

# Applications Of Nanotechnology In Veterinary Medicine

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## **Green Biosynthesis of Nanoparticles** - Mahendra Rai 2013-12-04

There are physical and chemical methods of synthesis of nanomaterials. But due to the damage caused by these methods to the environment there is a pressing need of green nanotechnology, which is a clean and eco-friendly technology for the development of nanomaterials. The present book includes green synthesis of nanoparticles by algae, diatoms and plants. The mechanism behind the synthesis of nanoparticles will also be discussed. The book would be a valuable resource for students, researchers and teachers of biology, chemistry, chemical technology, nanotechnology, microbial technology and those who are interested in green nanotechnology.

## **Nanotoxicity** - Susai Rajendran 2020-04-09

**Nanotoxicity: Prevention, and Antibacterial Applications of Nanomaterials** focuses on the fundamental concepts for cytotoxicity and genotoxicity of nanomaterials. It sheds more light on the underlying phenomena and fundamental mechanisms through which nanomaterials interact with organisms and physiological media. The book provides good guidance for toxic prevention methods and management in the manufacture/application/disposal. The book also discusses the potential applications of nanomaterials-based antibiotics. The potential toxic effects of nanomaterials result not only from the type of base materials, but also from their size/ ligands/surface chemical modifications. This book discusses why different classes of nanomaterials display toxic properties, and what can be done to mitigate this toxicity. It also explores how nanomaterials are being used as antimicrobial agents, being used to purify air and water, and counteract a range of infectious diseases. This is an important reference for materials scientists, environmental scientists and biomedical scientists, who are seeking to gain a greater understanding of how nanomaterials can be used to combat toxic agents, and how the toxicity of nanomaterials themselves can best be mitigated. Explains the underlying phenomena and fundamental mechanisms through which nanomaterials interact with organisms and physiological media Outlines major methods for mitigating and prevention of nanotoxicity Discusses the applications of nanomaterials-based antibiotics

## **Innovative Approaches for Nanobiotechnology in Healthcare Systems** - Amna, Touseef 2021-09-17

Innovative and fusion technologies have shown an incredible ability to improve various aspects of society, such as healthcare systems. Nanobiotechnology is one such technology that is being applied to medical equipment and treatment approaches. Many pharmaceutical and medical companies have begun to count on medical nanotechnology due to its abundant applications and practical uses. **Innovative Approaches for Nanobiotechnology in Healthcare Systems** is a pivotal reference source that provides insights into a comprehensive collection of novel techniques used for the development of safe drugs using the available resources for diverse deadly diseases. This book discusses the various platforms of nanobiotechnology that are utilized in various fields. It is expected that bionanosystems will play a crucial role in the treatment of human diseases and the improvement of existing healthcare systems. This book is ideal for scientists, biotechnologists, microbiologists, medical professionals, entrepreneurs, policymakers, researchers, academicians, and students.

## **Nanotechnology in Dermatology** - Adnan Nasir 2012-12-02

**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.

## **Green Nanomaterials as Potential Antimicrobials** - Ali Haider 2022-12-12

This book focuses on nanomaterials with antibacterial properties. Antibacterial resistance is a growing concern that poses a serious threat to public health worldwide. This book looks at the fabrication, material's properties, and characterization of a range of metallic, bimetallic, and metal-oxide-based nanomaterials that can be exploited for their antimicrobial properties. A key focus of this book is its emphasis on 'green' synthesis of nanomaterials, as many conventional routes of nanomaterial fabrication do not fulfill key sustainability criteria in terms of their toxicity and lack of eco-friendliness. Additionally, this book introduces the application of nanoparticles to veterinary medicine. Given the ever-increasing global livestock population coupled with the emergence of drug-resistant pathogens of animal origin (bacterial, parasitic, and hemoprotozoa), the use of nanoparticles as antibacterial agents represents a paradigm shift in every aspect of veterinary care. Authored by scholars with combined expertise in nanomaterials and veterinary medicine, this book provides valuable information for researchers working on sustainable nanomaterials with antibacterial properties.

## **Application of Nanotechnology in Veterinary Medicine** - Isayas Asefa 2022-05-11

Literature Review from the year 2022 in the subject Veterinary medicine, , course: Nanotechnology, language: English, abstract: The objective of this seminar paper is to review the application of nanotechnology on smart drug delivery system, in animal disease treatment and diagnosis, animal breeding and reproduction and also chicken product.

