Applications Of Nanotechnology In Veterinary Medicine

The book introduces the basic concepts of nanotechnology and the various technologies to characterize nanomaterials. It also covers the nanostructural features of mammalian cells/tissues and related nanomechanical properties. In addition, the book comprehensively describes the current state-of-the-art and future perspectives of nanotechnology in biosensors. It also discusses the potential of nanotechnology for delivering the diverse cancer therapeutics and illustrates its limitation due to the potential toxicity associated with oxidative stress. It also highlights the ethical issues and translational aspects related to nanotechnology. Finally, it summarizes the applications of nanotechnology in animal biotechnology, the recent perspectives and future challenges of nanomedicines. The content of the book are beneficial for the undergraduate, postgraduate and doctoral students as well the professionals working in the area of nanotechnology and nanomedicines.

The book focuses on Application of Nanotechnology in Membranes for Water Treatment but not only provides a series of innovative solutions for water reclamation through advanced membrane technology but also serves as a medium to promote international cooperation and networking for the development of advanced membrane technology for Universal well-being and to achieve the common goal of supplying economically, environmentally and societally sustainable freshwater and better sanitation systems. This book is unique because the chapters were authored by established researchers all around the globe based on their recent research findings. In addition, this book provides a holistic coverage of membrane development for water treatment, from the membrane preparation and characterizations to the

performance for specific processes and applications. Since that water scarcity has become a global risk and one of the most serious challenges for the scientific community in this century, the publication of this book is therefore significant as it will serve as a medium for a good reference of an alternative solution in water reclamation. This book will provide the readers with a thorough understanding of the different available approaches for manufacturing membranes both with innovative polymeric systems and inorganic nano-materials which could give enhanced functionalities, catalytic and antimicrobial activities to improve the performance of the existing membranes. It will be useful for leading decision and policy makers, water sector representatives and administrators, policy makers from the governments, business leaders, business houses in water treatment, and engineers/ scientists from both industrialized and developing countries as well.

Nanoparticles may be used in industrial processes, incorporated into consumer products, or applied as biomedical agents. Isotopic (radio)labeling is one of the most powerful methods for nanoparticle tracing in experimental studies. This book presents an introduction to some commonly used nanomaterials, describes various methods with which they may be radiolabeled, and provides illustrative examples of applications of the labeled particles. Finally, it discusses the use of nanomaterials in radiotherapy, the stable isotope labeling technique, and operational health and safety aspects related to the manipulation of nanoparticles in controlled areas. The book will appeal to anyone involved in nanotechnology, molecular imaging, radiochemistry, and nanomedicine.

The integration of nanotechnology with biotechnology has led to great opportunities and revolutionizing technologies in biology and medicine. Targeted delivery of therapeutic agents,

vaccine developments, imaging and novel diagnostic procedures have attracted prime attention of the scientists, who have been able to develop effective and validated nanoparticles and marketable products for human medicine. These developments are expeditiously extending to veterinary medicine because of the similar guiding principles and close linkages between the two disciplines of medicine. Nanotechnology thus has a great potential to revolutionize veterinary medicine, animal production systems and food security. It is important that these emerging technologies form a part of the curriculum of veterinary sciences, particularly in the context of One Health initiatives. This book presents an understanding of the concept, current status and future potential of nanotechnology in veterinary and animal sciences.

A unique book that summarizes the properties, toxicology, and biomedical applications of TiO2-based nanoparticles Nanotechnology is becoming increasingly important for products used in our daily lives. Nanometer-sized titanium dioxide (TiO2) are widely used in industry for different purposes, such as painting, sunscreen, printing, cosmetics, biomedicine, and so on. This book summarizes the advances of TiO2 based nanobiotechnology and nanomedicine, covering materials properties, toxicological research, and biomedical application, such as antibacter, biosensing, and cancer theranostics. It uniquely integrates the TiO2 applications from physical properties, toxicology to various biomedical applications, and includes black TiO2 based cancer theranostics. Beginning with a comprehensive introduction to the properties and applications of nanoparticles, TiO2 Nanoparticles: Applications in Nanobiotechnology, Theranostics and Nanomedicine offers chapters on: Toxicity of TiO2 Nanoparticles; Antibacterial Applications of TiO2 Nanoparticles; Surface Enhanced Raman Spectrum of TiO2

Nanoparticle for Biosensing (TiO2 Nanoparticle Served as SERS Sensing Substrate); TiO2 as Inorganic Photosensitizer for Photodynamic Therapy; Cancer Theranostics of Black TiO2 Nanoparticles; and Neurodegenerative Disease Diagnostics and Therapy of TiO2-Based Nanoparticles. This title: -Blends the physical properties, toxicology of TiO2 nanoparticles to the many biomedical applications -Includes black TiO2 based cancer theranostics in its coverage -Appeals to a broad audience of researchers in academia and industry working on nanomaterials-based biosensing, drug delivery, nanomedicine TiO2 Nanoparticles: Applications in Nanobiotechnology, Theranostics and Nanomedicine is an ideal book for medicinal chemists, analytical chemists, biochemists, materials scientists, toxicologists, and those in the pharmaceutical industry.

