Viruses And Nanotechnology Current Topics In Microbiology And Immunology

This book reviews the various applications of nanotechnology in human health. The introductory chapters focus on the classifications, types, synthesis, and characterization of various types of nanomaterials, while subsequent chapters highlight current

applications of nanomaterials in the diagnosis and treatment of microbial and viral infections, and also in stem cell biology and regenerative medicine. Further, the book explores the potential role of nanomaterials in connection with neuronal differentiation, neuronal protection, and neurological diseases. It demonstrates the use of nanotechnology to diagnose and treat genetic disorders, as well as endocrine and metabolic syndrome diseases. It also

discusses the ethics and the negative impacts of nanomaterials on human health. Lastly, it examines the intellectual property aspects and government regulations associated with the research, design, and commercialization of nanotechnology-based products. Given its scope, it offers a valuable resource for all researchers and professionals working with nanotechnology-based applications in human health.

In this volume, the

authors provide an excellent overview of how far the plant viral vector field has come. The discipline is no longer exclusively in the domain of academics—there is a small, but growing number of small biotechnology companies that exploit plant viruses as the platform for commercial innovation in crop improvement, industrial product manufacturing, and human and veterinary health care.
Polymers and Nanomaterials for Gene Therapy provides the latest information on

gene therapy, a topic that has attracted significant attention over the past two decades for the treatment of inherited and acquired genetic diseases. Major research efforts are currently focused on designing suitable carrier vectors that compact and protect oligonucleotides for gene therapy. The book explores the most recent developments in the field of polymer science and nanotechnology, and how these advancements have helped in the design of advanced materials. Non-viral vector systems,

including cationic lipids, polymers, dendrimers, peptides and nanoparticles, are potential routes for compacting DNA for systemic delivery. However, unlike viral analogues that have no difficulty in overcoming cellular barriers and immune defense mechanisms, non-viral gene carriers consistently exhibit significant reduced transfection efficiency due to numerous extra- and intracellular obstacles. Therefore, biocompatibility and

potential for large-scale production make these compounds increasingly attractive for gene therapy. This book contains chapters on the engineering of polymers and nanomaterials for gene therapy, and how they can form complexes with DNA and avoid both in vitro and in vivo barriers. Other chapters describe in vitro, ex vivo, in vivo gene therapy studies, and the current issues affecting non-viral gene therapy. Explores current challenges in the research of genetic diseases

Discusses polymers for gene therapy and their function in designing advanced materials
Provides examples of organic and inorganic nanomaterials for gene therapy Includes labeling, targeting, and assays
Looks at characterization, physico-(bio)chemical properties, and applications
Presents nanobiotechnology in drug delivery and disease management
Featuring contributions from noted experts in the field, this book highlights recent advances

in the nano-based drug delivery systems. It also covers the diagnosis and role of various nanomaterials in the management of infectious diseases and non-infectious disorders, such as cancers and other malignancies and their role in future medicine. Nanobiotechnology in Diagnosis, Drug Delivery and Treatment starts by introducing how nanotechnology has revolutionized drug delivery, diagnosis, and treatments of diseases. It then focuses on the role

of various nanocomposites in diagnosis, drug delivery, and treatment of diseases like cancer, Alzheimer's disease, diabetes, and many others. Next, it discusses the application of a variety of nanomaterials in the diagnosis and management of gastrointestinal tract disorders. The book explains the concept of nanotheranostics in detail and its role in effective monitoring of drug response, targeted drug delivery, enhanced drug accumulation in the target tissues, sustained as well

as triggered release of drugs, and reduction in adverse effects. Other chapters cover aptamer-incorporated nanoparticle systems; magnetic nanoparticles; theranostics and vaccines; toxicological concerns of nanomaterials used in nanomedicine; and more. Provides a concise overview of state-of-the-art nanomaterials and their application like drug delivery in infectious diseases and non-infectious disorders Highlights recent advances in the nano-based drug

delivery systems and role of various nanomaterials Introduces nano-based sensors which detect various pathogens Covers the use of nanodevices in diagnostics and theranostics Nanobiotechnology in Diagnosis, Drug Delivery and Treatment is an ideal book for researchers and scientists working in various disciplines such as microbiology, biotechnology, nanotechnology, pharmaceutical biotechnology, pharmacology,

pharmaceutics, and nanomedicine.
Handbook of Research on Diverse Applications of Nanotechnology in Biomedicine, Chemistry, and Engineering
Development and Characterization of Genetically Engineered M13 Bacteriophage as Tissue Engineering Materials
Synthesis, Properties, Characterization, and Application
Manufacturing Processes and Products
Polymers and Nanomaterials for Gene Therapy

From the Introduction:

