central to virology research, and have been successfully used to detect, control, and treat infections of humans and animals. As part of the Third Annual Meeting of the European Virus Bioinformatics Center (EVBC), we have published this Special Issue on Virus Bioinformatics.

Encyclopedia of Bioinformatics and Computational Biology

Human Vaccines: Emerging Technologies in Design and Development discusses

the advances in molecular biology, biophysics, and informatics—among other disciplines—that have provided scientists with the tools to create new vaccines against emerging and re-emerging pathogens. For example, the virus-like particle technologies that led to licensing of highly efficacious HPV vaccines have only come into full realization in the last 10 years. Their success has, in turn, accelerated the pace with which nanoparticle vaccines are being developed. Given the rapidity with which the field is changing and the absence of any text documenting this change, there is a need for a resource that surveys these new vaccine technologies, assesses their potential, and describes their applications. This book provides that resource and complements traditional vaccinology books, but also serves as an excellent standalone for researchers and students with basic knowledge in immunology. Introduces new topics in vaccine immunology in the context vaccine design and production Consolidates the growing body of knowledge on new vaccine technologies that have only emerged in the past 2 - 3 decades Reviews the currently licensed vaccines that have utilized leading-edge technologies and how this has translated into improved efficacy and safety Provides a broad overview of innovative vaccine technologies, including immunological aspects

Human Vaccines

In contrast to existing books on immunoinformatics, this volume presents a cross-section of immunoinformatics research. The contributions highlight the interdisciplinary nature of the field and how collaborative efforts among bioinformaticians and bench scientists result in innovative strategies for understanding the immune system. Immunoinformatics is ideal for scientists and students in immunology, bioinformatics, microbiology, and many other disciplines.

The Impact of Bioinformatics on Vaccine Design and Development

Winner, 2018 Donald W. Light Award for Applied Medical Sociology, American Sociological Association Medical Sociology Section Winner, 2018 Distinguished Scholarship Award presented by the Pacific Sociology Association Honorable Mention, 2017 ESS Mirra Komarovsky Book Award presented by the Eastern Sociological Society Outstanding Book Award for the Section on Altruism, Morality, and Social Solidarity presented by the American Sociological Association A rich, multi-faceted examination into the attitudes and beliefs of parents who choose not to immunize their children. The measles outbreak at Disneyland in December 2014 spread to a half-dozen U.S. states and sickened 147 people. It is just one recent incident that the medical community blames on the nation's falling vaccination rates. Still, many parents continue to claim that the risks that vaccines pose to their children are far greater than their benefits. Given the research and the unanimity of opinion within the medical community, many ask how such parents—who are most likely to be white, college educated, and with a family income over \$75,000—could hold such beliefs. For over a decade, Jennifer Reich has been studying the phenomenon of vaccine refusal from the perspectives of parents who distrust vaccines and the corporations that make them, as well as the health care providers and policy makers who see them as essential to ensuring

community health. Reich reveals how parents who opt out of vaccinations see their decision: what they fear, what they hope to control, and what they believe is in their child's best interest. Based on interviews with parents who fully reject vaccines as well as those who believe in "slow vax," or altering the number of and time between vaccinations, the author provides a fascinating account of these parents' points of view. Placing these stories in dialogue with those of pediatricians who see the devastation that can be caused by vaccine-preventable diseases and the policy makers who aim to create healthy communities, *Calling the Shots* offers a unique opportunity to understand the points of disagreement on what is best for children, communities, and public health, and the ways in which we can bridge these differences.

Recent Advances in Animal Virology

This book covers a wide range of diverse immunoinformatics research topics, involving tools and databases of potential epitope prediction, HLA gene analysis, MHC characterizing, in silico vaccine design, mathematical modeling of host-pathogen interactions, and network analysis of immune system data. In that way, this fully updated volume explores the enormous value of computational tools and models in immunology research. Written for the highly successful *Methods in Molecular Biology* series, chapters include the kind of key insights and detailed implementation advice to encourage successful results in the lab. Authoritative and practical, *Immunoinformatics, Third Edition* serves as an ideal guide for scientists working at the intersection of bioinformatics, mathematical modelling, and statistics for the study of immune systems biology.

