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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.

Nanoparticles in Analytical and Medical Devices - Fang Gang 2020-09-01
Nanoparticles in Analytical and Medical Devices presents the latest information on the use of nanoparticles for a diverse range of analytical

and medical applications. Covers basic principles, proper use of nanoparticles in analytical and medical applications, and recent progress in the field. This comprehensive reference helps readers grasp the full potential of nanoparticles in their analytical research or medical practice. Chapters on cutting-edge topics bring readers up to date on the latest research and usage of nanoparticles, and a chapter on commercially available devices that utilize nanoparticles guides readers in overcoming issues with marketing biodevices. Synthesizes nanoparticle conjugation and other critical methods Covers nanoparticles in analytical methods and real analytical devices currently used in the medical field Provides useful new information not covered in the current literature in chapters on surface chemical functionalization for bio-immobilization and nanoparticle production from natural sources
Advances in Nanotechnology-Based Drug Delivery Systems - Anupam Das Talukdar 2022-06-06

Advances in Nanotechnology-Based Drug Delivery Systems covers the core concepts and latest research regarding the use of nanoscale materials for the development and application of drug delivery systems. The book introduces the reader to nanotechnology in drug delivery, covering the synthesis, encapsulation techniques, characterization and key properties of nanoscale drug delivery systems. Later chapters review

the broad range of target applications, including site-specific delivery of drugs for cardiovascular disease, cancer, bacterial infection, bone regeneration, and much more. This book helps translate advanced research into a clinical setting, analyzing the toxicity and health and safety challenges associated with utilizing nanotechnology in biomedicine. This will be a useful reference for those interested in nano-sized drug delivery in biomedicine, including academics and researchers in materials science, biomedical engineering, pharmaceutical science and related disciplines. Provides a clear introduction to nanotechnology in drug delivery, covering key principles, synthesis, characterization and unique properties of nanoscale materials for drug delivery systems“/li> Discusses preclinical, clinical and patented nano-drug delivery systems, enabling the reader to grasp the current state-of-the-art and market Covers a broad range of targets for nanoscale drug delivery systems, such as in neurological disorders, oral disease, renal disease, cancer, skin protection, and much more

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.

Nanotechnology and Medicine - Don Nardo 2018

Advances in medical technology are reshaping the practice of medicine and helping people live longer, healthier lives. Genetics research is leading to gene-based treatments that target specific types of cancer. Robots are disinfecting hospital floors, dispensing medication, and

assisting with surgeries. Engineers and medical researchers are working with 3D printers to create functioning human organs for transplants. These and other advances offer great promise but also, in some cases, pose difficult ethical questions. The Next-Generation Medical Technology series examines all of these ideas and events. Real-world examples, fully documented quotes, and sidebars add insight and interest to this fascinating subject.

GB,GBT,GB/T Chinese Standard(English-translated version)-Catalog001- - Dr. Meng Yongye CODEOFCHINA 2018-05-04

All English-translated Chinese codes are available at:
www.codeofchina.com

Medical Nanotechnology and Nanomedicine - Harry F. Tibbals 2017-12-19

Considering the fluid nature of nano breakthroughs—and the delicate balance between benefits and consequences as they apply to medicine—readers at all levels require a practical, understandable base of information about these developments to take greatest advantage of them. Medical Nanotechnology and Nanomedicine meets that need by introducing non-experts to nanomedicine and its evolving organizational infrastructure. This practical reference investigates the impact of nanotechnology on applications in medicine and biomedical sciences, and the broader societal and economic effects. Eschewing technological details, it focuses on enhancing awareness of the business, regulatory, and administrative aspects of medical applications. It gives readers a critical, balanced, and realistic evaluation of existing nanomedicine developments and future prospects—an ideal foundation upon which to plan and make decisions. Covers the use of nanotechnology in medical applications including imaging, diagnosis and monitoring, drug delivery systems, surgery, tissue regeneration, and prosthetics Part of the Perspectives in Nanotechnology series—which contains broader coverage of the societal implications of nanotechnology—this book can be used as a standalone reference. Organized by historical perspective, current status, and future prospects, this powerful book: Explores background, definitions and terms, and recent trends and forces in

nanomedicine Surveys the landscape of nanomedicine in government, academia, and the private sector Reviews projected future directions, capabilities, sustainability, and equity of nanomedicine, and choices to be made regarding its use Includes graphical illustrations, references, and keywords to reinforce concepts and aid further research In its assessment of alternative and sometimes conflicting concepts proposed for the application of nanotechnology to medicine, this book surveys major initiatives and the work of leading labs and innovators. It uses informative examples and case summaries to illustrate proven accomplishments and imagined possibilities in research and development.

