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Advanced Wound Repair Therapies - David Farrar 2011-06-21

Wound repair is an important and growing sector of the medical industry with increasingly sophisticated biomaterials and strategies being developed to treat wounds. Advanced wound repair therapies provides readers with up-to-date information on current and emerging biomaterials and advanced therapies concerned with healing surgical and chronic wounds. Part one provides an introduction to chronic wounds, with chapters covering dysfunctional wound healing, scarring and scarless wound healing and monitoring of wounds. Part two covers biomaterial therapies for chronic wounds, including chapters on functional requirements of wound repair biomaterials, polymeric materials for wound dressings and interfacial phenomena in wound healing. In part three, molecular therapies for chronic wounds are discussed, with chapters on topics such as drug delivery, molecular and gene therapies and antimicrobial dressings. Part four focuses on biologically-derived and cell-based therapies for chronic wounds, including engineered tissues, biologically-derived scaffolds and stem cell therapies for wound repair. Finally, part five covers physical stimulation therapies for chronic wounds, including electrical stimulation, negative pressure therapy and mechanical debriding devices. With its distinguished editor and international team of contributors, Advanced wound repair therapies is an essential reference for researchers and

materials scientists in the wound repair industry, as well as clinicians and those with an academic research interest in the subject. Provides readers with up-to-date information on current and emerging biomaterials and advanced therapies concerned with healing surgical and chronic wounds Chapters include the role of micro-organisms and biofilms in dysfunctional wound healing, tissue-biomaterial interaction and electrical stimulation for wound healing Covers biologically-derived and cell-based therapies for chronic wounds, including engineered tissues, biologically-derived scaffolds and stem cell therapies for wound repair

Practical Atlas for Bacterial Identification, Second Edition - D. Roy Cullimore 2010-03-17

Published nearly ten years ago, the first edition of Practical Atlas for Bacterial Identification broke new ground with the wealth of detail and breadth of information it provided. The second edition is poised to do the same. Differing fundamentally from the first edition, this book begins by introducing the concept of bacteria community intelligence as reflected in corrosion, plugging, and shifts in the quality parameters in the product whether it be water, gas, oil, or even air. It presents a new classification system for bacterial communities based upon their effect and activities, and not their composition. The book represents a radical departure from the classical reductionist identification of bacteria dominated by genetic

and biochemical analyses of separated strains. The author takes a holistic approach based on form, function, and habitat of communities (consorms) of bacteria in real environments. He uses factors related to the oxidation-reduction potential at the site where the consorm is active and the viscosity of the bound water within that consorm to position their community structures within a two-dimensional bacteriological positioning system (BPS) that then allows the functional role to be defined. This book has an overarching ability to define bacterial activities as consorms in a very effective and applied manner useful to an applied audience involved in bacterial challenges. Organized for ease of use, the book allows readers to start with the symptom, uncover the bacterial activities, and then indentify the communities distinctly enough to allow management and control practices that minimize the damage. The broad spectrum approach, new to this edition, lumps compatible bacteria together into a relatively harmonious consortia that share a common primary purpose. It gives a big picture view of the role of bacteria not as single strains but collectively as communities and uses this information to provide key answers to common bacterial problems.

Biotechnology of Lactic Acid Bacteria - Fernanda Mozzi 2015-09-04

Lactic acid bacteria (LAB) have historically been used as starter cultures for the production of fermented foods, especially dairy products. Over recent years, new areas have had a strong impact on LAB studies: the application of omics tools; the study of complex microbial ecosystems, the discovery of new LAB species, and the use of LAB as powerhouses in the food and medical industries. This second edition of *Biotechnology of Lactic Acid Bacteria: Novel Applications* addresses the major advances in the fields over the last five years. Thoroughly revised and updated, the book includes new chapters. Among them: The current status of LAB systematics; The role of LAB in the human intestinal microbiome and the intestinal tract of animals and its impact on the health and disease state of the host; The involvement of LAB in fruit and vegetable fermentations; The production of nutraceuticals and aroma compounds by LAB; and The formation of biofilms by LAB. This book is an essential reference for established researchers and scientists, clinical and advanced students,

university professors and instructors, nutritionists and food technologists working on food microbiology, physiology and biotechnology of lactic acid bacteria.