Vaccinology

Pan-genomics: Applications, Challenges, and Future Prospects covers current approaches, challenges and future prospects of pan-genomics. The book discusses bioinformatics tools and their applications and focuses on bacterial comparative genomics in order to leverage the development of precise drugs and treatments for specific organisms. The book is divided into three sections: the first, an "overview of pan-genomics and common approaches, brings the main concepts and current approaches on pan-genomics research; the second, "case studies in pan-genomics, thoroughly discusses twelve case, and the last, "current approaches and future prospects in pan-multiomics , encompasses the developments on omics studies to be applied on bacteria related studies. This book is a valuable source for bioinformaticians, genomics researchers and several members of biomedical field interested in understanding further bacterial organisms and their relationship to human health. Covers the entire spectrum of pangenomics, highlighting the use of specific approaches, case studies and future perspectives Discusses current bioinformatics tools and strategies for exploiting pangenomics data Presents twelve case studies with different organisms in order to provide the audience with real examples of pangenomics applicability

Introduction to Molecular Vaccinology

Like many words, the term "immunomics" equates to different ideas contingent on

context. For a brief span, immunomics meant the study of the Immunome, of which there were, in turn, several different definitions. A now largely defunct meaning rendered the Immunome as the set of antigenic peptides or immunogenic proteins within a single microorganism – be that virus, bacteria, fungus, or parasite – or microbial population, or antigenic or allergenic proteins and peptides derived from the environment as a whole, containing also proteins from eukaryotic sources. However, times have changed and the meaning of immunomics has also changed. Other newer definitions of the Immunome have come to focus on the plethora of immunological receptors and accessory molecules that comprise the host immune arsenal. Today, Immunomics or immunogenomics is now most often used as a synonym for high-throughput genome-based immunology. This is the study of aspects of the immune system using high-throughput techniques within a conceptual landscape borne of both clinical and biophysical thinking.

Vaccine Design: Methods and Protocols: Volume 1: Vaccines for Human Diseases

Genomics and Biotechnological Advances in Veterinary, Poultry, and Fisheries is a comprehensive reference for animal biotechnologists, veterinary clinicians, fishery scientists, and anyone who needs to understand the latest advances in the field of next generation sequencing and genomic editing in animals and fish. This essential reference provides information on genomics and the advanced technologies used to enhance the production and management of farm and pet animals, commercial and non-commercial birds, and aquatic animals used for food and research purposes. This resource will help the animal biotechnology research community understand the latest knowledge and trends in this field. Presents biological applications of cattle, poultry, marine and animal pathogen genomics Discusses the relevance of biomarkers to improve farm animals and fishery Includes recent approaches in cloning and transgenic cattle, poultry and fish production

Computer-Aided Vaccine Design

Vaccines are the pharmaceutical products that offer the best cost-benefit ratio in the prevention or treatment of diseases. In that a vaccine is a pharmaceutical product, vaccine development and production are costly and it takes years for this to be accomplished. Several approaches have been applied to reduce the times and costs of vaccine development, mainly focusing on the selection of appropriate antigens or antigenic structures, carriers, and adjuvants. One of these approaches is the incorporation of bioinformatics methods and analyses into vaccine development. This chapter provides an overview of the application of bioinformatics strategies in vaccine design and development, supplying some successful examples of vaccines in which bioinformatics has furnished a cutting edge in their development. Reverse vaccinology, immunoinformatics, and structural vaccinology are described and addressed in the design and development of specific vaccines against infectious diseases caused by bacteria, viruses, and parasites. These include some emerging or re-emerging infectious diseases, as well as therapeutic vaccines to fight cancer, allergies, and substance abuse, which have been facilitated and improved by using bioinformatics tools or which are under development based on bioinformatics strategies.

Genomics and Biotechnological Advances in Veterinary, Poultry, and Fisheries

This volume covers all aspects of infection by pathogenic *Leptospira* species, the causative agents of the world's most widespread zoonosis. Topics include aspects of human and animal leptospirosis as well as detailed analyses of our current knowledge of leptospiral structure and physiology, epidemiology, pathogenesis, genomics, immunity and vaccines. Updates are presented on leptospiral systematics, identification and diagnostics, as well as practical information on culture of *Leptospira*. Contact information is also provided for *Leptospira* reference centers. All chapters were written by experts in the field, providing an invaluable reference source for scientists, veterinarians, clinicians and all others with an interest in leptospirosis.