Nanotechnology is an exciting and rapidly emerging technology allowing us to work at the molecular level, often atom by atom, to create and manipulate tools, materials and functional structures that have nanometer dimensions. It has the potential to have great impact on diagnosis and treatment of animals. Unique size dependent properties of nanoparticles have numerous diagnostic applications such as diagnostic biosensors, imaging nanoprobe for magnetic resonance imaging contrast agents. Using nanotechnology multifunctional nanomaterial's can be designed to image a specific organ, target tissue, access deep molecular targets and provide drugs at controlled release. Great advances have been and are being made in nanobiochip materials, nanoscale biomimetic materials, nanomotors, nanocomposite materials, interface biomaterials and nanobiosensors with enormous prospect in veterinary medicine application. It is a research and development aimed at understanding and working with seeing, measuring and manipulating at the atomic, molecular and supramolecular levels. This correlates to length scales of roughly 1 to 100 nanometers. At this scale, the physical, chemical and biological properties of materials differ fundamentally and often unexpectedly integrated sensing, monitoring and controlling system could detect the presence of disease and notify the farmer and veterinarian to activate a targeted treatment delivery system. This is possible with nanotechnology and could permit a wide range of advances in the field of agriculture, animal and veterinary sciences such as conversion of agricultural and food wastes to energy and other useful by-products through enzymatic nanobioprocessing, development in

reproductive sciences, breeding managements, disease prevention and treatment in animals and public health. Applications of nanotechnology and nanoparticles in food, animal breeding and animal productivity such as in meat production, milk production are emerging rapidly. It used to create materials and change structure, enhanced quality and texture of foodstuffs at the molecular level. This technology has a major impact on production, processing, transportation, storage, traceability, safety and security of food.

*Nanotechnology* - Rakesh K. Sindhu 2021-05-28

This book gives a summary of the rapidly growing field of nanotechnology and includes materials and technologies that help in developing particles of various sizes, which can be utilized in different areas of research. It discusses the role of nanotechnology in different aspects, such as healthcare, especially in target-specific drug therapy for managing a number of medical disorders; agriculture, for developing smart field systems; and food industry, for improving and stabilizing the quality, healthiness, and shelf life of food. Being multidisciplinary, this book brings together the principles, theory, practices, and applications of not only nanotechnology but also those of nanobiotechnology, pharmaceuticals, food packaging, biosensors, and electronic devices. The book will be an exhilarating read for advanced undergraduate- and graduate-level students, general readers interested in nanotechnology, and researchers in chemistry, biology, and engineering. The scope of the book extends from basic research in physics, chemistry, and biology, including computational work and simulations, through to the development of new devices and technologies for applications in a wide range of industrial sectors (including information technology, medicine, manufacturing, high-performance materials, and energy and environmental technologies). It covers organic, inorganic, and hybrid materials and is an interdisciplinary book.

*Emerging Issues in Climate Smart Livestock Production* - Sukanta Mondal 2021-12-15

*Emerging Issues in Climate Smart Livestock Production: Biological Tools and Techniques* furnishes a detailed reference on livestock sustainability and the role of biotechnology for creating more sustainable livestock production systems. The book is a collection of scientific techniques, including genetic engineering used to modify and improve animals, fishes, and microorganisms for human benefit. The book is particularly attractive for scientists, researchers, students, educators, and professionals in agriculture, veterinary, and biotechnology science. This book promotes several biotechnological approaches that can easily be evaluated in the field for quality assurance programs beneficial to producing livestock products and overall public health. Biotechnology has the potential to improve the productivity of animals via increased growth, carcass quality and reproduction, improved nutrition and feed utilization, improved food quality and safety, improved animal health and welfare, and reduced waste through more efficient utilization of resources. Identifies and explores biotechnological approaches for sustainable livestock and fish production Focuses on strategies for enhancing livestock and fishery productivity and sustainability Presents the latest research on modern methods and technologies

*Marine Biomaterials* - Sougata Jana 2022

This book is focused on marine based biomedical carriers for delivery of therapeutics. Marine biomaterials and bio-based carriers show wide applications in pharmaceutical as well as biomedical fields for delivery of small and large molecules. Biomaterial-based composites, scaffolds or matrix systems are promising systems for controlled and prolonged release of drug in target site and control the premature release of drugs or bioactive compounds. This book discusses the targeted delivery of drugs and therapeutic applications. It also describes the use of marine biopolymers in cancer therapy. Different chapters describe the tissue engineering techniques to develop these carriers. The marine biomaterial-based systems are widely used for tissue engineering, and biomedical imaging. This book is meant for industry experts, students and researchers in the area of pharmaceutical sciences, biomedical engineering and material science and pharmacology.