Nanotechnology in Medicine and Biology - Huinan Liu 2021-11-18

Nanotechnology in Medicine and Biology brings together a multidisciplinary team of experts from the fields of materials science, nanotechnology, medicine and biomedical engineering to introduce new nanoscale biomaterials and their applications, diagnosis and treatment of disorders of the human body. The book presents the fundamentals for understanding the design, properties and selection of nanobiomaterials as well as their real-world applications in medicine. Each chapter addresses current regulations, manufacturing processes, and translation issues of nanobiomaterials for key applications. A discussion of current protocols and their benefits and disadvantages is also included. This book provides comprehensive background and knowledge in the field of nanobiomaterials that is suitable for academics, scientists and clinicians. Provides fundamental understanding on the design, properties and selection of biomaterials for applications in medicine and biology Reviews current regulations, protocols, manufacturing processes and translation issues of nanobiomaterials for medical applications Discusses tissue repair, wound healing, regenerative medicine, drug delivery, imaging and medical device applications

Nanomaterials for Clinical Applications - Costas Demetzos 2020-02-14

Nanomaterials in Clinical Medicine: Case Studies in Nanomedicines focuses on the nanomaterials that can be formulated as drug delivery vehicles, such as liposomes, micelles, nanoemulsions and nanogels. Their

physicochemical, morphological, thermo-dynamical and nanotoxicological properties are analyzed with respect to the design and development of drug delivery nanosystems for the encapsulation of an active pharmaceutical ingredient and its controlled release. Each chapter covers basic properties, the nanosystem (e.g., liposomes), the added value in drug delivery and targeting, and future perspectives. Case studies and examples of how nanomaterials are being used in clinical medicine, including marketed liposomal medicines and medical utility and regimens are also included. Particular attention is given to new nanocarriers, such as elastic liposomes, lipid polymeric hybrid nanoparticles, organogel, nanofibers carbon nanomaterials, quantum dots and inorganic nanoparticles. This book is an important information source for those wanting to increase their understanding of what major nanomaterials are being used to create more effective drug delivery systems. Summarizes the major nanomaterials used in clinical medicine, explaining how their properties make them suitable for this purpose Explains how nanomaterials are used to create increasingly efficient drug delivery vehicles Includes real-life examples, demonstrating how nanomaterials are being used in medical practice

Nanomedicine - Thomas J Webster 2012-10-19

Nanotechnology is at the forefront of advances in medicine.

Nanomedicine: Technologies and applications provides an important review of this exciting technology and its growing range of applications. After an introduction to nanomedicine, part one discusses key materials and their properties, including nanocrystalline metals and alloys, nanoporous gold and hydroxyapatite coatings. Part two goes on to review nanomedicine for therapeutics and imaging, before nanomedicine for soft tissue engineering is discussed in part three, including organ regeneration, skin grafts, nanotubes and self-assembled nanomaterials. Finally, nanomedicine for bone and cartilage tissue engineering is the focus of part four, with electrically active biocomposites as smart scaffolds investigated, as is cartilage and bone tissue engineering, regeneration and replacement. With its distinguished editor and international team of expert contributors, *Nanomedicine: Technologies*

and applications is an indispensable guide for all those involved in the research, development and application of this exciting technology, whilst providing a comprehensive introduction for students and academics interested in this field. Provides an important review of nanomedicine technology and its growing range of applications Discusses key nanomedicine materials and their properties, including nanocrystalline metals and alloys, nanoporous gold and hydroxyapatite coatings Reviews nanomedicine for therapeutics and imaging and nanomedicine for soft tissue engineering

Nanotechnology in Cancer Management - Kamil Reza Khondakar
2021-05-18

Nanotechnology in Cancer Management: Precise Diagnostics toward Personalized Health Care provides a well-focused and comprehensive overview of technologies involved in early stage cancer diagnostics via the detection of various cancer biomarkers, both in-vitro and in-vivo. The book briefly describes the advancement in cancer biomarker research relating to cancer diagnostics, covering fundamental aspects of various techniques, especially transduction methodologies, such as electrochemical, optical, magnetic, etc. In addition, it describes approaches on how to make options cost-effective, scalable for clinical application, and user-friendly. Advancements in technology related to device miniaturization, performance improvement and point-of-care applications round out discussions. Final sections cover future challenges, the prospects of various techniques, and how the introduction of nanotechnology in cancer management in a personalized manner is useful. Includes smart sensing materials such as smart electro-active nanomaterials, sensitive transducers development, nano-enabled advanced imaging, miniaturized analytical system, and device integration and interfacing for point-of-care applications Describes each component involved in the development of an efficient cancer diagnostics system Focuses on fundamental and applied concepts of the technologies, along with the related mechanisms proposed for diagnostics of cancer Enhances fundamental understandings of the concepts and development of nanotechnology based analytical tools and novel techniques for early

stage cancer diagnostics and management

Microdrop Generation - Eric R. Lee 2018-10-03

The applications and use of inkjet-like microfluidic drop ejectors have grown rapidly in many fields, including biotechnology, drug discovery, combinatorial chemistry, and microfabrication. Yet to date, end users and even designers of microdrop systems for scientific applications have had no books to reference on the subject. *Microdrop Generation* meets the needs of all those who need to understand the physics and engineering behind microdrop technology. It also contains detailed, how-to information on the practical construction, operation, troubleshooting, and fluid formulation for microdrop ejection systems. Written by a highly experienced practitioner of the art, the book is organized as a self-contained tutorial of microdrop technology ideal for those new to the field.