Multifunctional Hybrid Nanomaterials for Sustainable Agrifood and Ecosystems shows how hybrid nanomaterials (HNMs) are being used to enhance agriculture, food and environmental science. The book discusses the synthesis and characterization of HNMs before exploring agrifoods and environmental functions. It shows how novel HNMs are being used for the detection and separation of heavy metal ions, for destroying and sensing of insecticides, in managed release fertilizer and pesticide formulations, plant protection, plant promotions, purification, detection, and to control mycotoxins. Further, the book describes the use of silica-based total nanosystems, carbon nanotubes, nanocellulose-based, and polymer nanohybrids for agricultural and biological applications. This book is an important reference source for materials scientists, engineers and food scientists who want to gain a greater understanding on how multifunctional nanomaterials are being used for a range of agricultural and environmental applications. Outlines the major nanomaterial types that are being used in agriculture Explains

why the properties of multifunctional nanomaterials are particularly efficient for use in agriculture Assesses the major challenges of using multifunctional nanomaterials on an industrial scale

This book presents selected topics on nanotechnological applications in the strategic sector of space. It showcases some current activities and multidisciplinary approaches that have given an unprecedented control of matter at the nanoscale and will enable it to withstand the unique space environment. It focuses on the outstanding topic of dual-use nanotechnologies, illustrating the mutual benefits of key enabling materials that can be used successfully both on earth and in space. It highlights the importance of space as a strategic sector in the global economy, with ever-increasing related businesses worldwide. In this light, it dedicates a chapter to the analysis of current and future markets for space-related nanotechnological products and applications.

Nanochemistry Nanophysics Nanoelectronics Molecular Machine Molecular Manufacturing Nanomedicine and Nanobiology Instruments and Methodology Environmental and Social Issues Basic Information Extensive Coverage Step-by-step Explanation Includes Modern Developments Explores Future Aspects Application-oriented Topics Appendices Glossary Chapter-end References Index

After an unidentified flying object is shot down by Russian MiG fighters, a team of scientists from Project Proteus and their ship are reduced to a size smaller than a human cell and sent to penetrate the surface of the mysterious object and uncover its s

An improved understanding of the interactions between nanoparticles and plant

retorts, including their uptake, localization, and activity, could revolutionize crop production through increased disease resistance, nutrient utilization, and crop yield. This may further impact other agricultural and industrial processes that are based on plant crops. This two-volume book analyses the key processes involved in the nanoparticle delivery to plants and details the interactions between plants and nanomaterials. Potential plant nanotechnology applications for enhanced nutrient uptake, increased crop productivity and plant disease management are evaluated with careful consideration regarding safe use, social acceptance and ecological impact of these technologies. Plant Nanobionics: Volume 1, Advances in the Understanding of Nanomaterials Research and Applications begins the discussion of nanotechnology applications in plants with the characterization and nanosynthesis of various microbes and covers the mechanisms and etiology of nanostructure function in microbial cells. It focuses on the potential alteration of plant production systems through the controlled release of agrochemicals and targeted delivery of biomolecules. Industrial and medical applications are included. Volume 2 continues this discussion with a focus on biosynthesis and toxicity.

Nanotechnology in Dermatology is the first book of its kind to address all of the important and rapidly growing aspects of nanotechnology as it relates to

dermatology. In the last few years there has been an explosion in research and development for products and devices related to nanotechnology, including numerous applications for consumers, physicians, patients, and industry. Applications are underway in medicine and dermatology for the early detection, diagnosis, and targeted therapy of disease, and nanodesigned materials and devices are expected to be faster, smaller, more powerful, more efficient, and more versatile than their traditional counterparts. Written by experts working in this exciting field, Nanotechnology in Dermatology specifically addresses nanotechnology in consumer skin care products, in the diagnosis of skin disease, in the treatment of skin disease, and the overall safety of nanotechnology. The book also discusses future trends of this ever-growing and changing field, providing dermatologists, pharmaceutical companies, and consumer cosmetics companies with a clear understanding of the advantages and challenges of nanotechnology today.