Nanotechnology and its underpinning sciences are progressing with unprecedented rapidity. With technical advances in a variety of nanoscale fabrication and manipulation technologies, the whole topical area is maturing into a vibrant field that is generating new scientific research and a burgeoning range of commercial applications, with an annual market already at the trillion dollar threshold. The means of fabricating and controlling matter on the nanoscale afford striking and unprecedented opportunities to exploit a variety of exotic phenomena such as quantum, nanophotonic and

nanoelectromechanical effects. Moreover, researchers are elucidating new perspectives on the electronic and optical properties of matter because of the way that nanoscale materials bridge the disparate theories describing molecules and bulk matter. Surface phenomena also gain a greatly increased significance; even the well-known link between chemical reactivity and surface-to-volume ratio becomes a major determinant of physical properties, when it operates over nanoscale dimensions. Against this background, this comprehensive work is designed to address the need for a dynamic, authoritative and readily accessible

source of information, capturing the full breadth of the subject. Its six volumes, covering a broad spectrum of disciplines including material sciences, chemistry, physics and life sciences, have been written and edited by an outstanding team of international experts. Addressing an extensive, cross-disciplinary audience, each chapter aims to cover key developments in a scholarly, readable and critical style, providing an indispensible first point of entry to the literature for scientists and technologists from interdisciplinary fields. The work focuses on the major classes of nanomaterials in terms of their synthesis, structure and

applications, reviewing nanomaterials and their respective technologies in well-structured and comprehensive articles with extensive cross-references. It has been a constant surprise and delight to have found, amongst the rapidly escalating number who work in nanoscience and technology, so many highly esteemed authors willing to contribute. Sharing our anticipation of a major addition to the literature, they have also captured the excitement of the field itself in each carefully crafted chapter. Along with our painstaking and meticulous volume editors, full credit for the success of this enterprise must go to these

individuals, together with our thanks for (largely) adhering to the given deadlines. Lastly, we record our sincere thanks and appreciation for the skills and professionalism of the numerous Elsevier staff who have been involved in this project, notably Fiona Geraghty, Megan Palmer and Greg Harris, and especially Donna De Weerd-Wilson who has steered it through from its inception. We have greatly enjoyed working with them all, as we have with each other.

A thorough overview of nanobiotechnology and its place in advances in applied science and engineering, The Nanobiotechnology Handbook

combines contributions from physics, bioorganic and bioinorganic chemistry, molecular and cellular biology, materials science, and medicine as well as from mechanical, electrical, chemical, and biomedical engineering

With the huge experience more than a decade as an author, co-author and reviewer, the editors decided to share the knowledge on the current problem which is COVID-19. The information about corona virus and its impact on various aspects including society, economy and the quality of life is clearly given in this book. The virus has been spread across the globe and troubling the

mankind. Till date, several countries have been damaged literally not only with the lives, but also with the loss of economy, mental ability, psychological issues etc. More variants of this virus have also been observed with more severity and damage to the humans. This pandemic affected the life of the people socially, economically, physically, and mentally. The human loss through this pandemic cannot be recovered. The awareness about the virus, its transmission and precautions, causative ways, different methods of drugs etc. needs to be provided to the layman and as whole to the community. This book mainly aims to answer all

the above raised issues and worked out thoroughly. Thus, this book is a comprehensive information with basic knowledge about different aspects surrounding COVID-19. Layman, Young researchers, basic science graduates, medical and clinical sciences graduates, students, hospital workers, nurses, doctors, engineers, and every professional area of people can benefit from this book.

Interest in RNA nanotechnology has increased in recent years as recognition of its potential for applications in nanomedicine has grown. Edited by the world's foremost experts in nanomedicine, this comprehensive, state-of-the-art

reference details the latest research developments and challenges in the biophysical and single molecule approaches in RNA nanotechnology. In addition, the text also provides in-depth discussions of RNA structure for nanoparticle construction, RNA computation and modeling, single molecule imaging of RNA, RNA nanoparticle assembly, RNA nanoparticles in therapeutics, RNA chemistry for nanoparticle synthesis, and conjugation and labeling.

Foodborne Diseases

Coronaviruses: Transmission, Frontliners, Nanotechnology and Economy

Structure-based Study of Viral Replication

Encyclopedia of Virology

Fundamentals of Nanoparticles

Nanotechnology is an interdisciplinary field that is rapidly evolving and expanding. Significant advancements have been made in nanotechnology-related disciplines in the past few decades and continued growth and progression in the field are anticipated. Moreover, nanotechnology, omnipresent in innovation, has been applied to resolve critical challenges in nearly every field, especially those related to biological technologies and processes. This book, used as either a textbook for a short course or a reference book, provides state-of-the-art analysis of essential topics in

nanotechnology for bioengineers studying and working in biotechnology, chemical/biochemical, pharmaceutical, biomedical, and other related fields. The book topics range from introduction to nanotechnology and nanofabrication to applications of nanotechnology in various biological fields. This book not only intends to introduce bioengineers to the amazing world of nanotechnology, but also inspires them to use nanotechnology to address some of the world's biggest challenges.