Nanoscience in Dermatology - Michael R. Hamblin 2016-08-13

Nanoscience in Dermatology covers one of the two fastest growing areas within dermatological science, nanoscience and nanotechnology in dermatology. Recently, great progress has been made in the research and development of nanotechnologies and nanomaterials related to various applications in medicine and, in general, the life sciences. There is increasing enthusiasm for nanotechnology applications in dermatology (drug delivery, diagnostics, therapeutics, imaging, sensors, etc.) for understanding skin biology, improving early detection and treatment of skin diseases, and in the design and optimization of cosmetics. Light sensitive nanoparticles have recently been explored, opening a new era for the combined applications of light with nanotechnology, also called photonanodermatology. However, concerns have been raised regarding the adverse effects of intentional and unintentional nanoparticle exposure and their toxicity. Written by experts working in these exciting fields, this book extensively covers nanotechnology applications, together with the fundamentals and toxicity aspects. It not only addresses current applications of nanotechnology, but also discusses future trends of these ever-growing and rapidly changing fields, providing scientists and dermatologists with a clear understanding of the advantages and

challenges of nanotechnology in skin medicine. Provides knowledge of current and future applications of nanoscience and nanotechnology in dermatology Outlines the fundamentals, methods, toxicity aspects, and other relevant aspects for nanotechnology based applications in dermatology Coherently structured book written by experts working in the fields covered

Nanomaterials for Theranostics and Tissue Engineering - Filippo Rossi 2020-08-22

Nanomaterials for Theranostics and Tissue Engineering: Techniques, Trends and Applications provides information on the major methodologies for the application of nanomaterials in the medical field. In recent years, nanotechnology for medicine, commonly known as bionanotechnology, or nanomedicine, has revolutionized various types of medical treatment. This book is intended for practicing engineers and scientists, and includes detailed, readily applicable protocols. It focuses on 4 major themes, including the synthesis of nanosystems for controlled drug delivery, nanotechnology-enhanced sensing systems, the application of nanotechnologies to the synthesis of novel biomaterials, and safety issues related to the application of medicinal nanotechnology. Provides a comprehensive overview on how nanotechnology is being used to create new tissue engineering techniques Covers, in detail, the physicochemical fundamentals of bionanotechnologies Explores major applications in the fields of theranostics and tissue engineering Assesses important challenges and safety issues related to the implementation of nanotechnology in medicine

Fundamentals of Nanotechnology - Gabor L. Hornyak 2018-12-14
WINNER 2009 CHOICE AWARD OUTSTANDING ACADEMIC TITLE!
Nanotechnology is no longer a subdiscipline of chemistry, engineering, or any other field. It represents the convergence of many fields, and therefore demands a new paradigm for teaching. This textbook is for the next generation of nanotechnologists. It surveys the field's broad landscape, exploring the physical basics such as nanorheology, nanofluidics, and nanomechanics as well as industrial concerns such as manufacturing, reliability, and safety. The authors then explore the vast

range of nanomaterials and systematically outline devices and applications in various industrial sectors. This color text is an ideal companion to Introduction to Nanoscience by the same group of esteemed authors. Both titles are also available as the single volume Introduction to Nanoscience and Nanotechnology Qualifying instructors who purchase either of these volumes (or the combined set) are given online access to a wealth of instructional materials. These include detailed lecture notes, review summaries, slides, exercises, and more. The authors provide enough material for both one- and two-semester courses.

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

Nanotechnologies in Preventative 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

Radical Abundance - K. Eric Drexler 2013-05-07

K. Eric Drexler is the founding father of nanotechnology—the science of engineering on a molecular level. In Radical Abundance, he shows how rapid scientific progress is about to change our world. Thanks to atomically precise manufacturing, we will soon have the power to

produce radically more of what people want, and at a lower cost. The result will shake the very foundations of our economy and environment. Already, scientists have constructed prototypes for circuit boards built of millions of precisely arranged atoms. The advent of this kind of atomic precision promises to change the way we make things—cleanly, inexpensively, and on a global scale. It allows us to imagine a world where solar arrays cost no more than cardboard and aluminum foil, and laptops cost about the same. A provocative tour of cutting edge science and its implications by the field's founder and master, Radical Abundance offers a mind-expanding vision of a world hurtling toward an unexpected future.

Nanotechnology for Oral Drug Delivery - João Pedro Martins
2020-07-30

Nanotechnology for Oral Drug Delivery: From Concept to Applications discusses the current challenges of oral drug delivery, broadly revising the different physicochemical barriers faced by nanotechnology-based oral drug delivery systems, and highlighting the challenges of improving intestinal permeability and drug absorption. Oral delivery is the most widely used form of drug administration due to ease of ingestion, cost effectiveness, and versatility, by allowing for the accommodation of different types of drugs, having the highest patient compliance. In this book, a comprehensive overview of the most promising and up-to-date engineered and surface functionalized drug carrier systems, as well as opportunities for the development of novel and robust delivery platforms for oral drug administration are discussed. The relevance of controlling the physicochemical properties of the developed particle formulations, from size and shape to drug release profile are broadly reviewed. Advances in both in vitro and in vivo scenarios are discussed, focusing on the possibilities to study the biological-material interface. The industrial perspective on the production of nanotechnology-based oral drug delivery systems is also covered. Nanotechnology for Oral Drug Delivery: From Concept to Applications is essential reading for researchers, professors, advanced students and industry professionals working in the development, manufacturing and/or commercialization of

nanotechnology-based systems for oral drug delivery, targeted drug delivery, controlled drug release, materials science and biomaterials, in vitro and in vivo testing of potential oral drug delivery technologies. Highlights the relevance of oral drug delivery in the clinical setting Covers the most recent advances in the field of nanotechnology for oral drug delivery Provides the scientific community with data that can facilitate and guide their research