Bioinformatics for Vaccinology

Computational pre-screening of antigens is now routinely applied to the discovery of vaccine candidates. Computer-aided vaccine design is a comprehensive introduction to this exciting field of study. The book is intended to be a textbook for researchers and for courses in bioinformatics, as well as a laboratory reference guide. It is written mainly for biologists who want to understand the current methods of computer-aided vaccine design. The contents are designed to help biologists appreciate the underlying concepts and algorithms used, as well as limitations of the methods and strategies for their use. Chapters include: MHC and T cell responses; Immunoglobulins and B cell responses; Scientific publications and databases; Database design; Computational T cell vaccine design; Computational B cell vaccine design; infectious disease informatics; Vaccine safety and quality assessments; and Vaccine adjuvant informatics. Essential reading for any biologist who wants to understand methods of computer-aided vaccine design Description of available data sources and publicly available software, with detailed analysis of strengths and weaknesses Theoretical concepts and practical examples of database design and development for a virtual screening campaign

Application of Bioinformatics in Cancers

The scope of this book is to present the most recent trends based on omic analyses of microorganisms causing diseases in farm animals and how these approaches result in new strategies of treatment. The topics in this book include fasciolosis, avian coccidiosis, bovine anaplasmosis, tick-borne diseases, and babesiosis, among others. This book presents the recent advances in the omic field with an emphasis on how these analyses have led researchers to know the mechanisms that pathogens use to invade and colonize the host cell of farm animals. In this way, new treatments of control and prevention can be employed.

Reverse Vaccinology

"A subject collection from the Cold Spring Harbor perspectives in biology."

Textbook Of Bioinformatics, A: Information-theoretic

Perspectives Of Bioengineering And Biological Complexes

Genetics and Evolution of Infectious Diseases

The astounding diversity of the immune system and the complexity of its regulatory pathways makes immunology a combinatorial science. Computational analysis has therefore become an essential element of immunology research and this has led to the creation of the emerging field of immunoinformatics. This book is the first to feature thorough coverage of this new field. Immunoinformatics facilitates the understanding of immune function by modelling the interactions among immunological components. Biological research provides ever deeper insights into the complexity of living organisms while computer science provides an effective means to store and analyse large volumes of complex data. Combining the two fields increases the efficiency of biological research and offers the potential for major advances in the study of biological systems. This book encompasses key developments in immunoinformatics, including immunological databases, sequence analysis, structure modelling, mathematical modelling of the immune system, simulation of laboratory experiments, statistical support for immunological experimentation and immunogenomics. The difficulties in effective application of bioinformatic tools in immunology arise at both ends of the spectrum: most immunologists have only a limited comprehension of sophisticated data analysis and applicability and limitations, while the average computer scientist lacks knowledge of the depth and complexity of biological data. The purpose of this book, therefore, is to present contributions from a multidisciplinary team of biologists and computer scientists to explore the issues related to better understanding of immune function and, in particular, to help apply new computer science methods to immunological research. Related Novartis Foundation symposia: 247 In Silico Simulation of Biological Processes Chair: Denis Noble 252 Generation and effector functions of regulatory lymphocytes Chair: Jean-François Bach

Vaccine Design

Immunoinformatics: Predicting Immunogenicity In Silico is a primer for researchers interested in this emerging and exciting technology and provides examples in the major areas within the field of immunoinformatics. This volume both engages the reader and provides a sound foundation for the use of immunoinformatics techniques in immunology and vaccinology. The volume is conveniently divided into four sections. The first section, Databases, details various immunoinformatic databases, including IMGT/HLA, IPD, and SYEPEITHI. In the second section, Defining HLA Supertypes, authors discuss supertypes of GRID/CPCA and hierarchical clustering methods, Hla-Ad supertypes, MHC supertypes, and Class I Hla Alleles. The third section, Predicting Peptide-MCH Binding, includes discussions of MCH binders, T-Cell epitopes, Class I and II Mouse Major Histocompatibility, and HLA-peptide binding. Within the fourth section, Predicting Other Properties of Immune Systems, investigators outline TAP binding, B-cell epitopes, MHC similarities, and predicting virulence factors of immunological interest. Immunoinformatics: Predicting Immunogenicity In Silico merges skill sets of the lab-based and the

computer-based science professional into one easy-to-use, insightful volume.