Ch. 1. Human rhinovirus cell entry and uncoating / Renate Fuchs and Dieter Blaas -- ch. 2. Role of lipid microdomains in influenza virus multiplication / Makoto Takeda -- ch. 3. Functions of integrin alpha2beta1, a

collagen receptor, in the internalization of echovirus 1 / Varpu Marjomäki ... [et al.] -- ch. 4. Entry mechanism of murine and SARS coronaviruses - similarity and dissimilarity / Fumihiro Taguchi -- ch. 5. Hepatitis viruses, signaling events, and modulation of the innate host response / Syed Mohammad Moin, Anindita Kar-Roy and Shahid Jameel -- ch. 6. Virus-cell interaction of HCV / Hideki Tani ... [et al.] -- ch. 7. RNA replication of hepatitis C virus / Hideki Aizaki and Tetsuro Suzuki -- ch. 8. Structure and dynamics in viral RNA packaging / Thorsten Dieckmann and Marta Zumwalt -- ch. 9. Rational design of viral protein structures with predetermined immunological properties / James Lara and Yury

Khudyakov -- ch. 10. Bioinformatics resources for the study of viruses at the Virginia Bioinformatics Institute / Anjan Purkayastha ... [et al.] -- ch. 11. Virus architecture probed by atomic force microscopy / A. J. Malkin ... [et al.] -- ch. 12. Filovirus assembly and budding / Takeshi Noda and Yoshihiro Kawaoka -- ch. 13. Challenges in designing HIV Env immunogens for developing a vaccine / Indresh K. Srivastava and R. Holland Cheng -- ch. 14. Insights into the Caliciviridae family / Grant Hansman -- ch. 15. Mathematical approaches for stoichiometric quantification in studies of viral assembly and DNA packaging / Peixuan Guo, Jeremy Hall and Tae Jin Lee -- ch. 16. Virus-like particles of fish nodavirus / Chan-Shing Lin -- ch.

17. The assembly of the double-layered capsids of phytoreoviruses / Toshihiro Omura ... [et al.] -- ch. 18. Structure and assembly of human herpesviruses: new insights from cryo-electron microscopy and tomography / Z. Hong Zhou and Pierrette Lo -- ch. 19. Human papillomavirus type 16 capsid proteins: immunogenicity and possible use as prophylactic vaccine antigens / Tadahito Kanda, Kei Kawana and Hiroyuki Yoshikawa -- ch. 20. Chimeric recombinant Hepatitis E virus-like particles presenting foreign epitopes as a novel vector of vaccine by oral administration / Yasuhiro Yasutomi -- ch. 21. Nucleocapsid protein of hantaviruses (Bunyaviridae): structure and functions / Alexander Plyusnin ... [et al.] -- ch. 22. Astrovirus

replication: an overview / Susana Guix, Albert Bosch and Rosa M. Pintó -- ch. 23. DNA vaccines against viruses / Britta Wahren and Margaret Liu -- ch. 24. Life cycles of polyomaviridae - DNA tumor virus / Masaaki Kawano, Hiroshi Handa and R. Holland Cheng

Nanotechnology is a multidisciplinary field that is revolutionizing the way we detect and treat damage to the human body. Nanomedicine applies nanotechnology to highly specific medical interventions for the prevention, diagnosis, and treatment of diseases. They are increasingly being used to overcome biological barriers in the body to improve the way we deliver compounds to specific tissues and organs. In particular, nanomedicines have been shown to be beneficial for

stabilizing therapeutic compounds, overcoming obstacles to cellular and tissue uptake, and improving biodistribution of compounds to target sites in vivo. Nanomedicines have demonstrated significant therapeutic advantages for a multitude of biomedical applications, however the clinical translation of these nanotechnology platforms has not progressed as quickly as the plethora of positive results would have suggested. Understanding the advances in nanomedicine to date and the challenges that still need to be overcome, will allow future research to improve on existing platforms and to address the current translational and regulatory limitations. This eBook “Advances and Challenges in

Nanomedicine" has brought together experts in the fields of nanomedicine, nanotechnology, nanotoxicology, pharmaceutics, manufacturing, and translation to discuss the application of nanotechnology to drug delivery. This information is presented as original research, opinion, perspective, and review articles. The goal of this eBook is to generate collaborative discussion on the current status, general trends, challenges, strategies, and future direction of pharmaceutical nanotechnology, as well as highlight current and emerging nanoparticulate platforms with potential medical applications.

Emerging Topics in Physical Virology is a state-of-the-art account of recent advances in the experimental analysis

and modeling of structure, function and dynamics of viruses. It is the first interdisciplinary book that integrates a review of relevant experimental techniques, such as cryo-electron microscopy, atomic force microscopy and mass spectrometry with the latest results on the biophysical and mathematical modeling of viruses. The book comprehensively covers the structure and physical properties of the protein envelopes that encapsulate and hence protect the delicate viral genome, their assembly and disassembly, the organization of the viral genome, infection, evolution, as well as applications of viruses in Biomedical Nanotechnology. It is an essential primer for scientists working in all aspects of virology, including the

increasing use of viruses and virus-like particles in bio- and nano-technology. Its review style makes it moreover suitable for non-experts as an introduction into this exciting research area. Contents:Cryo-Electron Microscopy of Viruses (N A Ranson & P G Stockley)What Does It Take to Make a Virus: The Concept of the Viral "Self" (N G A Abrescia et al.)Beyond Quasi-Equivalence: New Insights Into Viral Architecture via Affine Extended Symmetry Groups (T Keef & R Twarock)Mechanical Properties of Viruses (W H Roos & G J L Wuite)Investigating Viral Structure, Function and Dynamics with Mass Spectrometry (E B Monroe & P E Prevelige)An Overview of Capsid Assembly Kinetics (J Z Porterfield & A