The book "Pharmacology and Therapeutics" targets every aspect of the mechanisms for the chemical actions of both traditional and novel drugs. This book covers six sections: Molecular Modeling and Bio-molecular Pharmacology, Immunopharmacology, Environmental Pharmacology and Toxicology, Nanotechnology and Chemotherapy, Drugs and Drug Delivery System and

Addiction Pharmacology. Each of these sections is interwoven with the theoretical aspects and experimental techniques of physiology, biochemistry, nutrition, cellular and molecular biology, microbiology, immunology, genetics, and pathology. This book will be a significant source to scientists, physicians, health care professionals and students who are interested to explore the effect of chemical agents on human life.

Nanotechnology is increasingly used in the food industry in the production, processing, packaging, and preservation of foods. It is also used to enhance flavor and color, nutrient delivery, and bioavailability, and to improve food safety and in quality management. Nanotechnology Applications in the Food Industry is a comprehensive reference book containing exhaustive information on nanotechnology and the scope of its applications in the food industry. The book has five sections delving on all aspects of nanotechnology and its key role in food industry in the present scenario. Part I on Introduction to Nanotechnology in Food Sector covers the technological basis for its application in food industry and in agriculture. The use of nanosized foods and nanomaterials in food, the safety issues pertaining to its applications in foods and on market analysis and consumer perception of food nanotechnology has been discussed in the section. Part II on Nanotechnology in Food Packaging reviews the use of nanopolymers,

nanocomposites and nanostructured coatings in food packaging. Part III on Nanosensors for Safe and Quality Foods provides an overview on nanotechnology in the development of biosensors for pathogen and food contaminant detections, and in sampling and food quality management. Part IV on Nanotechnology for Nutrient Delivery in Foods deals with the use of nanotechnology in foods for controlled and effective release of nutrients. Part V on Safety Assessment for Use of Nanomaterials in Food and Food Production deliberates on the benefits and risks associated with the extensive and long term applications of nanotechnology in food sector.

An overview of nanotechnology and its potential The field of nanotechnology is undergoing rapid developments on many fronts. This reference provides a comprehensive review of various nanotechnologies with a view to their biomedical applications. With chapters contributed by distinguished scientists from diverse disciplines, Biomedical Applications of Nanotechnology : Reviews recent advances in the designing of various nanotechnologies based on nucleic acids, polymers, biomaterials, and metals Discusses biomedical nanotechnology in areas such as drug and gene delivery Covers advanced aspects of imaging and diagnostics Includes a chapter on the issue of nanotoxicology Complete with figures and tables, this is a practical, hands-on reference book for researchers in

pharmaceutical and biotech industries, biomedical engineers, pharmaceutical scientists, pharmacologists, and materials scientists as well as for the policymakers who need to understand the potential of nanotechnology. It is also an excellent resource book for graduate-level students in pharmaceutical sciences, biomedical engineering, and other fields in which nanotechnology is playing an increasingly important role.

Nanotechnology has developed remarkably in recent years and, applied in the food industry, has allowed new industrial advances, the improvement of conventional technologies, and the commercialization of products with new features and functionalities. This progress offers the potential to increase productivity for producers, food security for consumers and economic growth for industries. Food Applications of Nanotechnology presents the main advances of nanotechnology for food industry development. The fundamental concepts of the technique are presented, followed by examples of application in several sectors, such as the enhancement of flavor, color and sensory characteristics; the description of the general concepts of nano-supplements, antimicrobial nanoparticles and other active compounds into food; and developments in the field of packaging, among others. In addition, this work updates readers on the industrial development and the main regulatory aspects for the safety and

commercialization of nanofoods. Features: Provides a general overview of nanotechnology in the food industry Discusses the current status of the production and use of nanomaterials as food additives Covers the technological developments in the areas of flavor, color and sensory characteristics of food and food additives Reviews nanosupplements and how they provide improvements in nutritional functionality Explains the antibacterial properties of nanoparticles for food applications This book will serve food scientists and technologists, food engineers, chemists and innovators working in food or ingredient research and new product development. Gustavo Molina is associate professor at the UFVJM (Diamantina—Brazil) in Food Engineering and head of the Laboratory of Food Biotechnology and conducts scientific and technical research. His research interests are focused on industrial biotechnology. Dr. Inamuddin is currently working as assistant professor in the chemistry department of Faculty of Science, King Abdulaziz University, Jeddah, Saudi Arabia. He is also a permanent faculty member (assistant professor) at the Department of Applied Chemistry, Aligarh Muslim University, Aligarh, India. He has extensive research experience in multidisciplinary fields of analytical chemistry, materials chemistry, and electrochemistry and, more specifically, renewable energy and environment. Prof. Abdullah M. Asiri is professor of organic photochemistry and has been the

head of the chemistry department at King Abdulaziz University since October 2009, as well as the director of the Center of Excellence for Advanced Materials Research (CEAMR) since 2010. His research interest covers color chemistry, synthesis of novel photochromic and thermochromic systems, synthesis of novel coloring matters and dyeing of textiles, materials chemistry, nanochemistry and nanotechnology, polymers, and plastics. Franciele Maria Pelissari graduated in Food Engineering; earned her master's degree (2009) at the University of Londrina (UEL), Londrina, Brazil; and her PhD (2013) at the University of Campinas (Unicamp), Campinas, Brazil. Since 2013, she has been associate professor at the Institute of Science and Technology program at the Federal University of Jequitinhonha and Mucuri (UFVJM), Diamantina, Brazil, in Food Engineering, and also full professor in the graduate program in Food Science and Technology.