Molecular Vaccines

There are several reasons to be interested in infectious disease informatics. First, it is of practical significance to understand how the technology revolution has been reshaping infectious disease research and management, as rapid advances in geno- associated technologies have changed the very nature of the questions we can ask. Second, the emerging evidence has confirmed that the application of information technologies in healthcare enhances our ability to deal with infectious diseases. Finally, the implementation of electronic health records has created new and exciting opportunities for secure, reliable and ethically sound clinical decision support and biosurveillance guided by the genomics of pathogens with epidemic potential. This volume addresses the growing need for the critical overview of recent developments in microbial genomics and biomedical informatics relevant to the control of infectious diseases. This field is rapidly expanding, and attracts a wide audience of clinicians, public health professionals, biomedical researchers and computer scientists who are fascinated by the complex puzzle of infectious disease. This book takes a multidisciplinary approach with a calculated move away from the traditional health informatics topics of computerized protocols for antibiotic p- scribing and pathology testing. Instead authors invite you to explore the emerging frontiers of bioinformatics-guided pathogen profiling, the system microbiolo- enabled intelligent design of new drugs and vaccines, and new ways of real-time biosurveillance and hospital infection control. Throughout the book, references are made to different products supplied by public sources and commercial vendors, but this is not an endorsement of these products or vendors.

Leptospira and Leptospirosis

This collection of 25 research papers comprised of 22 original articles and 3 reviews is brought together from international leaders in bioinformatics and biostatistics. The collection highlights recent computational advances that improve the ability to analyze highly complex data sets to identify factors critical to cancer biology. Novel deep learning algorithms represent an emerging and highly valuable approach for collecting, characterizing and predicting clinical outcomes data. The collection highlights several of these approaches that are likely to become the foundation of research and clinical practice in the future. In fact, many of these technologies reveal new insights about basic cancer mechanisms by integrating data sets and structures that were previously immiscible. Accordingly, the series presented here bring forward a wide range of artificial intelligence approaches and statistical methods that can be applied to imaging and genomics data sets to identify previously unrecognized features that are critical for cancer. Our hope is that these articles will serve as a foundation for future research as the field of cancer biology transitions to integrating electronic health record, imaging, genomics and other complex datasets in order to develop new strategies that improve the overall health of individual patients.

Immunoinformatics

Using bioinformatics methods to generate a systems-level view of the immune system; description of the main biological concepts and the new data-driven algorithms. Despite the fact that advanced bioinformatics methodologies have not been used as extensively in immunology as in other subdisciplines within biology, research in immunological bioinformatics has already developed models of components of the immune system that can be combined and that may help develop therapies, vaccines, and diagnostic tools for such diseases as AIDS, malaria, and cancer. In a broader perspective, specialized bioinformatics methods in immunology make possible for the first time a systems-level understanding of the immune system. The traditional approaches to immunology are reductionist, avoiding complexity but providing detailed knowledge of a single event, cell, or molecular entity. Today, a variety of experimental bioinformatics techniques connected to the sequencing of the human genome provides a sound scientific basis for a comprehensive description of the complex immunological processes. This book offers a description of bioinformatics techniques as they are applied to immunology, including a succinct account of the main biological concepts for students and researchers with backgrounds in mathematics, statistics, and computer science as well as explanations of the new data-driven algorithms in the context of biological data that will be useful for immunologists, biologists, and biochemists working on vaccine design. In each chapter the authors show interesting biological insights gained from the bioinformatics approach. The book concludes by explaining how all the methods presented in the book can be integrated to identify immunogenic regions in microorganisms and host genomes.

Immunoinformatics

This book on bioinformatics is designed as an introduction to the conventional details of genomics and proteomics as well as a practical comprehension text with an extended scope on the state-of-the-art bioinformatic details pertinent to next-generation sequencing, translational/clinical bioinformatics and vaccine-design related viral informatics. It includes four major sections: (i) An introduction to bioinformatics with a focus on the fundamentals of information-theory applied to biology/microbiology, with notes on bioinformatic resources, data bases, information networking and tools; (ii) a collection of annotations on the analytics of biomolecular sequences, with pertinent details presented on biomolecular informatics, pairwise and multiple sequences, viral sequence informatics, next-generation sequencing and translational/clinical bioinformatics; (iii) a novel section on cytogenetic and organelle bioinformatics explaining the entropy-theoretics of cellular structures and the underlying informatics of synteny correlations; and (iv) a comprehensive presentation on phylogeny and species informatics. The book is aimed at students, faculty and researchers in biology, health/medical sciences, veterinary/agricultural sciences, bioengineering, biotechnology and genetic engineering. It will be a useful companion for managerial personnel in the biotechnology and bioengineering industries as well as in health/medical science.