Biomaterials Science - William R Wagner 2020-05-23

The revised edition of the renowned and bestselling title is the most comprehensive single text on all aspects of biomaterials science from principles to applications. Biomaterials Science, fourth edition, provides a balanced, insightful approach to both the learning of the science and technology of biomaterials and acts as the key reference for practitioners who are involved in the applications of materials in medicine. This new edition incorporates key updates to reflect the latest relevant research in the field, particularly in the applications section, which includes the latest in topics such as nanotechnology, robotic implantation, and biomaterials utilized in cancer research detection and therapy. Other additions include regenerative engineering, 3D printing, personalized medicine and organs on a chip. Translation from the lab to commercial products is emphasized with new content dedicated to medical device development, global issues related to translation, and issues of quality assurance and reimbursement. In response to customer feedback, the new edition also features consolidation of redundant material to ensure clarity and focus. Biomaterials Science, 4th edition is an important update to the best-selling text, vital to the biomaterials' community. The most comprehensive coverage of principles and applications of all classes of biomaterials Edited and contributed by the best-known figures in the biomaterials field today; fully endorsed and supported by the Society for Biomaterials Fully revised and updated to address issues of translation, nanotechnology, additive manufacturing, organs on chip, precision medicine and much more. Online chapter exercises available for most chapters

Nanomedicine and Nanobiotechnology - Stergios Logothetidis

2012-01-15

This book presents the laboratory, scientific and clinical aspects of nanomaterials used for medical applications in the fields of regenerative medicine, dentistry and pharmacy. It gives a broad overview on the in vitro compatibility assessment of nanostructured materials implemented in the medical field by the combination of classical biological protocols and advanced non-destructive nano-precision techniques with special emphasis on the topographical, surface energy, optical and electrical properties. Materials in the physical form of nanoparticles, nanotubes, and thin films are addressed in terms of their toxicity. The different pillars of the Nanomedicine field are also highlighted. The book takes an interdisciplinary approach of medicine, biology, pharmacy, physics, chemistry, engineering, nanotechnology and materials science. The international group of authors specifically chosen for their distinguished expertise belong to the academic and industrial world in order to provide a broader perspective. It appeals to researchers and graduate students.

Cancer Nanotechnology - Sang Hyun Cho 2016-04-19

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.

Handbook of Nanotechnology Applications - Kajornsak Faungnawakij 2020-10-22

Handbook of Nanotechnology Applications: Environment, Energy, Agriculture and Medicine presents a comprehensive overview on recent developments and prospects surrounding nanotechnology use in water/wastewater separation and purification, energy storage and conversion, agricultural and food process, and effective diagnoses and treatments in medical fields. The book includes detailed overviews of nanotechnology, including nanofiltration membrane for water/wastewater treatment, nanomedicine and nanosensor development for medical implementation, advanced nanomaterials of different structural dimensions (0D, 1D, 2D and 3D) for energy applications, as well as food and agricultural utilization. Other sections discuss the challenges of lab-based research transitioning towards practical industrial use. Helps scientists and researchers quickly learn and understand the key role of nanotechnology in important industrial applications Takes an interdisciplinary approach, demonstrating how nanotechnology is being used in a wide range of industry sectors Outlines the role nanotechnology plays in creating safer, cheaper and more energy-efficient projects and devices

Nanotherapeutics - Ezharul Hoque Chowdhury 2016-04-21

The emergence of nanotherapeutics is attributable to the integration of nanotechnology, recombinant DNA technology, and synthetic organic chemistry with medicine for treating critical human diseases in a more efficient and specific molecular approach than therapy with

conventionally-designed and formulated drugs. *Nanotherapeutics: From Laboratory to Clinic* comprehensively discusses the current shortcomings for delivery of classical (small) drugs, macromolecular therapeutics, and recombinant vaccine via the common intravascular and extravascular routes. The book describes the synthetic/chemical engineering methods as well as recombinant, hybridoma, and phage display technologies to fabricate different types of nanoparticulate carriers and drugs. It also reveals the diversified approaches undertaken by harnessing nanotechnology to overcome the multistep extracellular and intracellular barriers and to facilitate the development of novel strategies for therapeutic delivery and imaging. The author elaborates on the preclinical and clinical trials of potential nanoparticle-based products in animal models and patients and the approval/commercialization of nanotherapeutics, addressing all relevant human diseases. A focus on the above issues in a concise but illustrative manner fills the gap between the laboratory findings originating from the research on identification of cellular and systemic barriers of classical and macromolecular drugs along with development of strategies for fabrication and testing of nanotherapeutics, and the clinical outcomes emanating from the testing of the selected potential nanotherapeutics on patients of particular diseases. The book also fills a gap in the existing literature between the design and development of diversified nanotherapeutics for various purposes and the investigation and evaluation of potential barriers and resultant therapeutic efficacy of those nano-medicine formulations.