Zlotnick)Assembly and Disassembly of Deltahedral Viral Shells (A Yu Morozov et al.)What Determines the Size of an RNA Virus? (C M Knobler & W M Gelbart)Physics of Viral Infectivity: Matching Genome Length with Capsid Size (A Evilevitch & M Castelnovo)Topology of Viral DNA (J Arsuaga et al.)The Use of Viruses in Biomedical Nanotechnology (K J Koudelka & M Manchester) Readership: Biologists, biophysicists, chemists, clinicians and mathematical biologists interested in virus structure, function and dynamics. Keywords:Virology;Modeling;Virus Assembly;Virus Structure;Genome Organisation;Cryo-Electron Microscopy;Mass Spectrometry;Viral Evolution

Structure and Physics of Viruses
Nanotechnology Commercialization
Application of Nanotechnology in Food Science and Food Microbiology
Visualizing Immunity
Viral and Antiviral Nanomaterials
Recent Developments in Applied Microbiology and Biochemistry provides a comprehensive treatment and understanding on application oriented microbial concepts, giving readers insights into recent developments in microbial biotechnology and medical, agricultural and environmental microbiology. Discusses microbial proteomics and their importance in medical microbiology Explores emerging trends in the prevention of

current global health problems, such as cancer and obesity
Shows recent approaches in the production of novel enzymes from environmental samples by enrichment culture and metagenomics approaches
Guides readers through the status and recent developments in analytical methods for the detection of foodborne microorganisms
A virus is considered a nanoscale organic material that can infect and replicate only inside the living cells of other organisms, ranging from animals and plants to microorganisms, including bacteria and archaea. The structure of viruses consists

of two main parts: the genetic material from either DNA or RNA that carries genetic information, and a protein coat, called the capsid, which surrounds and protects the genetic material. By inserting the gene encoding functional proteins into the viral genome, the functional proteins can be genetically displayed on the protein coat to form bioengineered viruses. Therefore, viruses can be considered biological nanoparticles with genetically tunable surface chemistry and can serve as models for developing virus-like nanoparticles and even nanostructures. Via this process

of viral display, bioengineered viruses can be mass-produced with lower cost and potentially used for energy and biomedical applications. This book highlights the recent developments and future directions of virus-based nanomaterials and nanostructures. The virus-based biomimetic materials formulated using innovative ideas were characterized for the applications of biosensors and nanocarriers. The research contributions and trends on virus-based materials covering energy harvesting devices to tissue regeneration in the last two decades are discussed.

"Tobacco Mosaic Virus (TMV) is an RNA plant virus which in its native form is made up of an 18 nm diameter protein capsid that self-assembles around a single stranded RNA (ssRNA) genome. Due to its unique features TMV has attracted recent interest as a template for producing a variety of novel materials and devices with highly desired optical and electronic properties for use in a broad range of fields including memory storage and plasmonic applications. As TMV based technology develops significant challenges must be overcome in the future including infectivity and self-assembly issues. We propose using poly A RNA as an

alternative to the native TMV RNA to form poly A containing TMV-like rods as poly A overcomes many of the possible future and current issues and furthermore is potentially more versatile than TMV RNA for use in the field of nanotechnology. Here we present evidence which suggest that poly A is indeed able to form TMV-like rods through interaction with TMV coat protein. Furthermore we present visual evidence using TEM and AFM to confirm that the rods formed using poly A as the nucleating RNA strand have the same shape and dimensions of TMV rods. The possibility and utility of tethering poly A

containing TMV-like rods to a gold surface will also be discussed." --

Epidemiology of Endocrine Tumors brings current data and clinical research into one source for a multidisciplinary audience. The book discusses the prevalence, incidence, etiology, pathology, diagnosis and treatment of various endocrine tumors. With clear and focused writing, it is essential reading for healthcare professionals, endocrinologists, oncologists, and public health professionals. Users will be able to bridge the knowledge gap that exists in the comprehensive coverage surrounding the epidemiology of

endocrine tumors. Globally, the prevalence and incidence of endocrine tumors is high. This audience needs a treatise where they can gain a broad overview of endocrine tumors with a focus on epidemiology. Supplies information about the epidemiology of various endocrine tumors, both benign and malignant, to endocrinologists, oncologists and related health care professionals Focuses on the impact upon costs and patient deaths due to complications of these tumors Describes how endocrine tumors affect various age groups and ethnicities, discussing the prevention of

endocrine tumors Presents chapters on Cancer Problem, Specific Endocrine Tumors, Prevention, Detection and Diagnosis, and Treatment of Endocrine Tumors Provides review questions with an answer key and detailed glossary

The Nanobiotechnology Handbook

Viruses and Nanotechnology

Poly Adenosine Monophosphate Ribonucleic Acid Mediated Tobacco Mosaic Virus-like Rod Self-assembly as an Alternative to Tobacco Mosaic Virus Rod Use in Future Nanotechnology Applications