*Silver Nanomaterials for Agri-Food Applications* - Kamel A. Abd-Elsalam 2021-08-13

*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

*Fungal Cell Factories for Sustainable Nanomaterials Productions and Agricultural Applications* - Kamel A. Abd-Elsalam 2022-10-28

*Fungal Cell Factories for Sustainable Nanomaterials Productions and Agricultural Applications* explores the mycogenic synthesis of many metal nanoparticles, including processing processes, environmental protection, and future perspectives. Nanomaterials, including silver, gold, palladium, copper, zinc, selenium, titanium dioxide, metal sulphide, cellulose, have been formed by major fungal genes, such as mushrooms, *Fusarium*, *Trichoderma*, endophytic fungi, and yeast, in addition to lichens. Understanding the exact process involved in the synthesis of nanoparticles and the effects of various factors on the reduction of metal ions can help to improve low-cost strategies for the synthesis and extraction of nanoparticles. Other sections focus on a new framework for the production of nano-antimicrobial, the use of myconanoparticles against plant diseases, post-harvest antibiotics, mycotoxin control and plant pests in addition to certain animal pathogens. Myconanomaterials are well developed with great potential and promise for advanced diagnostics, biosensors, precision farming and targeted smart delivery systems. Assesses the impact of a variety of copper-based nanostructures on agri-food sectors, addressing the most relevant knowledge gaps Explores the opportunities that myconanotechnology can provide for industrial applications Explains the major challenges of applying myconanotechnology at an industrial scale

*Bionanotechnology* - Anil Kumar Anal 2018-02-02

This book deals with a subject of high interest and importance in all sectors, including biomedical, food, agriculture, energy, and environment. Biological systems are essential in nanotechnology, and many new applications are being developed by mimicking the natural systems. Approaching these topics from an engineering perspective, the book offers insight on the details of nanoscale fabrication processes as well as cell biology. The basics of biology and chemistry, with a focus on how to engineer the behavior of molecules at the nanoscale, are also explored and analyzed. The aim of the text is to provide the reader with broader knowledge of biological methods for signal transduction and molecular recognitions systems and how they can be replicated in bio-sensing applications. The reader will learn the basic structures and interactions of biomacromolecules for developing biocompatible and eco-friendly devices.

*Advances in Nanomaterials* - Mushahid Husain 2016-03-15

This book provides a review of the latest research findings and key applications in the field of nanomaterials. The book contains twelve chapters on different aspects of nanomaterials. It begins with key fundamental concepts to aid readers new to the discipline of nanomaterials, and then moves to the different types of nanomaterials studied. The book includes chapters based on the applications of nanomaterials for nano-biotechnology and solar energy. Overall, the book comprises chapters on a variety of topics on nanomaterials from expert authors across the globe. This book will appeal to researchers and professional alike, and may also be used as a reference for courses in nanomaterials.

**Nanoparticles in Medicine** - Ashutosh Kumar Shukla 2019-08-31

This book describes the medical applications of inorganic nanoparticles. Nanomedicine is a relatively advanced field, which enhances the treatment of various diseases, offering new options for overcoming the problems associated with the use of conventional medicines. Discussing the toxicological and safety aspects associated with medical applications of nanoparticles, the book presents the latest research on topics such as emerging nanomaterials for cancer therapy, applications of nanoparticles in dentistry, and fluoride nanoparticles for biomedical applications, and also includes chapters on the use of nanoparticles such as silver and gold. /div