The Biofilm Primer - J. William Costerton 2007-03-06

This book details the widely accepted hypothesis that the majority of bacteria in virtually all ecosystems grow in matrix-enclosed biofilms. The author, who first proposed this biofilm hypothesis, uses direct evidence from microscopy and from molecular techniques, arguing cogently for moving beyond conventional culture methods that dominated microbiology in the last century. Bacteria grow predominantly in biofilms in natural, engineered, and pathogenic ecosystems; this book provides a solid basis for the understanding of bacterial processes in environmental, industrial, agricultural, dental and medical microbiology. Using a unique "ecological" perspective, the author explores the commensal and pathogenic colonization of human organ systems.

Handbook of Nanoceramic and Nanocomposite Coatings and Materials - Abdel Salam Hamdy Makhlouf 2015-05-08

In this new handbook, top researchers from around the world discuss recent academic and industrial advances in designing ceramic coatings and materials. They describe the role of nanotechnology in designing high performance nanoceramic coatings and materials in terms of the unique advantages that can be gained from the nano scale, including the latest techniques for the synthesis and processing of ceramic and composite coatings for different applications. Focuses on the most advanced technologies for industry-oriented nano-ceramic and nano-composite coatings, including recent challenges for scaling up nano-based coatings in industry Covers the latest evaluation methods for measuring coatings performance Discusses novel approaches for improving the performance of ceramic and composite coatings and materials via nanotechnology Provides the most recent and advanced techniques for surface characterization

Encyclopedia of Microbiology - 2009-01-14

Available as an exclusive product with a limited print run, *Encyclopedia of Microbiology*, 3e, is a comprehensive survey of microbiology, edited by

world-class researchers. Each article is written by an expert in that specific domain and includes a glossary, list of abbreviations, defining statement, introduction, further reading and cross-references to other related encyclopedia articles. Written at a level suitable for university undergraduates, the breadth and depth of coverage will appeal beyond undergraduates to professionals and academics in related fields. 16 separate areas of microbiology covered for breadth and depth of content Extensive use of figures, tables, and color illustrations and photographs Language is accessible for undergraduates, depth appropriate for scientists Links to original journal articles via Crossref 30% NEW articles and 4-color throughout - NEW!

Desk Encyclopedia of Microbiology - Moselio Schaechter 2010-04-19
The Desk Encyclopedia of Microbiology, Second Edition is a single-volume comprehensive guide to microbiology for the advanced reader. Derived from the six volume e-only Encyclopedia of Microbiology, Third Edition, it bridges the gap between introductory texts and specialized reviews. Covering topics ranging from the basic science of microbiology to the current "hot" topics in the field, it will be invaluable for obtaining background information on a broad range of microbiological topics, preparing lectures and preparing grant applications and reports. * The most comprehensive single-volume source providing an overview of microbiology to non-specialists * Bridges the gap between introductory texts and specialized reviews. * Provides concise and general overviews of important topics within the field making it a helpful resource when preparing for lectures, writing reports, or drafting grant applications

The Root Canal Biofilm - Luis E. Chávez de Paz 2015-10-20
This book presents the current state of research on the basic scientific aspects of root canal biofilm biology within a clinically applicable context. Root canal biofilms are complex polymicrobial structures adhering to the root canal surface that are formed by microorganisms invading the pulpal space of teeth, and are associated with persistent root canal infections. Concerted efforts to study root canal biofilms have been made in the past decade, resulting in the publication of observational and experimental studies that detail the morphology and

biology of these structures in infected root canals. In addition to confirming that bacteria in root canals do not exist in free-floating planktonic states as previously assumed, this new information on root canal biofilm infections has provided an opportunity to re-evaluate conventional clinical protocols and improve endodontic therapeutic measures.