Applications of Nanomaterials in Human Health

Current Topics in Tropical Emerging Diseases and Travel Medicine

Viral Nanotechnology presents an up-to-date overview of the rapidly developing field of viral nanotechnology in the areas of immunology, virology, microbiology, chemistry, physics, and mathematical modeling. Its chapters are by leading researchers and practitioners, making it both a comprehensive and indispensable resource for study and research. The field of viral nanotechnology is new and quickly expanding due to increasing demand of the applications already

developed. The editors identify viral nanotechnology as a significant science that concerns itself with how to use the molecular modules that the distinctly different science of molecular engineering only constructs. The current potential applications of viral technology are manifold, with opportunities to revolutionize practices in photonics, catalysis, electronics, energy, biomedicine, health care, and public health. This book emphasizes using viral nanotechnology to improve health. A special emphasis is placed upon using viral

nanotechnology for developing vaccines. In addition, it documents viral nanotechnology's use as a powerful tool for developing drugs and genetic therapies. There is also great potential in its use as a means for diagnostics, including the development of diagnostic reagents and novel imaging technologies for detecting disease and infectious agents. Viral nanotechnology's rapid and exciting growth is due to the need for new tools in the prevention, diagnosis, and treatment of disease. The contributors to this volume approach each chapter with the hope that their

research and practices will contribute to an improvement in health and life on an unprecedented scale in human history.

Nanotechnology in Diagnosis, Treatment and Prophylaxis of Infectious Diseases delivers comprehensive coverage of the application of nanotechnology to pressing problems in infectious disease. This text equips readers with cutting-edge knowledge of promising developments and future prospects in nanotechnology, paying special attention to microbes that are now resistant to conventional antibiotics, a concerning problem in modern medicine.

Readers will find a thorough discussion of this new approach to infectious disease treatment, including the reasons nanotechnology presents a promising avenue for the diagnosis, treatment, and prophylaxis of infectious diseases. Provides a comprehensive overview of the use of nanotechnology in the treatment and diagnosis of infectious diseases Covers all common types of infective agents, including bacteria, viruses, fungi, and protozoa, along with their vectors, ticks, mosquitoes, flies, etc. Delivers commentary from an international researcher

base, providing insights across differing economic statuses Includes a foundation of basic nanotechnological concepts to aid in designing new strategies to combat several pathogenic diseases and cancer Illustrates the high antimicrobial potential of nanoparticles, ultimately demonstrating how they are a promising alternative class that can be successfully used in fighting a myriad of infections

Describing how the utilization of viral nanoparticles (VNPs) in nanosciences and nanotechnology has become a popular field of research,

this concise study provides an overview of the many applications of VNPs, in areas ranging from materials science to biomedicine. With summarized chapters on the many different VNP building blocks; chemistries that allow one to attach, entrap, or display functionalities; potential applications, such as their use as gene-delivery vectors, novel vaccines, imaging modalities, and in applications in targeted therapeutics; and the manifold achievements toward utilizing VNPs as tools for novel biosensors and nanoelectronic devices, this informed report is an

invaluable insight into the developing field of VNPs.
Fundamentals of Nanoparticles: Classifications, Synthesis Methods, Properties and Characterization explores the nanoparticles and architecture of nanostructured materials being used today in a comprehensive, detailed manner. This book focuses primarily on the characterization, properties and synthesis of nanoscale materials, and is divided into three major parts. This is a valuable reference for materials scientists, and chemical and mechanical engineers working in R&D and

academia, who want to learn more about how nanoparticles and nanomaterials are characterized and engineered. Part one covers nanoparticles formation, self-assembly in the architecture nanostructures, types and classifications of nanoparticles, and signature physical and chemical properties, toxicity and regulations. Part two presents different ways to form nanometer particles, including bottom-up and top-down approaches, the classical and non-classical theories of nanoparticles formation and self-assembly, surface functionalization and other surface treatments

to allow practical use. Part three covers characterization of nanoparticles and nanostructured materials, including the determination of size and shape, in addition to atomic and electronic structures and other important properties. Includes new physical and chemical techniques for the synthesis of nanoparticles and architecture nanostructures Features an in-depth treatment of nanoparticles and nanostructures, including their characterization and chemical and physical properties Explores the unusual properties of

materials that are developed by modifying their shape and composition and by manipulating the arrangement of atoms and molecules

Explains important techniques for the synthesis, fabrication and the characterization of complex nano-architectures

An Integrated Textbook

Advances and Challenges in Nanomedicine

Tools for Material Science and Biomedicine

Exploring an Emerging Technique of Nanotechnology in Vaccine Design and Manufacturing to combat SARS-CoV-2.

Viral Nanoparticles

Emerging Topics in Physical

Virology is a state-of-the-art account of recent advances in the experimental analysis and modeling of structure, function and dynamics of viruses. It is the first interdisciplinary book that integrates a review of relevant experimental techniques, such as cryo-electron microscopy, atomic force microscopy and mass spectrometry with the latest results on the biophysical and mathematical modeling of viruses. The book comprehensively covers the structure and physical properties of the protein envelopes that encapsulate and hence protect the

delicate viral genome, their assembly and disassembly, the organization of the viral genome, infection, evolution, as well as applications of viruses in Biomedical Nanotechnology. It is an essential primer for scientists working in all aspects of virology, including the increasing use of viruses and virus-like particles in bio- and nano-technology. Its review style makes it moreover suitable for non-experts as an introduction into this exciting research area. As a paradigm for the future, micro-scale technology seeks to fuse revolutionary concepts in

science and engineering and then translate it into reality. Nanotechnology is an interdisciplinary field that aims to connect what is seen with the naked eye and what is unseen on the molecular level. The Handbook of Research on Diverse Applications of Nanotechnology in Biomedicine, Chemistry, and Engineering examines the strengths and future potential of micro-scale technologies in a variety of industries. Highlighting the benefits, shortcomings, and emerging perspectives in the application of nano-scale technologies, this book is a comprehensive reference

source for synthetic chemists, engineers, graduate students, and researchers with an interest in the multidisciplinary applications, as well as the ongoing research in the field.