This comprehensive reference text discusses advance concepts and applications in the field of nanotechnology. The text presents a detailed discussion of key important concepts including nanomaterials and nanodevices, nano-bio interface, nanoscale memories, and semiconductor nanotechnology. It discusses applications of nanotechnology in the fields of aerospace engineering, cosmetic industry, pharmaceutical science, food industry, and the textile industry. The text

will be useful for senior undergraduate and graduate students in the field of electrical engineering, electronics engineering, nanotechnology, and pharmaceutical science. Discussing fundamental, advanced concepts and their applications in a single volume, this text will be useful as a reference text for senior undergraduate and graduate students in the field of electrical engineering, electronics engineering, nanotechnology, and pharmaceutical science. It comprehensively discusses important concepts such as nano-robotics, carbon-based nanomaterials, and nanoscale memories. The text discusses advanced concepts of nanotechnology and its applications in the fields of textile, pharmaceutical sciences, aerospace, and food industry. It will be an ideal reference text for senior undergraduate and graduate students in the field of electrical engineering, electronics engineering, nanotechnology, and nanoscience.

This new volume discusses the multitude of possibilities for new development in nanotechnology that focuses on overcoming the problems and challenges faced by the biomedical and food industries. The volume hopes to facilitate the development of devices and materials that benefit patients and their healthcare. The book is broken into three parts that cover: nanotechnology techniques for biomedical applications nanoparticles and materials for food, health, and

pharmaceutical application potential applications of nanotechnology in food safety

This pioneering book offers an introduction to photodynamic therapy, a promising new approach in the treatment of complex diseases like cancer and microbial infections in animals. Addressing all aspects, ranging from basics to clinical practice, it presents the history and fundamentals of photodynamic therapy for non-experts. It includes a collection of basic and clinical studies in cancer and infectious diseases, as well as illustrations of successful treatment procedures and future perspectives and innovative applications involving nanotechnology and advanced drug delivery. This valuable resource offers readers insights into how the therapy works and how to apply it effectively in daily practice.

Nanotechnology is changing the world in a very big way, but at the atomic and sub-atomic level. Although the roots of nanotechnology can be traced back to more than a century ago, the last three decades have witnessed an explosion of nano-based technologies and products. This reference work examines the history, current status, and future directions of nanotechnology through an exhaustive search of the technical and scientific literature. The more than 4000 bibliographic citations it includes are carefully organized into core subject areas, and a geographic and subject index allows readers to quickly locate documents

of interest. Although a sense of the global reach and interest in nanotechnology can be gleaned from the reference sections of countless journal articles, conference papers, and books, this is the only reference work providing an in-depth global perspective that is ready-made for nanotechnology professionals and those interested in learning more about all things nanotechnology. Despite the abundance of online resources, there is still an urgent need for well-researched, well-presented, concise, and thematically organized reference works. Instead of relying on wiki pages, citation aggregators, and related websites, the author searched the databases and databanks of scholarly literature search providers such as EBSCO, ProQuest, PUBMED, STN International, and Thomson Reuters. In addition, he used select serials-related databases to account for pertinent documents from countries in which English is not the primary national language (i.e., China Online Journals, e-periodica, J-STAGE, and SciELO Brazil among others).

Functionalized Nanomaterials for Catalytic ApplicationJohn Wiley & Sons

This book sheds new light on the use of nanoparticles in the fields of parasitology and public and animal health.? Nanotechnology has been used in many fields of research and in practical applications. A special subgroup is represented by the so-called nanobiotechnology, which is a multidisciplinary integration of

biotechnology, nanotechnology, chemical processing, material science and engineering. In the fields of parasitology and public and animal health this technology has been used to develop systems, wherein acaricides and insecticides are included. This technique avoids direct contact of the hosts of parasites (animals, humans) with the insecticides/acaricides and thus minimizes effects on their health and also the development of resistances of the vectors (ticks, mosquitos, flies etc.). Since actually many original articles on the use of nanoparticles bearing arthopodocides appear in different journals – as well as in Parasitology Research of Springer - it seems reasonable to check the status quo and to elucidate possible chances of progress. This book will appeal to a wide readership, from researchers through veterinarians to professionals working in the conservation, public health, or sustainable agriculture area.