**Nanotechnologies in Food** - Qasim Chaudhry 2017-05-17

*Nanotechnologies in Food* provides an overview of the products and applications of nanotechnologies in agri-food and related sectors. Following on from the success of the first edition, this new edition has been revised and updated to bring the reader fully up to date on the

emerging technological, societal, and policy and regulatory aspects in relation to nanotechnologies in food. This book contains new chapters discussing some of the aspects that have attracted a lot of debate and research in recent years, such as how the regulatory definition of 'nanomaterial' is shaping up in Europe and whether it will result in a number of exciting food additives being regarded as nanomaterials, how the new analytical challenges posed by manufactured nanoparticles in food are being addressed and whether the emerging field of nano delivery systems for food ingredients and supplements, made of food materials or other soft/degradable polymers, can raise any consumer safety concerns. The edition concludes by discussing the future trends of the technological developments in the area of nanotechnologies and potential future 'fusion' with other fields, such as biotechnology and synthetic biology. This book provides a source of much needed and up-to-date information on the products and applications of nanotechnology for the food sector - for scientists, regulators, and consumers alike. It also gives an independent, balanced, and impartial view of the potential benefits as well as risks that nanotechnology applications may bring to the food sector. Whilst providing an overview of the state-of-the-art and foreseeable applications to highlight opportunities for innovation, the book also discusses areas of uncertainty in relation to public perception of the new technological developments, and potential implications for consumer safety and current regulatory controls. The book also discusses the likely public perceptions of nanotechnologies in the light of past technological developments in the food sector, and how the new technology will possibly be regulated under the existing regulatory frameworks.

*Food Science and Nutrition: Breakthroughs in Research and Practice* - Management Association, Information Resources 2018-02-02

Health and nutrition has become a global focal point as the population continues to grow exponentially. While providing food for the global population is crucial, it is also necessary to provide options that are nutritious in order to promote healthier lifestyles around the world. *Food Science and Nutrition: Breakthroughs in Research and Practice* is an innovative reference source for the latest academic material on how dietary nutrition can impact people's lives, prevent disease, and maintain an overall healthier lifestyle. Highlighting a range of topics, such as health preservation, functional foods, and herbal remedies, this publication is ideally designed for researchers, academics, students, policy makers, government officials, and technology developers.

**Nanotechnology in Modern Animal Biotechnology** - Sanjay Singh 2019

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.

*Environmental Nanotechnology: Implications and Applications* - 2022-11-01

*Environmental Nanotechnology: Implications and Applications, Volume 99* focuses on the implications and applications of Environmental Nanotechnology. The book presents the various methods used for the production and characterization of nanoparticles, and includes chapters on Nanoparticles: An overview, Nanomaterials and photocatalysis for environment: Applications and characterization, Toxicity of inorganic nanoparticles, Overview of nanoparticles technology usage for water treatment with an emphasis on the emerging water pollutants, Nanotechnology in wastewater treatment, Nanomaterials for groundwater remediation, Development of nano-sensor and biosensor as an air pollution detection technique for the foreseeable future, and more. Additional chapters in this comprehensive release include Nanomaterials as a tool for soil remediation in sustainable agriculture, Impact of nanoparticles in wastewater treatment, Nanoparticles in solid waste: Impact and management strategies, and Global regulations and legislations on nanoparticles usage and application in diverse horizons.

Includes information on how nanotechnology impacts different environmental fields Presents the benefits of Nanotechnology usage in the treatment of groundwater, water, wastewater, air and soil-like environmental compartments Discusses available management and policies for the regulation of nanotechnology usage

*Multifunctional Hybrid Nanomaterials for Sustainable Agri-food and Ecosystems* - Kamel A. Abd-El Salam 2020-04-14

*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

*Pharmacology and Therapeutics* - Sivakumar Joghi Thatha Gowder 2014-07-02

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.

**Concepts and Applications in Veterinary Toxicology** - PK Gupta 2019-08-12

This book: "Concepts and Applications in Veterinary Toxicology: An Interactive Guide": covers a broad spectrum of topics related to students specializing in veterinary toxicology and for veterinary medical practitioners. Since the major emphasis of the book is to teach veterinary students, therefore more attention has been given to common toxicants to which several species are exposed including pet animals. The subject of veterinary toxicology is complicated greatly by the wide variations in responses of domestic, companion, aquatic, wild, and zoo species to toxicants. Therefore, emphasis has also been given to species variation and diagnostic toxicology including clinical management that is more relevant to veterinary profession. Key Features · Highlights specialized topics essential for veterinary specialists. · Covers a variety of common toxicants to which several species including pet animals are exposed. · Includes sample questions and answers that are extremely valuable for students, clinical pharmacists, teachers, and academicians in preparing for their board and other examinations.