Mitochondrial Dysfunction and Nanotherapeutics - Marcos Roberto de Oliveira 2021-07-15

Mitochondrial Dysfunction and Nanotherapeutics: Aging, Diseases, and Nanotechnology-Related Strategies in Mitochondrial Medicine provides a comprehensive overview of mitochondrial dysfunction and current strategies for targeting the organelle. Based on the most current research, the editor lined up a team of worldwide experts to cover the most exciting research in the area, considering the impact through the human life span. This book is structured in two parts that provide a good balance of foundational and applied content. Part I deals with an

overview of mitochondrial dysfunction and its role in the aging process, including metabolic diseases, neuro-affective and neurodegenerative disorders, sepsis, and toxicological aspects. Part II covers therapeutic substance delivery to mitochondria with a focus on cancer, neurodegenerative diseases, and increasing the bioavailability of natural compounds of interest. Several nanoscale strategies are described. *Mitochondrial Dysfunction and Nanotherapeutics: Aging, Diseases, and Nanotechnology-Related Strategies in Mitochondrial Medicine* is a complete resource for researchers in this exciting field. Its comprehensive coverage makes this book particularly interesting to bioscience researchers looking to understand the foundations of mitochondrial health throughout the human life span. Additionally, clinician researchers, medical doctors, nutritionists, pharmacologists, and sports scientists may be attracted to the detailed information on the organelle-targeted delivery strategies. Contains detailed information on mitochondrial dysfunction Reviews our current understanding of the role of mitochondria in aging Includes coverage of specific conditions, including sports and affective disorders, among others Discusses mitochondria targeted delivery of therapeutic compounds

Bionanotechnology - Ljiljana Fruk 2021-02-04

Connecting theory with real-life applications, this essential textbook equips students with a comprehensive knowledge of the key concepts in bionanotechnology.

Nanotechnology in Endodontics - Anil Kishen 2015-03-18

This book provides detailed information on the emerging applications of nanomaterials and nanoparticles within endodontics, highlighting the exciting potential clinical impact of nanotechnology in the field. The range of applications covered is diverse, encompassing drug and gene delivery, tissue engineering, antibacterial strategies, dentin tissue stabilization, dentin pulp regeneration and use in restorative and endodontic materials. Important scientific background information relating to each application is provided, with clear coverage of basic principles. In addition, potential pitfalls are identified and explained. The cytotoxicity of nanomaterials and nanoparticles is also addressed in a

separate chapter. The book will be of value both for endodontic practitioners and for all scientists and graduate students who are interested in the application of nanotechnology in endodontics.

Nano Comes to Life - Sonia Contera 2021-11-16

"Increasingly, scientists are gaining control over matter at the nanometer scale. Spearheaded by physical scientists operating at the interfaces of physics and biology (such as the author herself), advances in nanoscience and technology are transforming how we think about life and treat human health. This is due to a convergence of size. To do medicine, one must understand and be able to reach the nanoscale environment of healthy cells in tissues and organs, as well as other nano-sized building blocks that constitute a living organism, such as proteins and DNA. The ground-breaking advances being made at the frontiers of nanoscience and -technology, specifically in the areas of biology and medicine, are the subject of this short, popular-level book. Chapter 1 describes how nanotechnology and quantitative methods in biology are progressively being deployed to embrace life in all its multiscale, hierarchical intricacy and multiplicity. Chapters 2 through 4 review how bioinspired and biomimetic nanostructures and nanomachines are being created and integrated into strategies aimed at solving specific medical problems. In particular, Chapter 2 summarizes how scientists are seeking to build artificial nanostructures using both biological molecules and the organizational principles of biology. Chapter 3 gives an account of how nanotechnology is being used to develop drug-delivery strategies that specifically target cancer cells and tumors to improve the efficacy of current cancer chemotherapies. Chapter 4 reviews the science of one of the most potentially transformative scientific fields: tissue engineering. In a concluding chapter (Chapter 5), Contera reviews how nanotechnology, biology, and medicine will continue fusing with other sciences and technologies - incorporating more mathematical and computational modelling, as well as AI and robotics. Nanoscale devices will be used to learn biology; and biology will be used to inspire increasingly sophisticated "transmaterial" devices that mimic some of the characteristics of biology and incorporate new features that are not

available in the biological world. The effects on human health and longevity will be profound. In a more personal epilogue, Contera describes the crossroads at which we find ourselves. Accessing our own biology evokes a mixture of possibility and dread. However, Contera maintains that we can create a positive transmaterial world for the benefit of humankind, and she describes ways in which scientists are proactively engaging with the public, politicians, industry, and entrepreneurs, as well as the media and the arts, to communicate the power and risks of new advances and to influence the ways in which new technologies will affect our future"--

Nanotechnology For Dummies - Richard D. Booker 2011-02-23

This title demystifies the topic for investors, business executives, and anyone interested in how molecule-sized machines and processes can transform our lives. Along with dispelling common myths, it covers nanotechnology's origins, how it will affect various industries, and the limitations it can overcome. This handy book also presents numerous applications such as scratch-proof glass, corrosion resistant paints, stain-free clothing, glare-reducing eyeglass coatings, drug delivery systems, medical diagnostic tools, burn and wound dressings, sugar-cube-sized computers, mini-portable power generators, even longer-lasting tennis balls, and more. Nanotechnology is the science of matter at the scale of one-billionth of a meter or 1/75,000th the size of a human hair. Written in the accessible, humorous For Dummies style, this book demystifies nanotechnology for investors, business people, and anyone else interested in how molecule-sized machines and processes will soon transform our lives. Investment in nanotechnology is exploding, with \$3.7 billion in nanotechnology R&D spending authorized by the U.S. government in 2003 and international investment reported at over \$2 billion.