Silver Nanomaterials for Agri-Food Applications explores how silver-based nanomaterials are being used to create more efficient systems and products across the agri-food sector. In particular, the book covers silver nanomaterials as antimicrobial agents, in food science, for plant protection, and for water purification. Sections highlight the effect of silver nanoantimicrobials and drug synergism on drug-resistant pathogens, offer an overview of silver nanomaterials-based nanosensors in agri-food applications, explore the use of silver

nanostructures in plant science applications, cover plant protection applications, describe silver nanomaterial applications in the removal of dyes and pesticides from wastewater, and more. Explores the applications of silver-based nanomaterials for plant protection, water treatments, and in food science Outlines why silver-based nanomaterials have properties that make them beneficial for protection against infectious diseases Assesses the challenge of integrating silver-based nanomaterials into agricultural systems

This book collects reviews and original articles from eminent experts working in the interdisciplinary arena of nanotechnology use in drug delivery. From their direct and recent experience, the readers can achieve a wide vision on the new and ongoing potentialities of nanotechnology application of drug delivery. Since the advent of analytical techniques and capabilities to measure particle sizes in nanometer ranges, there has been tremendous interest in the use of nanoparticles for more efficient methods of drug delivery. On the other hand, this reference discusses advances in design, optimization, and adaptation of gene delivery systems for the treatment of cancer, cardiovascular, pulmonary, genetic, and infectious diseases, and considers assessment and review procedures involved in the development of gene-based pharmaceuticals.

Rapid advances in nanotechnology have enabled the fabrication of nanoparticles

from various materials with different shapes, sizes, and properties, and efforts are ongoing to exploit these materials for practical clinical applications. Nanotechnology is particularly relevant in the field of oncology, as the leaky and chaotic vasculature of tumors—a hallmark of unrestrained growth—results in the passive accumulation of nanoparticles within tumors. Cancer Nanotechnology: Principles and Applications in Radiation Oncology is a compilation of research in the arena of nanoparticles and radiation oncology, which lies at the intersection of disciplines as diverse as clinical radiation oncology, radiation physics and biology, nanotechnology, materials science, and biomedical engineering. The book provides a comprehensive, cross-disciplinary survey of basic principles, research techniques, and outcomes with the goals of eventual clinical translation. Coverage includes A general introduction to fabrication, preferential tumor targeting, and imaging of nanoparticles The specific applications of nanomaterials in the realms of radiation therapy, hyperthermia, thermal therapy, and normal tissue protection from radiation exposure Outlooks for future research and clinical translation including regulatory issues for ultimate use of nanomaterials in humans Reflecting profound advances in the application of nanotechnology to radiation oncology, this comprehensive volume demonstrates how the unique physicochemical properties of nanoparticles lead to novel

strategies for cancer treatment and detection. Along with various computational and experimental techniques, each chapter highlights the most promising approaches to the use of nanoparticles for radiation response modulation.
This new book focuses on recent developments in this field, focusing on nanostructured materials and nanocomposites. The book deals with some recent developments in the synthesis and characterization of nanomaterial as well as its incorporation into polymer matrixes. The biological applications of nanomaterials are also discussed in detail, along with new approaches in nanostructured materials and nanocomposites. Highlights include a detailed discussion on synthesis of nanostructured materials and nanocomposites; reviews of biodiesel production; green nanostructured materials; and nanosensors, nanomedicines, and biomedical applications of nanostructured materials.
Antimicrobial Nanoarchitectonics: From Synthesis to Applications brings together recent research in antimicrobial nanoparticles, specifically in the sustained and controlled delivery of antimicrobials. Particular attention is given to i) reducing the side effects of antibiotics, ii) increasing the pharmacological effect, and iii) improving aqueous solubility and chemical stability of different antimicrobials. In addition, antimicrobial nanoparticles in drug delivery are discussed extensively. The book also evaluates the pros and cons of using nanostructured biomaterials

in the prevention and eradication of infections. It is an important reference resource for materials scientists and bioengineers who want to learn how nanomaterials are used in antimicrobial therapy. Provides readers with the information necessary to select the appropriate bionanomaterial to solve particular infection problems Includes case studies, showing how particular bionanomaterials have been used to cure infections Explains the central role that nanotechnology plays in modern antimicrobial therapy Evaluates the pros and cons of using nanostructured biomaterials in the prevention and eradication of infections