*The ELSI Handbook of Nanotechnology* - Chaudhery Mustansar Hussain 2020-03-31

This Handbook focuses on the recent advancements in Safety, Risk, Ethical Society and Legal Implications (ELSI) as well as its commercialization of nanotechnology, such as manufacturing. Nano is moving out of its relaxation phase of scientific route, and as new products go to market, organizations all over the world, as well as the general public, are discussing the environmental and health issues associated with nanotechnology. Nongovernmental science organizations have long since reacted; however, now the social sciences have begun to study the cultural portent of nanotechnology. Societal concerns and their newly constructed concepts, show nanoscience interconnected with the economy, ecology, health, and governance. This handbook addresses these new challenges and is divided into 7 sections: Nanomaterials and the Environment; Life Cycle Environmental Implications of Nanomanufacturing; Bioavailability and Toxicity of Manufactured Nanoparticles in Terrestrial Environments; Occupational Health Hazards

of Nanoparticles; Ethical Issues in Nanotechnology; Commercialization of Nanotechnology; Legalization of Nanotechnology.

Phytonanotechnology - N. Thajuddin 2020-05-31

Phytonanotechnology: Challenges and Prospects consolidates information on the use of phytonanoparticles for biomedical, environmental and agricultural applications, covering recent advances in experimental and theoretical studies on various properties of nanoparticles derived from plant sources. The book deals with various attributes of phytonanoparticles, discussing their current and potential applications. In addition, it explores the development of phytonanoparticles, synthesis techniques, characterization techniques, environmental remediation applications, anti-microbial properties, miscellaneous applications, and multi-functional applications. Risks associated with nanoparticles are also discussed. This book is an important reference for materials scientists, engineers, environmental scientists, food scientists and biomedical scientists who want to learn more about the applications of nanoparticles derived from plant sources. Explores synthesis methods of phytonanoparticles from a variety of plant groups Discusses the major biological reactions of phytonanoparticles Outlines the major opportunities and challenges of using phytonanoparticles in biomedical, environmental and agricultural applications

**Nanotechnology Applications in Food** - Alexandru Grumezescu 2017-02-22

Nanotechnology Applications in Food: Flavor, Stability, Nutrition, and Safety is an up-to-date, practical, applications-based reference that discusses the advantages and disadvantages of each application to help researchers, scientists, and bioengineers know what and what not to do to improve and facilitate the production of food ingredients and monitor food safety. The book offers a broad spectrum of topics trending in the food industry, such as pharmaceutical, biomedical, and antimicrobial approaches in food, highlighting current concerns regarding safety, regulations, and the restricted use of nanomaterials. Includes how nanobiosensors are useful for the detection of foodborne pathogens Discusses applications of nanotechnology from flavor and nutrition, to stability and safety in packaging Includes nano and microencapsulation, nanoemulsions, nanosensors, and nano delivery systems Identifies practical applications of nanoscience for use in industry today

**Neurotoxicity of Nanomaterials and Nanomedicine** - Xinguo Jiang 2016-10-03

Neurotoxicity of Nanomaterials and Nanomedicine presents an overview of the exciting research in neurotoxicity and nanomaterials. Nanomaterials have been extensively used in medicine, including diagnosis probes, drug carriers, and embedded materials. While some have been approved for clinical use, most nanomaterials are waiting to be transferred from lab to clinic. However, the toxicity is a main barrier that restricts the translation. This comprehensive book includes chapters on the most commonly used individual nanoparticles, with information on the applications, neurotoxicity, and related mechanisms of each, providing the most in-depth and current information available. The book examines the pathways that nanomaterials enter into, and eliminate, from the brain, along with the strategies that could reduce the neurotoxicity of nanomaterials. Providing a background to the subject, detailed information, and ideas for future directions in research, the book is essential for students and researchers in toxicology, and for those in medicine, neurology, pharmacology, pharmaceutical science, and materials science who are researching nanomaterials. Presents a thorough discussion of the most common nanoparticles in the brain and their neurotoxicology Includes the most common nanoparticles, their applications, and mechanisms Provides one of the first books to focus on nanomedicine and neurotoxicity

Nanotechnologies in Preventive and Regenerative Medicine - Vuk Uskokovic 2017-11-22

Nanotechnologies in Preventive and Regenerative Medicine demonstrates how control at the nanoscale can help achieve earlier diagnoses and create more effective treatments. Chapters take a logical approach, arranging materials by their area of application. Biomaterials are, by convention, divided according to the area of their application, with each chapter outlining current challenges before discussing how nanotechnology and nanomaterials can help solve these challenges This applications-orientated book is a valuable resource for researchers in biomedical science who want to gain a greater understanding on how nanotechnology can help create more effective vaccines and treatments, and to nanomaterials researchers seeking to gain a greater understanding of how these materials are applied in medicine.