Antimicrobial and Antiviral Materials - Peerawatt Nunthavarawong 2022-03-17

Emerging microbial and viral infections are a serious challenge to health, safety, and economics around the world. Antimicrobial and antiviral technologies are needed to disrupt the progression and replication of bacteria and viruses and to counter their rapidly evolving resistance. This book discusses recent developments in materials science and engineering in combating infectious diseases and explores advances in antimicrobial and antiviral materials, including polymers, metals, and ceramics and their applications in the fight against pathogens. Features

- Covers progress in biomimetic antimicrobial and antiviral materials and antimicrobial/antiviral bulk materials and coatings
- Describes modern methods for disinfection of biomedical materials against microbial and viral infection resistance, especially for depressing novel coronavirus (COVID-19)
- Details methods to improve material properties to have a longer service life in combating infection
- Emphasizes chemical, physical, mechanical, tribological, and antimicrobial/antiviral properties
- Offers current and future applications of emerging antimicrobial/antiviral technologies

This book will be of interest to materials researchers and industry professionals focusing on antimicrobial and antiviral applications.

Microbial Biofilms - Dharumadurai Dhanasekaran 2016-07-13

In the book Microbial Biofilms: Importance and applications, eminent scientists provide an up-to-date review of the present and future trends on biofilm-related research. This book is divided with four subdivisions as biofilm fundamentals, applications, health aspects, and their control. Moreover, this book also provides a comprehensive account on microbial interactions in biofilms, pyocyanin, and extracellular DNA in facilitating

Pseudomonas aeruginosa biofilm formation, atomic force microscopic studies of biofilms, and biofilms in beverage industry. The book comprises a total of 21 chapters from valued contributions from world leading experts in Australia, Bulgaria, Canada, China, Serbia, Germany, Italy, Japan, the United Kingdom, the Kingdom of Saudi Arabia, Republic of Korea, Mexico, Poland, Portugal, and Turkey. This book may be used as a text or reference for everyone interested in biofilms and their applications. It is also highly recommended for environmental microbiologists, soil scientists, medical microbiologists, bioremediation experts, and microbiologists working in biocorrosion, biofouling, biodegradation, water microbiology, quorum sensing, and many other related areas. Scientists in academia, research laboratories, and industry will also find it of interest.

Antimicrobial Coatings and Modifications on Medical Devices - Zheng Zhang 2017-05-24

Based on a fundamental understanding of the interaction between bacteria and materials, this timely volume emphasizes the latest research in the antimicrobial interfacial design and provides an invaluable blueprint for improving antimicrobial performance on devices and products. *Antimicrobial Coatings and Modifications* targets reduction of microbial accumulation on biomedical and industrial materials through changing interfacial characteristics. Applying a viable antimicrobial coating or modification to resist alarming threats is a highly demanding requirement for many medical and engineering applications. Many contemporary books in the area of antimicrobial solution focus on applying antimicrobial agents or materials that can kill bacteria. The volume pays more attention to eliminating bacterial contamination and biofilm formation through surface characteristics with minimized bacterial resistance and environmental impact.

The Essential Tension - Sonya Bahar 2017-11-28

'The Essential Tension' explores how agents that naturally compete come to act together as a group. The author argues that the controversial concept of multilevel selection is essential to biological evolution, a proposition set to stimulate new debate. The idea of one collective unit

emerging from the cooperative interactions of its constituent (and mutually competitive) parts has its roots in the ancient world. More recently, it has illuminated studies of animal behavior, and played a controversial role in evolutionary biology. In Part I, the author explores the historical development of the idea of a collectivity in biological systems, from early speculations on the sociology of human crowd behavior, through the mid-twentieth century debates over the role of group selection in evolution, to the notion of the selfish gene. Part II investigates the balance between competition and cooperation in a range of contemporary biological problems, from flocking and swarming to experimental evolution and the evolution of multicellularity. Part III addresses experimental studies of cooperation and competition, as well as controversial ideas such as the evolution of evolvability and Stephen Jay Gould's suggestion that "spandrels" at one level of selection serve as possible sources of variability for the next higher level. Finally, building on the foundation established in the preceding chapters, the author arrives at a provocative new proposition: as a result of the essential tension between competition and cooperation, multiple levels may be essential in order for evolutionary processes to occur at all.