Several nano-scale devices have emerged that are capable of analysing plant diseases, nutrient deficiencies and any other ailments that may affect food security in agro-ecosystems. It has been envisioned that smart delivery systems can be developed and utilised for better management of agricultural ecosystems. These systems could exhibit beneficial, multi-functional characteristics, which could be used to assess and also control habitat-imposed stresses to crops. Nanoparticle-mediated smart delivery systems can control the delivery of nutrients or bioactive and/or pesticide molecules in plants. It has been suggested that nano-particles in plants might help determine their nutrient status and could also be used as cures in agro-ecosystems. Further, to enhance soil and crop

productivity, nanotechnology has been used to create and deliver nano fertilizers, which can be defined as nano-particles that directly help supply nutrients for plant growth and soil productivity. Nano-particles can be absorbed onto clay networks, leading to improved soil health and more efficient nutrient use by crops. Additionally, fertilizer particles can be coated with nano-particles that facilitate slow and steady release of nutrients, reducing loss of nutrients and enhancing their efficiency in agri-crops. Although the use of nanotechnology in agro-ecosystems is still in its early stages and needs to be developed further, nano-particle-mediated delivery systems are promising solutions for the successful management of agri-ecosystems. In this context, the book offers insights into nanotechnology in agro-ecosystems with reference to biogenic nanoparticles. It highlights the: • occurrence and diversity of Biogenic Nanoparticles • mechanistic approach involved in the synthesis of biogenic nanoparticles • synthesis of nanoparticles using photo-activation, and their fate in the soil ecosystem • potential applications of nanoparticles in agricultural systems • application and biogenic synthesis of gold nanoparticles and their characterization • impact of biogenic nanoparticles on biotic stress to plants • mechanistic approaches involved in the antimicrobial effects and cytotoxicity of biogenic nanoparticles • role of biogenic nanoparticles in plant diseases management • relevance of

biological synthesized nanoparticles in the longevity of agricultural crops • design and synthesis of nano-biosensors for monitoring pollutants in water, soil and plant systems • applications of nanotechnology in agriculture with special refer to soil, water and plant sciences A useful resource for postgraduate and research students in the field of plant and agricultural sciences, it is also of interest to researchers working in nano and biotechnology.

This important new book provides the fundamental understanding of the peptide and protein drug delivery systems with a special focus on their nanotechnology applications. Addressing an increasing interest in peptide and protein drug delivery systems in both academic and industrial circles worldwide, this book fills the need for a comprehensive review and assessment of conventional and nonconventional routes of administration.

This exploratory textbook starts with fundamentals that satisfy the needs of a diverse group of educators, researchers and students aspiring to engage in research and engineering of nanomaterials. It bridges the gap between undergraduate students in science and engineering who have not yet chosen a specific career path, graduate students still considering different disciplines and the cross-cutting scientific topics in nanomaterials. It extends to methods of common practice in the field, spanning experimental, and theoretical techniques. The extensive use of nanomaterials, such as carbon nanotubes, in the future of global technological solutions underscores the relevance of this text aimed at students and researchers with a range of interests. “Advances in Nanomaterials: Fundamentals, Properties and Applications,” is ideal for senior undergraduate and graduate students, faculty and general

science enthusiasts interested in nanomaterials across contexts ranging from solar energy, structural engineering, to medical devices, to semiconductors.

General introduction to biosensors and recognition receptors -- Biomarkers in health care -- The use of nanomaterials and microfluidics in medical diagnostics -- SPR-based biosensor technologies in disease detection and diagnostics -- Piezoelectric-based biosensor technologies in disease detection and diagnostics -- Electrochemical-based biosensor technologies in disease detection and diagnostics -- MEMS-based cell counting methods -- Lab-on-a-chip platforms for disease detection and diagnosis -- Applications of quantum dots in biosensors and diagnostics -- Applications of molecularly imprinted nanostructures in biosensors and diagnostics -- Smart nanomaterial's : applications in biosensors and diagnostics -- Applications of magnetic nanomaterial's in biosensors and diagnostics -- Graphene applications in biosensors and diagnostics -- Optical biosensors and applications to drug discovery for cancer cases -- Biosensors for detection of anticancer drug-DNA interactions

This contribution book collects reviews and original articles from eminent experts working in the interdisciplinary arena of novel drug delivery systems and their uses. From their direct and recent experience, the readers can achieve a wide vision on the new and ongoing potentialities of different drug delivery systems. Since the advent of analytical techniques and capabilities to measure particle sizes in nanometer ranges, there has been tremendous interest in the use of nanoparticles for more efficient methods of drug delivery. On the other hand, this reference discusses advances in the design, optimization, and adaptation of gene delivery systems for the treatment of cancer, cardiovascular, pulmonary, genetic, and infectious diseases, and

considers assessment and review procedures involved in the development of gene-based pharmaceuticals.