Demonstrates how nanotechnology can help achieve more successful diagnoses at an earlier stage Explains how nanomaterials can be manipulated to create more effective drug treatments Offers suggestions on how the use of nanotechnology might have future applications to create even more effective treatments

**Nanotechnology in Modern Animal Biotechnology** - Pawan Kumar Maurya 2019-07-20

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

Fungal Nanobionics: Principles and Applications - Ram Prasad 2018-07-27

Fungal nanobionics has great prospects for developing new products with industrial, agriculture, medicine and consumer applications in a wide range of sectors. The fields of chemical engineering, agri-food, biochemical, pharmaceuticals, diagnostics and medical device development all employ fungal products, with fungal nanomaterials currently used in a wide range of applications, ranging from drug development to food industry and agricultural sector. The fungal agents emerge as an environmentally friendly, clean, non-toxic agent for the biogenic metal nanoparticles and employs both intracellular and extracellular methods. The simplicity of scaling up and downstream processing and the presence of fungal mycelia affording an increased surface area provide key advantages. In addition, the larger spectrum of synthesized nanoparticle morphologies and the substantially faster biosynthesis rate in cell-free filtrate (due to the higher amount of proteins secreted in fungi) make this a particularly enticing route. Understanding the diversity of fungi in assorted ecosystems, as well as their interactions with other microorganisms, animals and plants, is essential to underpin real and innovative technological developments and the applications of metal nanoparticles in many disciplines including agriculture, catalysis, and biomedical biosensors. Importantly, biogenic fungal nanoparticles show significant synergistic characteristics when combined with antibiotics and fungicides to offer substantially greater resistance to microbial growth and applications in nanomedicine ranging from topical ointments and bandages for wound healing to coated stents. **Nanotechnology Applications for Cancer Chemotherapy** - Sanyog Jain 2020-09-30

Applications of Nanotechnology in Cancer Chemotherapy offers a complete and concise summary of nanotechnological interventions for cancer management. It highlights the basics of oncology, the cancer microenvironment, targets for active drug delivery, the underlying mechanisms and molecular pathways to enhance the drug delivery to the cancer site. The book discusses the principles of basic and innovative nanocarrier-based therapeutic approaches to modulate the progression of the disease. In addition, this book also explores the evolving targeting approaches specific to the cancer site and type. The scope of the book is not limited to targeted drug delivery for various cancers, but also explores the advancements in cancer imaging and diagnostics employing the nanotechnological tools. Emphasis has been given on the important evaluation techniques like in-vitro cell culture and in-vivo animal models to assess the performance of cancer nanomedicines. The book includes clinical study reports of various drug moieties explored using variety of nanoconstructs in myriad cancer conditions with the input of global market and pharmacoeconomics. Discusses how organic and inorganic nanoplateforms are being used in cancer treatment Shows how nanotechnology is being used to create new and more accurate diagnostic tools Surveys the current generation of cancer nanomedicines, assessing their advantages and challenges

**The Trends In Nano Materials Synthesis And Applications** - Tuba ÇAKICI 2022-11-15

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Application of Nanotechnology in Drug Delivery - Ali Demir Sezer 2014-07-25

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.

**Plant Nanobionics** - Ram Prasad 2019-04-30

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.