Polyurethane - Fahmina Zafar 2012-08-29

The enchanting and worthy world of PU beckoned to bring forth the book titled "Polyurethane". The book is divided into three sections: structures, properties and characterization of PU, applications of PU and a separate section on Biobased PU, covering the research and development in these areas. Each contributed chapter handles new and interesting topics introducing the reader to the wider known and unknown applications of PU such as PU for grouting technologies, fuel binder, extraction of metals, treatment of industry wastewater, alkanolamide PU coatings and foams, and others. The book aims to cater a larger audience comprising of readers from polymer chemistry, materials chemistry, and industrial chemistry.

Biophysics of Infection - Mark C. Leake 2016-05-18

This book describes modern biophysical techniques that enable us to understand and examine dynamic processes of infection at the molecular

level. Cutting-edge research articles, laboratory protocols, case studies and up-to-date reviews cover topics such as single-molecule observation of DNA replication repair pathways in *E. coli*; evolution of drug resistance in bacteria; restriction enzymes as barriers to horizontal gene transfer in *Staphylococcus aureus*; infectious and bacterial pathogen biofilms; killing infectious pathogens through DNA damage; bacterial surfaces in host-pathogen interactions; bacterial gene regulation by riboswitches; transcription regulation in enterobacterial pathogens; the bacterial flagellar motor; initial surface colonization by bacteria; *Salmonella Typhi* host restrictions; as well as monitoring proton motive force in bacteria; microbial pathogens using digital holography; mathematical modelling of microbial pathogen motility; neutron reflectivity in studying bacterial membranes; force spectroscopy in studying infection and 4D multi-photon imaging to investigate immune responses. The focus is on the development and application of complex techniques and protocols at the interface of life sciences and physics, which increase the physiological relevance of biophysical investigations.

Microbicides in Coatings - Frank Sauer 2017-07-04

All about biocides for coatings: When it comes to protecting coatings, it is essential to strike the right balance between controlling germs in order to avoid economic damage on the one hand and tolerating microbial life where it is necessary and useful on the other. The new book from Frank Sauer provides a comprehensive overview of the working mechanisms and possible applications of microbicides for coatings - invaluable for formulators and technicians as well as for business people with a basic knowledge of chemistry and biology.

Biomaterials and Tissue Engineering in Urology - J Denstedt 2009-04-29

Urology is the branch of medicine dealing with disorders or diseases of the male genitor-urinary tract and the female urinary tract. This important book summarises the wealth of recent research on the use of biomaterials and tissue engineering to treat urological disorders. Part one reviews the fundamentals with chapters on such topics as biofilms and encrustation formation. Part two then discusses recent advances in

biomaterials and design of urological devices such as metal ureteral stents, self-lubricating catheter materials and penile implants. Chapters in Part three address urological tissue engineering with coverage of themes such as artificial and natural biomaterials, nano-technology and placental stem cells for tissue engineering the regeneration of urological tissue and organs. With its eminent editors and international team of contributors, Biomaterials and tissue engineering in urology is an invaluable resource to researchers of urological biomaterials, devices and regenerative medicine in both industry and academia, as well as an important reference for medical practitioners. Provides a comprehensive review of biomaterials and tissue engineering in urology Explores the fundamentals of urology, focusing on biofilms and encrustation and formation Discusses recent advances in biomaterials and the design of urological devices, catheters and stents

Targeting Biofilms in Translational Research, Device

Development, and Industrial Sectors - Dustin L. Williams 2019-11-06

This book offers a much-needed discussion on the targeting of biofilm-related infections. Chapters include discussions on the impact of biofilm on medical implants, industrial applications, as well as wound and tissue infections. It also offers discussions on regulatory management for industrial sectors and medical environments. Given that there continues to be a paucity of effective antimicrobial products, devices, and coatings in clinical and industrial use that effectively reduce rates of infection or biofilm-related problems, Targeting Biofilms in Translational Research, Device Development, and Industrial Sectors, offers a fresh and much-needed perspective aimed at helping create healthier controlled environments and safer devices. This comprehensive book is indispensable for industrial and academic translational researchers, device developers, and regulatory experts looking to create more effective antimicrobial products.