This book recalls the basics required for an understanding of the nanoworld (quantum physics, molecular biology, micro and nanoelectronics) and gives examples of applications in various fields: materials, energy, devices, data management and life sciences. It is clearly shown how the nanoworld is at the crossing point of knowledge and innovation.

Written by an expert who spent a large part of his professional life in the field, the title also gives a general insight into the evolution of nanosciences and nanotechnologies. The reader is thus provided with an introduction to this complex area with different "tracks" for further personal comprehension and reflection. This guided and illustrated tour also reveals the importance of the nanoworld in everyday life.

Exploring an Emerging Technique of Nanotechnology in Vaccine Design and Manufacturing to combat SARS-CoV-2. Nanoparticles are

loosely defined as nanoscale-sized and tunable particulate structures that mimic structural features of natural viruses. Besides traditional vaccine modalities and DNA and vector-based vaccines, nanoparticle vaccines offer a unique opportunity to advance vaccine science and provide tractable solutions to the current pandemic and beyond. This adaptive design makes them highly promising platforms for next-generation vaccine development, providing pathways to drive strong nAb responses, or broader antibody-based immunity that might better account for

variation and evolution of viral pathogens. COVID-19 has become a major cause of global mortality and driven massive health and economic disruptions. At present, over 26 nanoparticle vaccine candidates have advanced into clinical testing, with ?60 more in pre-clinical development. Hence an attempt has been made in this Booklet to explore the emerging technique of nanotechnology in vaccine design and manufacturing to combat SARS-CoV-2, and highlight opportunities and challenges presented by these novel vaccine platforms. …Dr. H. K. Saboowala. M.B.(Bom)

.M.R.S.H.(London)

Epidemiology of Endocrine Tumors

Recent Developments in Applied Microbiology and Biochemistry

Plant Viral Vectors

Dengue Virus

Nanotechnology in Diagnosis, Treatment and Prophylaxis of Infectious Diseases

Nanotechnology is a collective term describing a broad range of relatively novel topics. Scale is the main unifying theme, with nanotechnology being concerned with matter on the nanometer scale. A

quintessential tenet of nanotechnology is the precise self-assembly of nanometer-sized components into ordered devices. Nanotechnology seeks to mimic what nature has achieved, with precision at the nanometer level down to the atomic level. Nanobiotechnology, a division of nanotechnology, involves the exploitation of biomaterials, devices or methodologies in the nanoscale. In recent years a set of b- molecules has

been studied and utilized. Virus particles are natural nanomaterials and have recently received attention for their tremendous potential in this field. The extensive study of viruses as pathogens has yielded detailed knowledge about their biological, genetic, and physical properties. Bacterial viruses (bacteophages), plant and animal eukaryotic viruses, and viruses of archaea have all been characterized in this manner. The knowledge

of their replicative cycles allows manipulation and tailoring of particles, relying on the principles of self-assembly in infected hosts to build the base materials. The atomic resolution of the virion structure reveals ways in which to tailor particles for higher-order functions and assemblies. This update on SARS-CoV-2 focuses on basic knowledge about the virus and COVID-19 treatment. Chapters present basic information about the disease and its

treatment. The virology, epidemiology, etiology, and damage response framework of SARS-CoV-2 are also discussed in detail. The book also covers recent topics of interest to pharmacology scholars such as the immunopathogenesis of SARS-CoV2, nanotechnology, repurposed drug treatments, COVID-19 vaccines, and phytomedicine for COVID-19 therapeutics. Readers in pharmacology, virology and medicine will

find the book a simple, yet informative update on SARS-CoV-2 and COVID-19 treatment. Encyclopedia of Virology, Fourth Edition, builds on the solid foundation laid by the previous editions, expanding its reach with new and timely topics. In five volumes, the work provides comprehensive coverage of the whole virosphere, making this a unique resource. Content explores viruses present in the environment and the pathogenic viruses of humans, animals, plants

and microorganisms. Key areas and concepts concerning virus classification, structure, epidemiology, pathogenesis, diagnosis, treatment and prevention are discussed, guiding the reader through chapters that are presented at an accessible level, and include further readings for those needing more specific information. More than ever now, with the Covid19 pandemic, we are seeing the huge impact viruses have on our life and society. This

encyclopedia is a must-have resource for scientists and practitioners, and a great source of information for the wider public. Offers students and researchers a one-stop shop for information on virology not easily available elsewhere Fills a critical gap of information in a field that has seen significant progress in recent years Authored and edited by recognized experts in the field, with a range of different expertise, thus ensuring a

high-quality standard This book offers a comprehensive review of basic and clinical research on Varicella-zoster Virus, the only human herpesvirus for which vaccines to prevent both primary and recurrent infection are approved.