Emerging Nanotechnologies for Diagnostics, Drug Delivery and Medical Devices - Ashim K Mitra 2017-02-13

Emerging Nanotechnologies for Diagnostics, Drug Delivery and Medical Devices covers the modern micro and nanotechnologies used for diagnosis, drug delivery, and theranostics using micro, nano, and

implantable systems. In-depth coverage of all aspects of disease treatment is included. In addition, the book covers cutting-edge research and technology that will help readers gain knowledge of novel approaches and their applications to improve drug/agent specificity for diagnosis and efficient disease treatment. It is a comprehensive guide for medical specialists, the pharmaceutical-industry, and academic researchers discussing the impact of nanotechnology on diagnosis, drug delivery, and theranostics. Gives readers working in immunology, drug delivery, and medicine a greater awareness on how novel nanotechnology orientated methods can help improve treatment Provides readers with backgrounds in nanotechnology, chemistry, and materials science an understanding on how nanotechnology is used in immunology and drug delivery Includes focused coverage of the use of nanodevices in diagnostics, therapeutics, and theranostics not offered by other books

Publications Combined - Over 100 Studies In Nanotechnology With Medical, Military And Industrial Applications 2008-2017 -

Over 7,300 total pages ... Just a sample of the contents: Title : Multifunctional Nanotechnology Research Descriptive Note : Technical Report,01 Jan 2015,31 Jan 2016 Title : Preparation of Solvent-Dispersible Graphene and its Application to Nanocomposites Descriptive Note : Technical Report Title : Improvements To Micro Contact Performance And Reliability Descriptive Note : Technical Report Title : Delivery of Nanotethered Therapies to Brain Metastases of Primary Breast Cancer Using a Cellular Trojan Horse Descriptive Note : Technical Report,15 Sep 2013,14 Sep 2016 Title : Nanotechnology-Based Detection of Novel microRNAs for Early Diagnosis of Prostate Cancer Descriptive Note : Technical Report,15 Jul 2016,14 Jul 2017 Title : A Federal Vision for Future Computing: A Nanotechnology-Inspired Grand Challenge Descriptive Note : Technical Report Title : Quantifying Nanoparticle Release from Nanotechnology: Scientific Operating Procedure Series: SOP C 3 Descriptive Note : Technical Report Title : Synthesis, Characterization And Modeling Of Functionally Graded Multifunctional Hybrid Composites For Extreme Environments Descriptive Note : Technical Report,15 Sep 2009,14 Mar 2015 Title : Equilibrium

Structures and Absorption Spectra for SixOy Molecular Clusters using Density Functional Theory Descriptive Note : Technical Report Title : Nanotechnology for the Solid Waste Reduction of Military Food Packaging Descriptive Note : Technical Report,01 Apr 2008,01 Jan 2015 Title : Magneto-Electric Conversion of Optical Energy to Electricity Descriptive Note : Final performance rept. 1 Apr 2012-31 Mar 2015 Title : Surface Area Analysis Using the Brunauer-Emmett-Teller (BET) Method: Standard Operating Procedure Series: SOP-C Descriptive Note : Technical Report,30 Sep 2015,30 Sep 2016 Title : Stabilizing Protein Effects on the Pressure Sensitivity of Fluorescent Gold Nanoclusters Descriptive Note : Technical Report Title : Theory-Guided Innovation of Noncarbon Two-Dimensional Nanomaterials Descriptive Note : Technical Report,14 Feb 2012,14 Feb 2016 Title : Deterring Emergent Technologies Descriptive Note : Journal Article Title : The Human Domain and the Future of Army Warfare: Present as Prelude to 2050 Descriptive Note : Technical Report Title : Drone Swarms Descriptive Note : Technical Report,06 Jul 2016,25 May 2017 Title : OFFSETTING TOMORROW'S ADVERSARY IN A CONTESTED ENVIRONMENT: DEFENDING EXPEDITIONARY ADVANCE BASES IN 2025 AND BEYOND Descriptive Note : Technical Report Title : A Self Sustaining Solar-Bio-Nano Based Wastewater Treatment System for Forward Operating Bases Descriptive Note : Technical Report,01 Feb 2012,31 Aug 2017 Title : Radiation Hard and Self Healing Substrate Agnostic Nanocrystalline ZnO Thin Film Electronics Descriptive Note : Technical Report,26 Sep 2011,25 Sep 2015 Title : Modeling and Experiments with Carbon Nanotubes for Applications in High Performance Circuits Descriptive Note : Technical Report Title : Radiation Hard and Self Healing Substrate Agnostic Nanocrystalline ZnO Thin Film Electronics (Per5 E) Descriptive Note : Technical Report,01 Oct 2011,28 Jun 2017 Title : High Thermal Conductivity Carbon Nanomaterials for Improved Thermal Management in Armament Composites Descriptive Note : Technical Report Title : Emerging Science and Technology Trends: 2017-2047 Descriptive Note : Technical Report Title : Catalysts for Lightweight Solar Fuels Generation Descriptive Note : Technical

Report,01 Feb 2013,31 Jan 2017 Title : Integrated Real-Time Control and Imaging System for Microbiorobotics and Nanobiostructures Descriptive Note : Technical Report,01 Aug 2013,31 Jul 2014