The functionalization of nanomaterials provides them with some unique properties, making the same nanomaterial amenable for various applications by simply manipulating functional components. However, functionalized nanomaterials also face some challenges, along with some encouraging new applications in the future. This book provides a detailed account of applications of the functionalization of nanomaterials. This book can serve as a reference book for scientific investigators, including doctoral and post-doctoral scholars and undergraduate and graduate students, in context with the scope of applications of functionalized nanomaterials. It also highlights recent advances, challenges, and opportunities in the application of nanomaterials. This book will provide critical and comparative data for nanotechnologists. It may also be beneficial for multidisciplinary researchers, industry personnel, journalists, policy makers, and the common public to understand the scope of functionalized nanomaterials in detail and in depth. Features: This book covers various applications of functionalized nanomaterials. It discusses recent global research trends and future applications of functionalized nanomaterials. It highlights the need for more rigorous regulatory frameworks for the safe use of functionalized nanomaterials. It contains contributions from international experts and will be a valuable resource for researchers.

Advances in Animal Genomics provides an outstanding collection of integrated strategies involving traditional and modern - omics (structural, functional, comparative and epigenomics) approaches and genomics-assisted breeding methods which animal biotechnologists can utilize to dissect and decode the molecular and gene regulatory networks involved in the

complex quantitative yield and stress tolerance traits in livestock. Written by international experts on animal genomics, this book explores the recent advances in high-throughput, next-generation whole genome and transcriptome sequencing, array-based genotyping, and modern bioinformatics approaches which have enabled to produce huge genomic and transcriptomic resources globally on a genome-wide scale. This book is an important resource for researchers, students, educators and professionals in agriculture, veterinary and biotechnology sciences that enables them to solve problems regarding sustainable development with the help of current innovative biotechnologies. Integrates basic and advanced concepts of animal biotechnology and presents future developments Describes current high-throughput next-generation whole genome and transcriptome sequencing, array-based genotyping, and modern bioinformatics approaches for sustainable livestock production Illustrates integrated strategies to dissect and decode the molecular and gene regulatory networks involved in complex quantitative yield and stress tolerance traits in livestock Ensures readers will gain a strong grasp of biotechnology for sustainable livestock production with its well-illustrated discussion

Today we find the applications of nanotechnology in all spheres of life. Nanotechnology: Therapeutic, Nutraceutical and Cosmetic Advances discusses recent advances in the field, particularly with therapeutics, nutraceuticals and cosmetic sciences. Therapeutics is an area which has perhaps benefitted the most, although nanoscience and technology have quietly entered the realms of food science and are playing pivotal roles in the efficient utilization of nutraceuticals. Finally, even before therapeutics came cosmetics and companies started marketing unique products embedding the beneficial and advanced properties enabled by the

use of nanostructures. This book highlights trends and applications of this wonderful new technology.

The volume includes presentations of technological and research accomplishments along with novel approaches in nanomedicine and nanotechnology. It explores the different types of nanomedicinal drugs with their production and commercial significance. Other topics discussed are the use of natural and synthetic nanoparticles for the production of drugs, different types of nanoparticles systems, drug carriers, wound-healing antimicrobial activity, effects of natural materials in nanomedicine, and toxicity of nanoparticles. The valuable information presented in this volume will help to keep those in this field up to date on the key findings, observations, and fabrication of drugs related to nanomedicine and nanotechnology. With chapters written by prominent researchers from academia, industry, and government and private research laboratories across the world, the book will prove to be a rich resource.

Nutrient Delivery: Nanotechnology in the Agri-Food Industry, Volume Five, discusses the fabrication, merits, demerits, applications, and bioavailability enhancement mechanisms of various nanodelivery systems. Recent developments in various nanodelivery systems are also highlighted. Volume 5 contains twenty chapters, prepared by outstanding international researchers from Argentina, Brazil, Canada, China, Croatia, India, Iran, Ireland, México, Pakistan, Portugal, Serbia, Sri Lanka, and the United States. In recent years, the delivery of micronutrients at nanoscale has been widely studied as these systems have the potential to improve bioavailability, enable controlled release and enhance stability of food bioactives to a greater extent. The nanodelivery systems typically consist of the food bioactive compound encapsulated and stabilized in food grade ingredients such as lipids, proteins or

polysaccharides with diameters ranging from 10 nm to 1000 nm. Among these, the lipid based delivery systems such as nanoemulsions, solid lipid nanoparticles, nanoliposomes and micelles are widely studied for the delivery of lipophilic bioactive compounds. These delivery vehicles improve the solubility, permeability, stability and bioavailability of the lipophilic compounds thereby enhancing their potential for oral delivery and functional food development. On the other hand, the hydrophilic bioactives are delivered through protein, polysaccharide or biopolymer based colloidal nanosystems such as hydrogels, nanogels and polymer nanoparticles. The major concern other than solubility is the intestinal permeability of the micronutrients. For instance, the delivery system for compounds with poor intestinal permeability and low solubility need to be carefully designed using suitable lipids and surfactants. Offers updated material for undergraduate and postgraduate students in food science, biotechnology, and related engineering fields Provides a valuable resource of recent scientific progress, along with most known applications of nanomaterials in the food industry for researchers, engineers, and academics Includes novel opportunities and ideas for developing or improving technologies in the food industry