Nanobiotechnology in Diagnosis, Drug Delivery and Treatment

Virus-Based Nanomaterials and Nanostructures

Viral Nanotechnology

An Update on SARS-

CoV-2: Damage-response Framework, Potential Therapeutic Avenues and the Impact of Nanotechnology on COVID-19 Therapy Classifications, Synthesis Methods, Properties and Characterization

Nanotechnology is a fast-evolving discipline that already produces outstanding basic knowledge and industrial applications for the benefit of society. It is a new emerging and fascinating field of science, that permits advanced research in many areas. The first applications of nanotechnology mainly concerned material sciences; applications in the agriculture and food sectors are still emerging. Food science

nanotechnology is an area of rising attention that unties new possibilities for the food industry. Due to the rapid population growth there is a need to produce food and beverages in a more efficient, safe and sustainable way. The application of nanotechnology in food has also gained great importance in recent years in view of its potential application to improve production of food crops, enhance nutrition, packaging and food safety overall. The new materials, products and applications are anticipated to bring lots of improvements to the food and related sectors, impacting agriculture and food production, food processing, distribution, storage, sanitation as well as the development of innovative products and sensors for effective detection of contaminants. Therefore, nanotechnology present with a large potential to provide an opportunity for the researchers of food

science, food microbiology and other fields, to develop new tools for incorporation of nanoparticles into food system that could augment existing functions and add new ones. However, the number of relative publications currently available is rather small. The present Research Topic aims to provide with basic information and practical applications regarding all aspects related to the applications of nanotechnology in food science and food microbiology, namely, nanoparticle synthesis, especially through the eco-friendly perspective, potential applications in food processing, biosensor development, alternative strategies for effective pathogenic bacteria monitoring as well as the possible effects on human health and the environment.

This book contemplates the structure, dynamics and physics of virus particles: From the moment they come into existence

by self-assembly from viral components produced in the infected cell, through their extracellular stage, until they recognise and infect a new host cell and cease to exist by losing their physical integrity to start a new infectious cycle. (Bio)physical techniques used to study the structure of virus particles and components, and some applications of structure-based studies of viruses are also contemplated. This book is aimed first at M.Sc. students, Ph.D. students and postdoctoral researchers with a university degree in biology, chemistry, physics or related scientific disciplines who share an interest or are actually working on viruses. We have aimed also at providing an updated account of many important concepts, techniques, studies and applications in structural and physical virology for established scientists working on viruses, irrespective of their physical, chemical or

biological background and their field of expertise. We have not attempted to provide a collection of for-experts-only reviews focused mainly on the latest research in specific topics; we have not generally assumed that the reader knows all of the jargon and all but the most recent and advanced results in each topic dealt with in this book. In short, we have attempted to write a book basic enough to be useful to M.Sc and Ph.D. students, as well as advanced and current enough to be useful to senior scientists with an interest in Structural and/or Physical Virology.

This book summarizes the synthesis, properties, characterization, and application of viral and antiviral nanomaterials by using interdisciplinary subjects ranging from materials science to biomedical science. Viral and Antiviral Nanomaterials: Synthesis, Properties,

Characterization, and Application highlights attainments in utilizing nanomaterials as powerful tools for the treatment of viral infections in plants, animals, and humans. It reviews the adopted strategies for designing viral and antiviral nanomaterials for medical applications, including cancer therapy and drug delivery. It also explains the different kinds of antiviral nanosized structures, their chemistries, and the attributes that enable them to be suitable targets for nanotherapeutics. The contributors have prepared the content in a comprehensive manner for readers to use their research findings to improve the healthcare of all living beings. FEATURES Reviews the novel tools for synthesis and characterization of nanomaterials as viral and antiviral agents Explores the different applications of currently available nanomaterials for

the treatment of viral infections Investigates the role of antiviral nanodrugs in human and plant systems Addresses the activity of nanostructures in drug-delivery systems for cancer treatment Allows readers from various backgrounds to access the advanced research and practices across traditional frontiers Discusses viral nanomaterials as the viable future of antiviral drugs and nanovaccines in animals and humans This authoritative book is of exceptional relevance to postgraduate scholars, researchers, and scientists interested in nanomedicine, biomedical science, materials science, biopharmaceutical technology, microbiology, and virology to improve virus- and cancer-based therapeutic tools for animal and human welfare.

Scientific research on dengue has a long and rich history. The literature has been

touched by famous names in medicine- Benjamin Rush, Walter Reed, and Albert Sabin, to name a very few- and has been fertile ground for medical historians . The advances made in those early investigations are all the more remarkable for the limited tools available at the time. The demonstration of a viral etiology for dengue fever, the recognition of mosquitoes as the vector for transmission to humans, and the existence of multiple viral variants (serotypes) with only partial cross-protection were all accomplished prior to the ability to culture and characterize the etiologic agent. Research on dengue in this period was typically driven by circumstances. Epidemics of dengue created public health crises, although these were relatively short-lived in any one location, as the population of susceptible individuals quickly shrank. Military considerations became as a major

driving force for research. With the introduction of large numbers of non-immune individuals into endemic areas, dengue could cripple military readiness, taking more soldiers out of action than hostile fire. Dengue and dengue hemorrhagic fever, which assumed pandemic proportions during the latter half of the last century, have shown no indication of slowing their growth during this first decade of the twenty-first century. Challenges remain in understanding the basic mechanisms of viral replication and disease pathogenesis, in clinical management of patients, and in control of dengue viral transmission. Nevertheless, new tools and insights have led to major recent scientific advances. As the first candidate vaccines enter large-scale efficacy trials, there is reason to hope that we may soon "turn the corner" on this disease.