Vaccines

Since the publication of Fabio Bagnoli's and Rino Rappuoli's first book in 2011 (Vaccine Design: Innovative Approaches and Novel Strategies; ISBN 978 1 904455 74 5), the field of vaccinology has advanced significantly. The application of new

sophisticated 'omics' technologies and the use of pioneering approaches have yielded a wealth of new data. This new book distills the most important new findings to provide a timely overview of the field. Written by leading experts in the field, each chapter affords a critical insight to a particular topic, reviews current research, discusses future direction, and aims to stimulate discussion. The provision of extensive reference sections in the book's chapters positively encourages readers to pursue the subject in greater detail. The book has retained the format of the 2011 book and is divided into two main parts. The first section explores in considerable depth the key innovations that are dramatically changing the field, both for preclinical as well as clinical vaccine research fields. Some of the topics covered include: the use of deep sequencing * cellular screens to interrogate the human T and B cell repertoires * comparative genomics to track bacterial pathogens * quantitative proteomics * structural biology * novel strategies for vaccine administration * T-cell inducing vaccines * etc. The second section focuses on diseases for which current medical treatment is not very effective, as well as diseases that could be either prevented or treated by vaccination. The book's contributors believe that these will be the vaccines of the future, the 'vaccines for 2020.' This book is essential reading for everyone working in vaccine R and D in academia, biotechnology companies, and the pharmaceutical industry, and it is a recommended volume for all microbiology libraries. *** Librarians: ebook available on ProQuest and EBSCO [Subject: Microbiology, Vaccinology, Life Science]

Farm Animals Diseases, Recent Omic Trends and New Strategies of Treatment

This text provides a practical guide providing step-by-step protocol to design and develop vaccines. Chapters detail protocols for developing novel vaccines against infectious bacteria, viruses, fungi, and parasites for humans and animals. Volume 2: Vaccines for Veterinary Diseases includes vaccines for farm animals and fishes, vaccine vectors and production, vaccine delivery systems, vaccine bioinformatics, vaccine regulation and intellectual property. Written for the Methods in Molecular Biology series, chapters include introductions to their respective topics, lists of the necessary materials and reagents, step-by-step, readily reproducible laboratory protocols, and tips on troubleshooting and avoiding known pitfalls. Authoritative and practical, Vaccine Design: Methods and Protocols, Volume 2: Vaccines for Veterinary Diseases aims to ensure successful results in the further study of this vital field.

Immunomic Discovery of Adjuvants and Candidate Subunit Vaccines

This comprehensively revised second edition of Computational Systems Biology discusses the experimental and theoretical foundations of the function of biological systems at the molecular, cellular or organismal level over temporal and spatial scales, as systems biology advances to provide clinical solutions to complex medical problems. In particular the work focuses on the engineering of biological systems and network modeling. Logical information flow aids understanding of basic building blocks of life through disease phenotypes Evolved principles gives

insight into underlying organizational principles of biological organizations, and systems processes, governing functions such as adaptation or response patterns. Coverage of technical tools and systems helps researchers to understand and resolve specific systems biology problems using advanced computation. Multi-scale modeling on disparate scales aids researchers understanding of dependencies and constraints of spatio-temporal relationships fundamental to biological organization and function.

Immune Memory and Vaccines: Great Debates

This volume will address an important emergent area within the field of immunomics: the discovery of antigens and adjuvants within the context of reverse vaccinology. Conventional approaches to vaccine design and development requires pathogens to be cultivated in the laboratory and the immunogenic molecules within them to be identifiable. Conventional vaccinology is no longer universally successful, particularly for recalcitrant pathogens. By using genomic information we can study vaccine development in silico: 'reverse vaccinology', can identify candidate subunits vaccines by identifying antigenic proteins and by using equally rational approaches to identify novel immune response-enhancing adjuvants.

Immunoinformatics

While the sequence of the human genome sequence has hit the headlines, extensive exploitation of this for practical applications is still to come. Genomic and post-genomic technologies applied to viral and bacterial pathogens, which are almost equally important from a scientific perspective, have the potential to be translated into useful products and processes much more rapidly. Genomics, Proteomics and Vaccines introduces the history of vaccinology and discusses how vaccines are expected to evolve in the future. It describes the relevant technologies, including genome sequencing and analysis, DNA microarrays, 2D electrophoresis and 2D chromatography, mass spectrometry and high-throughput protein expression and purification. The book also features examples of the exploitation of genomics and post-genomics in vaccine discovery, and contains useful descriptions of the biology and pathogenesis of clinically important bacterial pathogens. This book should be of interest to all those working in vaccine discovery and development in pharmaceutical and biotechnology companies as well as in academic institutions.