As the impact and importance of nanotechnology continues to grow, nanomedicine and biotechnology have become areas of increased development. Drug delivery by nanoparticulates and nanocoatings for medicial devices are among the many new techniques on the horizon. Years from now we will laugh at the approaches to treating disease we currently conside

Nano particles have created a high interest in recent years by virtue of their unusual mechanical, electrical, optical and magnetic properties and find wide applications in all fields of

engineering. This edited volume aims to present the latest trends and updates in nanogenerators, thin film solar cells and green synthesis of metallic nanoparticles with a focus on nanostructured semiconductor devices. Exclusive chapter on electrical transport of nanostructure explains device physics for material properties for reduced dimensions. Additionally, the text describes the functionality of metallic nanoparticles and their application in molecular imaging and optical metamaterials. Piezoelectric nanogenerators has been touched upon from the energy perspective as well. Key Features: • Organized contents on Nanogenerators, VOC sensing, nanoelectronics, and NEMS. • Discusses eco-friendly green synthesis methods for metallic nanoparticles. • Touches upon low power nano devices (e.g. nanogenerators) for energy harvesting with quantum mechanical study. • Thin film/heterojunction based high efficiency solar cell addressed aimed at reducing global energy consumption.

Nanotechnology: Advances and Real-Life Applications offers a comprehensive reference text about advanced concepts and applications in the field of nanotechnology. The text – written by researchers practicing in the field – presents a detailed discussion of key concepts including nanomaterials and their synthesis, fabrication and characterization of nanomaterials, carbon-based nanomaterials, nano-bio interface, and nanoelectronics. The applications of nanotechnology in the fields of renewable energy, medicine and agriculture are each covered in a dedicated chapter. The text will be invaluable for senior undergraduate and graduate students in the fields of electrical engineering, electronics engineering, nanotechnology and nanoscience. Dr. Cherry Bhargava is an Associate Professor and Head, VLSI domain, at the School of Electrical and Electronics Engineering of Lovely Professional University, Jalandhar,

India. Dr. Amit Sachdeva is an Associate Professor at Lovely Professional University, Jalandhar, India.

With the rapid development in nanotechnology, it is now possible to modulate the physical and chemical properties of nanomaterials with molecular recognition and catalytic functional applications. Such research efforts have resulted in a huge number of catalytic platforms for a broad range of analytes ranging from metal ions, small molecules, ionic liquid and nucleic acids down to proteins. Functionalized nanomaterials (FNMs) have important applications in the environmental, energy and healthcare sectors. Strategies for the synthesis of FNMs have contributed immensely to the textile, construction, cosmetics, biomedical and environmental industries among others. This book highlights the design of functionalized nanomaterials with respect to recent progress in the industrial arena and their respective applications. It presents an inclusive overview encapsulating FNMs and their applications to give the reader a systematic and coherent picture of nearly all relevant up-to-date advancements. Herein, functionalization techniques and processes are presented to enhance nanomaterials that can substantially affect the performance of procedures already in use and can deliver exciting consumer products to match the current lifestyle of modern society.

Nanotechnology in Modern Animal Biotechnology: Concepts and Applications discusses the advancement of nanotechnologies in almost every field, ranging from materials science, to food, forensic, agriculture and life sciences, including biotechnology and medicine. Nanotechnology is already being harnessed to address many of the key problems in animal biotechnology, with future applications covering animal biotechnology (e.g. animal nutrition, health, disease diagnosis, and drug delivery). This book provides the tools, ideas and

techniques of nanoscale principles to investigate, understand and transform biological systems. Nanotechnology provides the ability to manipulate materials at atomic and molecular levels and also arrange atom-by-atom on a scale of ?1–100 nm to create, new materials and devices with fundamentally new functions and properties arising due to their small scale. Details the basics of nanotechnology, along with comprehensive information on the state-of-the-art and future perspectives of nanotechnology in biosensors Provides recent perspectives and the challenges of nanomedicine Provides new insights into the role nanomaterials can play in curing various diseases Includes the most recent diagnostic methods, such as nanosensors
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