RNA Nanotechnology and Therapeutics
Emerging Topics in Physical Virology
Nanotechnology for Bioengineers
Comprehensive Nanoscience and Technology
An Introduction to Nanoscience and Nanotechnology

A fascinating and informative look at state-of-the-art nanotechnology research, worldwide, and its vast commercial potential Nanotechnology Commercialization: Manufacturing Processes and Products presents a detailed look at the state of the art in nanotechnology and explores key issues that must still be addressed in order to successfully commercialize that vital technology. Written by a team of distinguished experts in the field, it covers a range of applications notably: military, space, and commercial transport applications, as well as

applications for missiles, aircraft, aerospace, and commercial transport systems. The drive to advance the frontiers of nanotechnology has become a major global initiative with profound economic, military, and environmental implications. Nanotechnology has tremendous commercial and economic implications with a projected $ 1.2 trillion-dollar global market. This book describes current research in the field and details its commercial potential—from work bench to market. Examines the state of the art in nanotechnology and explores key issues surrounding its commercialization Takes a real-world approach, with chapters written from a practical viewpoint, detailing the latest research and considering its potential commercial and defense applications Presents the current research and

proposed applications of nanotechnology in such a way as to stimulate further research and development of new applications Written by an all-star team of experts, including pioneer patent-holders and award-winning researchers in nanotechnology The major challenge currently faced by researchers in nanotechnology is successfully transitioning laboratory research into viable commercial products for the 21st century. Written for professionals across an array of research and engineering disciplines, Nanotechnology Commercialization: Manufacturing Processes and Products does much to help them bridge the gap between lab and marketplace.

Tropical emerging diseases pose a significant risk for the circulation of old

and new pathogens in areas previously unknown, also implying the possibility of new morbidities and mortalities and new consequences for naïve populations. Globalization, migration and travel are key factors for tropical diseases, and represent the need for integration of tropical medicine, travel medicine and epidemiology in the understanding of such complex situations. Neglected tropical diseases such as leprosy or Chagas disease, arboviral diseases, HIV, Ebola, and arenaviral infections are just a few examples. This book tries to update significant epidemiological and clinical research in many aspects with a multinational perspective.

The means by which non-enveloped viruses penetrate cellular membranes during cell entry remain poorly defined.

Recent findings indicate several members of this group share a common mechanism of membrane penetration in which the virus particle undergoes programmed conformational changes, leading to capsid disassembly and release of small membrane-interacting peptides. A complete understanding of host cell entry by this minimal system will help elucidate the mechanisms of non-enveloped virus membrane penetration in general

Researchers have used a variety of techniques over the past century to gain fun- damental insights in the field of immunology and, as technology has advanced, so too has the ability of researchers to delve deeper into the biological mechanics of immunity. The immune system is exceedingly complex and must patrol the entire

body to protect us from foreign invaders. This requires the immune system to be highly mobile and adaptable - able to respond to diverse microbial challenges while maintaining the ability to distinguish self from a foreign invader. This latter feature is of great importance because the immune system is equipped with toxic mediators, and a failure in self/non-self discrimination can result in serious diseases. Fortunately, in most cases, the immune system operates within the framework of its elegant design and protects us from diverse microbial challenges without initiating disease. Because the immune system is not confined to a single tissue, a comprehensive understanding of immunity requires that research be conducted at the molecular, cellular, and systems level. Immune cells often

find customized solutions to h- dling microbial insults that depend on the tissue(s) in which the pathogen is found.

Cell Entry by Non-Enveloped Viruses

Current Topics in the Utilization of Clay in Industrial and Medical Applications

Varicella-zoster Virus

Foodborne Diseases, Third Edition, covers the ever-changing complex issues that have emerged in the food industry over the past decade. This exceptional volume continues to offer broad coverage that provides a foundation for a practical understanding of diseases and to help researchers and scientists manage foodborne illnesses and

prevent and control outbreaks. It explains recent scientific and industry developments to improve awareness, education, and communication surrounding foodborne disease and food safety. Foodborne Diseases, Third Edition, is a comprehensive update with strong new topics of concern from the past decade. Topics include bacterial, fungal, parasitic, and viral foodborne diseases (including disease mechanism and genetics where appropriate), chemical toxicants (including natural intoxicants and bio-toxins), risk-based control measures, and virulence factors of microbial pathogens that cause

disease, as well as epigenetics and foodborne pathogens. Other new topics include nanotechnology, bioterrorism and the use of foodborne pathogens, antimicrobial resistance, antibiotic resistance, and more. Presents principles in disease processes in foodborne illness Includes hot-topic discussions such as the impact of nanotechnology on food safety Provides in-depth description of our current understanding of the infectious and toxic pathogens associated with food Presents cutting-edge research on epigenetics, antimicrobial resistance, and intervention technologies