Textbook and Color Atlas of Traumatic Injuries to the Teeth - Jens O. Andreasen 2018-09-18

Textbook and Color Atlas of Traumatic Injuries to the Teeth, Fifth Edition encompasses the full scope of acute dental trauma, including all aspects

of interdisciplinary treatment. This new edition embraces the significant advances made in the subject of dental traumatology since the publication of the previous edition in 2007. Thoroughly updated throughout, it includes eight new chapters, including one chapter focused on the development of bioengineered teeth and another on clinical regenerative endodontics. Providing the theoretical background behind the clinical applications, the text is supplemented by a step-by-step online guide to procedures at www.dentaltraumaguide.org. The book is also filled with full-color illustrations throughout—making it the ultimate guide for anyone treating individuals afflicted with dental injuries caused by traffic accidents, sporting injuries, violent assaults, and other falls, crashes, or injuries. New edition of the definitive reference on dental traumatology Thoroughly revised and updated with a modern look and feel Eight new chapters on innovative developments in the field Contributions from world-renowned authors and editors Linked to www.dentaltraumaguide.org with a specific chapter on how the book complements the online guide This comprehensive textbook is an invaluable reference for undergraduate BDS courses worldwide, as well as a core text for postgraduate pediatric, oral surgery, and endodontics courses.

Individuals Across the Sciences - Alexandre Guay 2016

Knowing what individuals are and how they can be identified is a crucial question for both philosophers and scientists. This volume explores how different sciences handle the issue of understanding individuality, as well as reflecting on how this scientific work relates to metaphysics itself.

Decontamination in Hospitals and Healthcare - Jimmy Walker 2014-02-13

Decontamination in Hospitals and Healthcare brings an understanding of decontamination practices and the development of technologies for cleaning and control of infection to a wide audience interested in public health, including healthcare specialists, scientists, students or patients. Part one highlights the importance and history of decontamination in hospitals and healthcare before exploring the role of standards in decontamination, infection control in Europe, and future trends in the area. Part two focuses on decontamination practices in hospitals and

healthcare. It considers the role of the nurse in decontamination, the issues of microbial biofilm in waterlines, control of waterborne microorganisms, and the use of gaseous decontamination technologies. Further chapters explore decontamination of prions, the use of protective clothing, no-touch automated room disinfection systems, and controlling the presence of microorganisms in hospitals. Part three discusses practices for decontamination and sterilization of surgical instruments and endoscopes. These chapters examine a range of guidance documents, including the choice framework for local policy and procedures for decontamination of surgical instruments, as well as novel technologies for cleaning and detection of contamination.

Decontamination in Hospitals and Healthcare provides a reference source on decontamination for public health professionals and students concerned with healthcare. It is particularly useful for scientists in microbiology and disinfection/decontamination laboratories, healthcare workers who use disinfectants, students in microbiology, clinicians, members of the Institute of Decontamination Sciences/Central Sterilising Club, and those employed in the Central Sterile Services departments of healthcare facilities. Discusses decontamination processes in Europe Provides an in-depth understanding into decontamination in healthcare settings, specifically hospitals and dental practices Examines the decontamination of surgical equipment and endoscopes

Ingle's Endodontics - Ilan Rotstein, DDS 2019-06-01

Ingle's Endodontics, 7th edition, is the most recent revision of the text that has been known as the "Bible of Endodontics" for half a century. The new edition, published in two volumes, continues the tradition of including the expertise of international leaders in the field. Eighty-six authors contributed cutting-edge knowledge and updates on topics that have formed the core of this book for years. New chapters reflect the ways in which the field of endodontics has evolved over the 50 years since the pioneer John I. Ingle authored *Endodontics*. *Ingle's Endodontics* will continue to be the standard against which all other endodontic texts will be measured. The 40 chapters are arranged in two volumes under three sections: The Science of Endodontics; The Practice

of Endodontics: Diagnosis, Clinical Decision Making, Management, Prognosis; and Interdisciplinary Endodontics. With contributions from the world's experts in all phases of the specialty, Ingle's Endodontics, 7th edition promises to be an indispensable dentistry textbook, an essential part of every endodontist's library.