Handbook of Personalized Medicine - Ioannis S. Vizirianakis
2014-02-12

This book compiles multidisciplinary efforts to conceptualize the environment in research and clinical setting that creates the fertile ground for the practical utility of personalized medicine decisions and also enables clinical pharmacogenomics for establishing pharmacotyping in drug prescription. It covers innovative drug formulations and nanotheranostics, molecular imaging and signatures, translational nanomedicine and informatics, stem cell therapy approaches, modeling and predictability of drug response, pharmacogenetics-guided drug prescription, pediatric drug dosing, pharmacovigilance and regulatory aspects, ethical and cost-effectiveness issues, pharmacogenomics knowledge bases, personal genome sequencing, molecular diagnostics, as well as information-based medicine.

Introduction to Nanoscience and Nanotechnology - Chris Binns
2021-10-13

Explore foundational and advanced topics in nanoscience with this intuitive introduction In the newly revised Second Edition of *Introduction to Nanoscience and Nanotechnology*, renowned researcher Dr. Chris Binns delivers an accessible and broad-based treatment of nanoscience and nanotechnology. Beginning with the fundamental physicochemical properties of nanoparticles and nanostructures, the book moves on to discuss how these properties can be exploited to produce high-performance materials and devices. Following chapters explore naturally occurring nanoparticles and artificially engineered carbon nanoparticles, their mechanical properties, and their applications in nanotechnological science. Both design ideologies for manufacturing nanostructures—bottom-up and top-down—are examined, as is the idea that the two methodologies can be combined to allow for the imaging, probing, and manipulation of nanostructures. A survey of the current state of nanotechnology rounds out the text and introduces the reader to

a variety of novel and exciting applications of nanoscience. The book also includes: A thorough introduction to the importance and impact of particle size on the magnetic, mechanical, and chemical properties of materials Comprehensive explorations of carbon nanostructures, including bucky balls and nanotubes, and single-nanoparticle devices Practical discussions of colloids and nanoscale interfaces, as well as nanomechanics and nanofluidics In-depth examinations of the medical applications of functional nanoparticles, including the treatment of tumors by hyperthermia and medical diagnosis Perfect for senior undergraduate and graduate students in materials science and engineering, *Introduction to Nanoscience and Nanotechnology* will also earn a place in the libraries of early-career and established researchers with professional or personal interests in nanoscience and nanotechnology.

Nanotechnology in Medicine - Vishnu Kirthi Arivarasan 2022-01-22
Nanomedicine is the field of science that deals with organic applications of medicine at the nano-scale level. It primarily addresses finding, anticipating, and treating sickness, as well as using nanotechnology to assist in controlling human frameworks at the cellular level. The nature of nanotechnology allows it to address numerous medical issues in humans. This book offers comprehensive information to better comprehend and apply multifunctional nanoparticles in nanomedicine, and thus open avenues in the field. Medicating at the nanolevel is an exceptional therapeutic avenue, as it avoids symptoms associated with conventional medicines. This book investigates recent insights into structuring novel drug delivery frameworks. It concentrates on the physical characteristics of drug delivery transporters, and the preliminary procedures involved in their use. The book offers in-depth detail that benefits academics and researchers alike, containing broad research from experts in the field, and serves as a guide for students and researchers in the field of nanomedicine, drug delivery, and nanotechnology.

Engineering, Medicine and Science at the Nano-Scale - Stephen J. Fonash 2018-08-17

Students at universities the world over will benefit from the authors' concise treatment, arising out of lectures given for a graduate and advanced undergraduate course at Penn State University (USA) and University of Technology Delft (NL). The textbook begins by addressing, in general terms, the phenomena and peculiarities that occur at the nanoscale. In the following five chapters, readers are introduced in detail to nanoscale physics, chemistry, materials science, and biology, followed by chapters on synthesis and fabrication as well as characterization at the nanoscale. In the next four chapters a variety of exemplary applications taken from a wide range of sectors are also presented and discussed. Concerns for safety, environmental impact, workforce development, economic wellbeing, and societal change issues arising from nanotechnology are woven throughout the book and additionally form the focus of the last two chapters.

Nanomaterials for Medical Applications - Zoraida Aguilar 2012-10-10

Structurally the work is demarcated into the six most popular areas of research: (1) biocompatibility of nanomaterials with living organisms in their various manifestations (2) nanobiosensors for clinical diagnostics, detecting biomolecules which are useful in the clinical diagnosis of genetic, metabolically acquired, induced or infectious disease (3) targeted drug delivery for nanomaterials in their various modifications (4) nanomedical devices and structures which are used in the development of implantable medical devices and structures such as nanorobots (5) nanopharmacology, as novel nanoparticles are increasingly engineered to diagnose conditions and recognize pathogens, identify ideal pharmaceutical agents to treat the condition or pathogens, fuel high-yield production of matched pharmaceuticals (potentially in vivo), locate, attach or enter target tissue,