*Antimicrobial Nanoarchitectonics* - Alexandru Mihai Grumezescu 2017-06-22

*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

**Diverse Applications of Nanotechnology in the Biological Sciences** - Khalid Rehman Hakeem 2022-06-30

*Diverse Applications of Nanotechnology in the Biological Sciences: An Essential Tool in Agri-Business and Health Care Systems* explores the diverse roles that nanobiotechnology plays in the medical sciences, pharmacy, healthcare, and in plants and agriculture. Looking at the diverse applications of nanotechnology in the healthcare field, the chapter authors discuss its importance in drug delivery, biomedical imaging and medical diagnostics, and healthcare management. The volume emphasizes how nanomedicine can treat different types of cancers and can improve medical imaging for the diagnosis of different kinds of diseases, resulting in quicker and more accurate diagnosis and better treatment options. The volume delves into nanobiotechnology in plants and its application in nanofertilizers and nano-pesticides in agriculture. It also documents how agri-nanobiotechnology can be a tool for innovative green technology that can be applied for global food security, biodiversity, and climate change solutions. The themes of nanobiotechnology in medicine and in plants are merged in the chapter on the types and therapeutic effects of plant product-based nanomedicine for malignancies. The potential toxicity of nanoparticles in plants is also elucidated. This volume provides an insightful overview of nanobiotechnology in medicine and in plants and agriculture that will be valuable for researchers and scientists and faculty and students in the areas of nanobiotechnology, agriculture, plant molecular biology, and medicine and healthcare.

*Nanotechnology for Animal Health and Production* - Dr S R Garg 2014-01-01

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.

**The Nanotechnology Revolution** - Dale A. Stirling 2018-01-17

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). Application of Nanotechnology in Mining Processes - Elvis Fosso-Kankeu 2022-01-31

b"Application of Nanotechnology in Mining Processes Nanotechnology has revolutionized processes in many industries but its application in the mining industry has not been widely discussed. This unique book provides an overview of the successful implementation of nanotechnology in some of the key environmental and beneficiation mining processes. This book explores extensively the potential of nanotechnology to revolutionize the mining industry which has been relying for a very long on processes with limited efficiencies. The nine specialized chapters focus on applying nanoflotation to improve mineral processing, effective extraction of metals from leachates or pregnant solutions using nanoscale supramolecular hosts, and development of nano-adsorbents or nano-based strategies for the remediation or valorization of AMD. The application of nanotechnology in mining has so far received little attention from the industry and researchers and this groundbreaking book features critical issues so far under-reported in the literature: Application of nanotechnology in mineral processing for the enhancement of froth flotation Development of smart nanomaterials and application for the treatment of acid mine drainage Recovery of values from pregnant solutions using nanoadsorbents Valorization of AMD through formation of multipurpose nanoproducts. Audience Industrial interest will be from mining plant operators, environmental managers, water treatment plants managers, and operators. Researchers in nanotechnology, environmental science, mining, and metallurgy engineering will find the book valuable, as will government entities such as regulatory bodies officers and environmentalists.

**Advances and Challenges in Nanomedicine** - Susan Hua 2019-02-28 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, pharmaceuticals, 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. **Nanoscale Materials in Targeted Drug Delivery, Theragnosis and Tissue Regeneration** - Sudesh Kumar Yadav 2016-06-04

This book is the first of its kind to offer a comprehensive and up-to-date discussion of the use of nanoscale materials for biomedical applications, with a particular focus on drug delivery, theragnosis and tissue regeneration. It also describes in detail the methods used in the preparation of nanoparticles. Response of nanoparticles in biological systems are also explored. Nanotechnology has led to the advent of a new field, nanomedicine, which focuses on the use of nanomaterials as drug-delivery vehicles to develop highly selective and effective drugs. The combination of molecular imaging and nanotechnology has produced theragnostic nanoparticles, which allow the simultaneous detection and monitoring of diseases. Nanotechnology can also be combined with biomaterials to create scaffolds for tissue regeneration. Further, significant advances have been made in the areas of drug delivery, theragnostic nanoparticles and tissue regeneration materials. Some nanomedicines and tissue regeneration materials are already commercially available, while others are undergoing clinical trials, and promising results have been documented. Despite the rapid advances in nanomedicine, there is a relative dearth of literature on the biomedical applications of nanoscale materials.

**Integrating Biologically-Inspired Nanotechnology into Medical Practice** - Nayak, B.K. 2016-09-07

Nanotechnology has grown in its use and adoption across sectors. In particular, the medical field has identified the vast opportunities nanotechnology presents, especially for earlier disease detection and diagnosis versus traditional methods. Integrating Biologically-Inspired Nanotechnology into Medical Practice presents the latest research on nanobiotechnology and its application as a real-world healthcare solution. Emphasizing applications of micro-scale technologies in the areas of oncology, food science, and pharmacology, this reference publication is an essential resource for medical professionals, researchers, chemists, and graduate-level students in the medical and pharmaceutical sciences.