Topics in Ecological and Environmental Microbiology - Tom Schmidt 2012

"In 2009, the third edition of the Encyclopedia of Microbiology and the Desk Encyclopedia of Microbiology published, providing customers with a six-volume compendium and condensed reference, respectively, on the vast subject of microbiology. This derivative will compile thirty-two chapters from the original MRW relating to microbial ecology (the study of how microbes interact with each other and their environments) and present them in a single thematic volume that will appeal to researchers, technicians, and students in the environmental science and microbial ecology fields. Classic and cutting-edge entries on topics including air quality, marine habitats, food webs, and microbial adhesion will be fully updated by their original authors (when possible), providing a up-to-date and affordable option to those with focused research interests"--Provided by publisher.

Adhesion of Cells, Viruses and Nanoparticles - Kevin Kendall 2010-11-15
"Adhesion of Cells, Viruses and Nanoparticles" describes the adhesion of cells, viruses and nanoparticles starting from the basic principles of adhesion science, familiar to postgraduates, and leading on to recent research results. The underlying theory is that of van der Waals forces acting between cells and substrates, embodied in the molecules lying at the surfaces, together with the geometry and elasticity of the materials involved. The first part describes the fundamental background to adhesion principles, including the phenomenology, the important equations and the modeling ideas. Then the mechanisms of adhesion are explored in the second part, including the elastic deformations of spheres and the importance of the energy of adhesion as measured in various tests. It is demonstrated that adhesion of cells is statistical and depends on Brownian movement and on the complex multiple contacts that can

form as cells move around. Then, detailed chapters on cell adhesion, contact of viruses and aggregation of nanoparticles follow in Part 3. Finally, the last chapter looks to the future understanding of cell adhesion and points out some interesting directions of research, development and treatment of diseases related to these phenomena. This book is an ideal resource for researchers on adhesion molecules, receptors, cell and tissue culturing, virus infection, toxicity of nanoparticles and bioreactor fouling. It can also be used to support undergraduate and Masters level teaching courses. "This is a fascinating book and it is an invaluable resource for understanding particle-particle/surface adhesion at micro- and nano- scales. I intend to keep one for my future reference and highly recommend it to my students." (Prof. Zhibing Zhang, School of Chemical Engineering, University of Birmingham, UK)

The Biofilm Primer - J. William Costerton 2007-03-16

This book details the widely accepted hypothesis that the majority of bacteria in virtually all ecosystems grow in matrix-enclosed biofilms. The author, who first proposed this biofilm hypothesis, uses direct evidence from microscopy and from molecular techniques, arguing cogently for moving beyond conventional culture methods that dominated microbiology in the last century. Bacteria grow predominantly in biofilms in natural, engineered, and pathogenic ecosystems; this book provides a solid basis for the understanding of bacterial processes in environmental, industrial, agricultural, dental and medical microbiology. Using a unique "ecological" perspective, the author explores the commensal and pathogenic colonization of human organ systems.

Parallel Processing and Applied Mathematics - Roman Wyrzykowski 2014-05-05

This two-volume-set (LNCS 8384 and 8385) constitutes the refereed proceedings of the 10th International Conference of Parallel Processing and Applied Mathematics, PPAM 2013, held in Warsaw, Poland, in September 2013. The 143 revised full papers presented in both volumes were carefully reviewed and selected from numerous submissions. The papers cover important fields of parallel/distributed/cloud computing and

applied mathematics, such as numerical algorithms and parallel scientific computing; parallel non-numerical algorithms; tools and environments for parallel/distributed/cloud computing; applications of parallel computing; applied mathematics, evolutionary computing and metaheuristics.