Reverse Vaccinology

Microbes that elude host's defenses and have developed resistance to the existing antibiotic arsenal continuously invade the human body. Cure for such diseases is inevitable as it may result in high morbidity and mortality, if not properly treated. Vaccination represents the most cost-effective way for disease prevention. Vaccines activate sentinels of the immune system including macrophages and T, B, and dendritic cells to release a battery of effector molecules and cytokines and ward off infection. For long-lasting protection, the memory cells also need to be evoked. This book encompasses biotechnological vaccines in clinical use, cocooning, disease resurgence postvaccination and other vaccine adverse effects,

prospects of therapeutic versus prophylactic vaccines, and design of effective vaccines using bioinformatic tools and engineering molecular pattern interactions.

Calling the Shots

Introduction to Molecular Vaccinology

Vaccinology: An Essential Guide outlines in a clear, practical format the entire vaccine development process, from conceptualization and basic immunological principles through to clinical testing and licensing of vaccines. With an outstanding introduction to the history and practice of vaccinology, it also guides the reader through the basic science relating to host immune responses to pathogens. Covering the safety, regulatory, ethical, and economic and geographical issues that drive vaccine development and trials, it also presents vaccine delivery strategies, novel vaccine platforms (including experimental vaccines and pathogens), antigen development and selection, vaccine modelling, and the development of vaccines against emerging pathogens and agents of bioterror. There are also sections devoted to veterinary vaccines and associated regulatory processes. Vaccinology: An Essential Guide is a perfect tool for designed for undergraduate and graduate microbiologists and immunologists, as well as residents, fellows and trainees of infectious disease and vaccinology. It is also suitable for all those involved in designing and conducting clinical vaccine trials, and is the ideal companion to the larger reference book Vaccinology: Principles and Practice.

Bioinformatics for Immunomics

This textbook provides an easy-to-understand introduction to the complex topic of vaccine research and development. It gives a comprehensive though clearly arranged insight to the most important aspects of molecular vaccinology, leading from the basics in immunology, to design of vaccines and mode of action of vaccines to the actual formulation, manufacturing and registration of vaccines. The volume is therefore a valuable text about modern vaccinology for graduate students and a basic introduction for newcomers in vaccine design and development.

Epitope Discovery and Synthetic Vaccine Design

Genomics, Proteomics and Vaccines

Genetics and Evolution of Infectious Diseases, Second Edition, discusses the constantly evolving field of infectious diseases and their continued impact on the health of populations, especially in resource-limited areas of the world. Students in public health, biomedical professionals, clinicians, public health practitioners, and decisions-makers will find valuable information in this book that is relevant to the control and prevention of neglected and emerging worldwide diseases that are a major cause of global morbidity, disability, and mortality. Although substantial gains have been made in public health interventions for the treatment, prevention,

and control of infectious diseases during the last century, in recent decades the world has witnessed a worldwide human immunodeficiency virus (HIV) pandemic, increasing antimicrobial resistance, and the emergence of many new bacterial, fungal, parasitic, and viral pathogens. The economic, social, and political burden of infectious diseases is most evident in developing countries which must confront the dual burden of death and disability due to infectious and chronic illnesses. Takes an integrated approach to infectious diseases Includes contributions from leading authorities Provides the latest developments in the field of infectious disease