Nanotechnology Based Approaches for Tuberculosis Treatment -

Prashant Kesharwani 2020-06-10

Nanotechnology Based Approaches for Tuberculosis Treatment discusses multiple nanotechnology-based approaches that may help overcome persisting limitations of conventional and traditional treatments. The book summarizes the types of nano drugs, their synthesis, formulation,

characterization and applications, along with the most important administration routes. It also explores recent advances and achievements regarding therapeutic efficacy and provides possible future applications in this field. It will be a useful resource for investigators, pharmaceutical researchers, innovators and scientists working on technology advancements in the areas of targeted therapies, nano scale imaging systems, and diagnostic modalities in tuberculosis. Addresses the gap between nanomedicine late discovery and early development of tuberculosis therapeutics Explores tuberculosis nanomedicine standardization and characterization with newly developed treatment, diagnostic and treatment monitoring modalities Covers the field thoroughly, from the pathogenesis of tuberculosis and multi-drug resistant mycobacterium tuberculosis, to treatment approaches using nanotechnology and different nanocarriers

Nanotechnology in Biology and Medicine - Tuan Vo-Dinh 2017-10-03

The second edition of Nanotechnology in Biology and Medicine is intended to serve as an authoritative reference source for a broad audience involved in the research, teaching, learning, and practice of nanotechnology in life sciences. This technology, which is on the scale of molecules, has enabled the development of devices smaller and more efficient than anything currently available. To understand complex biological nanosystems at the cellular level, we urgently need to develop a next-generation nanotechnology tool kit. It is believed that the new advances in genetic engineering, genomics, proteomics, medicine, and biotechnology will depend on our mastering of nanotechnology in the coming decades. The integration of nanotechnology, material sciences, molecular biology, and medicine opens the possibility of detecting and manipulating atoms and molecules using nanodevices, which have the potential for a wide variety of biological research topics and medical uses at the cellular level. This book presents the most recent scientific and technological advances of nanotechnology for use in biology and medicine. Each chapter provides introductory material with an overview of the topic of interest; a description of methods, protocols, instrumentation, and applications; and a collection of published data with

an extensive list of references for further details. The goal of this book is to provide a comprehensive overview of the most recent advances in instrumentation, methods, and applications in areas of nanobiotechnology, integrating interdisciplinary research and development of interest to scientists, engineers, manufacturers, teachers, and students.

Nanotechnology and Nanomaterials in the Treatment of Life-threatening Diseases - Narendra Kumar 2013-12-05

Nanotechnology and Nanomaterials in the Treatment of Life-threatening Diseases takes a scientific approach to nanotechnology and nanomaterials applications in medicine, while also explaining the core biological principles for an audience of biomedical engineers, materials scientists, pharmacologists, and medical diagnostic technicians. The book is structured by major disease groups, offering a practical, application-based focus for scientists, engineers, and clinicians alike. The spectrum of medical applications is explored, from diagnostics and imaging to drug delivery, monitoring, therapies, and disease prevention. It also focuses specifically on the synthesis of nanomaterials and their potential health risks (particularly toxicity). Nanomedicine — the application of nanomaterials and devices for addressing medical problems — has demonstrated great potential for enabling improved diagnosis, treatment, and monitoring of many serious illnesses, including cancer, cardiovascular and neurological disorders, HIV/AIDS, and diabetes, as well as many types of inflammatory and infectious diseases. Gain an understanding of how nanotechnologies and nanomaterials can be deployed in the fight against the major life-threatening diseases: cancer, neurological disorders (including Alzheimer's and Parkinson's), cardiovascular diseases, and HIV/AIDS Discover the latest developments in nanomedicine, from therapies and drug delivery to diagnostics and disease prevention The authors cover the health risks of nanomaterials as well as their benefits, considering toxicity and potential carcinogens
Nanomedicine Manufacturing and Applications - Francis Verpoort 2021-06-22

Nanomedicine explores the modification and enhancement of the properties and performances of typical drugs to treat various diseases. Nano-based medicines have advantages in several ways, such as in nanotherapeutics, nanotheranostics, and nanodiagnostics. *Nanomedicine Manufacturing and Applications* effectively explores the major manufacturing techniques and applications of nanomaterial-based medicine in the areas of chemotherapy, biochips, insulin pumps, and other treatment methods. This book explains how nanomedicines are developed from nanoparticles as well as their biomedical and other applications related to healthcare. This book is an important reference source for nanoscientists, biomaterials scientists, and biomedical engineers who want to learn more about how nano-based medicines are made and used. Outlines the process of making nanomedicine as well as nanodrug carriers, with a focus on nanomedicine for cancer treatment. Explains the formulation and manufacturing process of nanomedicines, showing how to build these materials. Demonstrates how nano-based medicines are being used to tackle a range of diseases in a way that conventional medicines cannot.

Nano - Robin Cook 2012-12-04

A lavishly funded, security-conscious nanotechnology institute in the foothills of the Rockies, Nano is ahead of the curve in the competitive world of molecular manufacturing, including the construction of microbivores, tiny nanorobots with the ability to gobble up viruses and bacteria. But when Pia Grazdani takes a job there, she's shocked by the secretive corporate culture. She's warned by her boss not to investigate the other work being done at the gigantic facility, nor to ask questions about the source of the seemingly endless capital that funds the institute's research. And when Pia encounters a fellow employee on a corporate jogging path suffering the effects of a seizure, she soon realizes she may have literally stumbled upon Nano's human guinea pigs. Is the tech giant on the cusp of one of the biggest medical discoveries of the twenty-first century—a treatment option for millions—or have they already sold out to the highest bidder?