Microbial Community Modeling: Prediction of Microbial Interactions and Community Dynamics - Hyun-Seob Song 2018-07-04

This book is a printed edition of the Special Issue "Microbial Community Modeling: Prediction of Microbial Interactions and Community Dynamics" that was published in Processes

Essential Endodontology - Dag Orstavik 2020-01-21

The authoritative reference that continues to present a systematic analysis of the scientific basis of endodontology The third edition of Essential Endodontology: Prevention and Treatment of Apical Periodontitis has been revised and updated to include the most recent developments in the field, maintaining its position as the major scientific treatise of apical periodontitis. Making an often-complex subject more digestible, the book explores the scientific basis of endodontology, adopting a systematic analysis of the available clinical and laboratory evidence. Promoting apical periodontitis as a disease entity, the comprehensive third edition focuses on its biology and clinical features, enabling the reader to have a better understanding of its diagnosis, prevention and treatment. In addition to thorough updates and full colour illustrations throughout, a new chapter on regenerative endodontics has been added to this edition. Written with a focus on the scientific basis of endodontology Includes a new chapter on regenerative endodontics Presents the most current information and major developments in this fast-moving field Provides helpful learning outcomes in each chapter Contains full colour illustrations, enriching the text Features contributions from a noted panel of international experts, including new contributors from across the globe Regarded as a vital companion to the pursuit of excellence in postgraduate and specialist education, Essential Endodontology is an indispensable and accessible resource for practicing endodontists, postgraduate students of

endodontology and those seeking professional certification in endodontology.

Porous Media - Kambiz Vafai 2010-08-24

Presenting state-of-the-art research advancements, Porous Media: Applications in Biological Systems and Biotechnology explores innovative approaches to effectively apply existing porous media technologies to biomedical applications. In each peer-reviewed chapter, world-class scientists and engineers collaborate to address significant problems and discuss exciting research in biological systems. The book begins with discussions on bioheat transfer equations for blood flows and surrounding biological tissue, the concept of electroporation, hydrodynamic modeling of tissue-engineered material, and the resistance of microbial biofilms to common modalities of antibiotic treatments. It examines how biofilms influence porous media hydrodynamics, describes the modeling of flow changes in cerebral aneurysms, and highlights recent advances in Lagrangian particles methods. The text also covers passive mass transport processes in cellular membranes and their biophysical implications, the modeling and treatment of mass transport through skin, the use of porous media in marine microbiology, the transport of large biological molecules in deforming tissues, and applications of magnetic stabilized beds for protein purification and adsorption, antibody removal, and more. The final chapters present potential in situ characterization techniques for studying porous media and conductive membranes and explain the development of bioconvection patterns generated by populations of gravitactic microorganisms in porous media. Using a common nomenclature throughout and with contributions from top experts, this cohesive book illustrates the role of porous media in addressing some of the most challenging issues in biomedical engineering and biotechnology. The book contains sophisticated porous media models that can be used to improve the accuracy of modeling a variety of biological processes.

Biofilm-based Healthcare-associated Infections - Gianfranco Donelli 2014-11-10

The aim of this book is to provide readers with a wide overview of the

main healthcare-associated infections caused by bacteria and fungi able to grow as biofilm. The recently acquired knowledge on the pivotal role played by biofilm-growing microorganisms in healthcare-related infections has given a new dynamic to detection, prevention and treatment of these infections in patients admitted to both acute care hospitals and long-term care facilities. Clinicians, hygienists and microbiologists will be updated by leading scientists on the state-of-art of biofilm-based infections and on the most innovative strategies for prevention and treatment of these infections, often caused by emerging multidrug-resistant biofilm-growing microorganisms.

Marine and Industrial Biofouling - Hans-Curt Flemming 2008-12-11

Biofouling is a costly problem, and it is encountered in a wide spectrum of technical systems, ranging from the shipping industry, power industry, water purification, automobile industry, paint and pharmaceuticals, to the microelectronics and food industries. Micro- and macroorganisms attach to surfaces and accumulate there, forming biofilms that cause interferences - a fundamentally natural process. Usually, a medical paradigm is applied: kill biofilms and the problem is solved. This leads to excessive biocide use. However, the success of this strategy is very limited; furthermore it leads to equipment damage and environmental pollution. Simply trying to kill the fouling organisms is clearly not seen as a successful strategy while cleaning is put forward as much more important. In this book, strategies to prevent adhesion, to mitigate the extent and effects of biofouling, and to detect and remove fouling layers are presented. Holistic approaches to the fouling process are elaborated, taking into account options such as nutrient limitation, repellent and easy-to-clean surfaces for fouling layer limitation, and replacing biocides with more environmentally friendly methods - in other words: learning how to live with fouling biofilms without suffering the damage they can do.