Bioinformatics: Sequences, Structures, Phylogeny

“ this book was written from start to finish by one extremely dedicated and erudite individual. The author has done an excellent job of covering the many topics that fall under the umbrella of computational biology for vaccine design, demonstrating an admirable command of subject matter in fields as disparate as object-oriented databases and regulation of T cell response. Simply put, it has just the right breadth and depth, and it reads well. In fact, readability is one of its virtues—making the book enticing and useful, all at once” Human Vaccines, 2010 “ This book has several strong points. Although there are many textbooks that deal with vaccinology, few attempts have been made to bring together descriptions of vaccines in history, basic bioinformatics, various computational solutions and challenges in vaccinology, detailed experimental methodologies, and cutting-edge technologies This book may well serve as a first line of reference for all biologists and computer scientists” -Virology Journal, 2009 Vaccines have probably saved more lives and reduced suffering in a greater number of people than any other medical intervention in human history, succeeding in eradicating smallpox and significantly reducing the mortality and incidence of other diseases. However, with the emergence of diseases such as SARS and the threat of biological warfare, vaccination has once again become a topic of major interest in public health. Vaccinology now has at its disposal an array of post-genomic approaches of great power. None has a more persuasive potential impact than the application of computational informatics to vaccine discovery; the recent expansion in genome data and the parallel increase in cheap computing power have placed the bioinformatics exploration of pathogen genomes centre stage for vaccine researchers. This is the first book to address the area of bioinformatics as applied to rational vaccine design, discussing the ways in which bioinformatics can contribute to improved vaccine development by introducing the subject of harnessing the mathematical and computing power inherent in bioinformatics to the study of vaccinology putting it into a historical and societal context, and exploring the scope of its methods and applications. Bioinformatics for Vaccinology is a one-stop introduction to computational vaccinology. It will be of particular interest to bioinformaticians with an interest in immunology, as well as to immunologists, and other biologists who need to understand how advances in theoretical and computational immunobiology can transform their working practices.

Pan-genomics: Applications, Challenges, and Future Prospects

This title discusses all aspects of non-infectious and non-cancer- so called NINC -

vaccines. Hypertension, diabetes and allergy vaccine development are referred to as well as the use of adjuvants and nanotechnology in vaccine development. The way of novel vaccines from bench to preclinical to clinical studies and launch to the market under EMEA (European Medicines Agency) and FDA (Food and Drug Administration) guidelines are described in-depth. The book is therefore of interest for researchers and clinicians engaged in vaccine development and molecular vaccine application.

Infectious Disease Informatics

Immunological Bioinformatics

Encyclopedia of Bioinformatics and Computational Biology: ABC of Bioinformatics combines elements of computer science, information technology, mathematics, statistics and biotechnology, providing the methodology and in silico solutions to mine biological data and processes. The book covers Theory, Topics and Applications, with a special focus on Integrative -omics and Systems Biology. The theoretical, methodological underpinnings of BCB, including phylogeny are covered, as are more current areas of focus, such as translational bioinformatics, cheminformatics, and environmental informatics. Finally, Applications provide guidance for commonly asked questions. This major reference work spans basic and cutting-edge methodologies authored by leaders in the field, providing an invaluable resource for students, scientists, professionals in research institutes, and a broad swath of researchers in biotechnology and the biomedical and pharmaceutical industries. Brings together information from computer science, information technology, mathematics, statistics and biotechnology Written and reviewed by leading experts in the field, providing a unique and authoritative resource Focuses on the main theoretical and methodological concepts before expanding on specific topics and applications Includes interactive images, multimedia tools and crosslinking to further resources and databases

Advanced Vaccine Research Methods for the Decade of Vaccines

This textbook provides an easy-to-understand introduction to the complex topic of vaccine research and development. It gives a comprehensive though clearly arranged insight to the most important aspects of molecular vaccinology, leading from the basics in immunology, to design of vaccines and mode of action of vaccines to the actual formulation, manufacturing and registration of vaccines. The volume is therefore a valuable text about modern vaccinology for graduate students and a basic introduction for newcomers in vaccine design and development.

Computational Systems Biology

In this book, expert international authors critically review the current cutting-edge research in vaccine design and development. Particular emphasis is given to new approaches and technologies.

Vaccine Design

This book discusses the prominence and implication of the viral diseases that are a major threat to animals around the globe. A number of these diseases have also shown links with human populations, which has implications for public health. This book offers detailed and up-to-date information on viral diseases in livestock and poultry that were and/or are still a problem. Including cutting-edge developments, it also highlights several landmark contributions in the field of virology from India. Additionally, the book features tables and figures showing important clinical data and recommendations, with references for further information. It also explores the economic impact of viral diseases for farmers and the livestock industry, providing several examples. Further, it presents the latest information on viral diseases in global context, with a focus on state-of-art, molecular tools for the development of diagnostics, prophylactics and therapeutics. Lastly, the book also describes the challenges posed by the emerging and transboundary viral infections and our preparedness to counter them.

Immunoinformatics

This book provides an essential introduction and guide for oncologists, immunologists and clinicians treating cancer patients.

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