Culture Negative Orthopedic Biofilm Infections - Garth D. Ehrlich 2012-12-18

During the recent transition between acute diseases caused by swarms of single planktonic bacteria, and chronic infections caused by bacteria

growing in slime-enclosed biofilms, a general clinical consensus has emerged that pathologies with bacterial etiologies are frequently culture negative. Because biofilm infections now affect 17 million Americans per year (killing approximately 450,000), the suggestion that these common and lethal infections regularly go unnoticed by the only FDA-approved method for their detection and characterization is a matter of urgent concern. Biologically, we would expect that planktonic bacterial cells would colonize any new surface, including the surface of an agar plate, while the specialized sessile cells of a biofilm community would have no such proclivity. In the study of biofilm diseases ranging from otitis media to prostatitis, it was found that direct microscopy and DNA- and RNA-based molecular methods regularly document the presence of living bacteria in tissues and samples that are culture negative. The editors selected orthopedic biofilm infections as the subject of this book because these infections occur against a background of microbiological sterility in which modern molecular methods would be expected to find bacterial DNA, RNA-based microscopic methods would be expected to locate bacterial cells, and cultures would be negative. Moreover, in Orthopedics we find an already biofilm-adapted surgical group in which current strategies are based on the meticulous removal of compromised tissues, antibiotic options as based on high biofilm-killing local doses, and there are practical bedside strategies for dealing with biofilm infections. So here is where the new paradigm of biofilm infection meets the equally new paradigm of the culture negativity of biofilms, and this volume presents a conceptual synthesis that may soon combine the most effective molecular methods for the detection and identification of bacteria with a surgical discipline that is ready to help patients.

Bacteria in Agrobiolgy: Crop Productivity - Dinesh K. Maheshwari 2013-06-28

The future of agriculture greatly depends on our ability to enhance productivity without sacrificing long-term production potential. The application of microorganisms, such as the diverse bacterial species of plant growth promoting rhizobacteria (PGPR), represents an ecologically and economically sustainable strategy. The use of these bio-resources for

the enhancement of crop productivity is gaining importance worldwide. Bacteria in Agrobiolology: Crop Productivity focus on the role of beneficial bacteria in crop growth, increased nutrient uptake and mobilization, and defense against phytopathogens. Diverse group of agricultural crops and medicinal plants are described as well as PGPR-mediated bioremediation leading to food security.

Ekologi Sistem Akuatik - Andi Kurniawan 2018-10-31

Fundamen dalam Pemanfaatan dan Pelestarian Lingkungan Perairan Sistem akuatik adalah sistem dimana media utama yang ditempati oleh organisme di sistem ini adalah air. Keberadaan air baik sebagai bagian utama dari perairan terbuka ataupun media dominan diantara partikel - partikel dari suatu substrat (air interstitial). Buku ini menyediakan pembahasan mengenai pengetahuan fundamen terkait prinsip dan keberagaman ekologi dari sistem akuatik. Pembahasan yang diberikan dalam buku ini memberikan referensi tentang prinsip dan pengetahuan yang harus dimiliki untuk dapat memahami, memanfaatkan dan melestarikan lingkungan perairan. Fokus utama pembahasan sistem akuatik di buku ini meliputi faktor - faktor lingkungan dan sistem kehidupan terutama bagaimana keberadaan dan dinamika air mempengaruhi kehidupan di perairan. Buku ini disusun untuk pembaca yang ingin memahami karakteristik ekosistem perairan sebagai sistem akuatik. Isi buku ini disusun sebagai buku referensi untuk mahasiswa dan pembaca umum terkait mata kuliah atau bidang ilmu Ekologi Perairan, Manajemen Sumberdaya Perairan, Limnologi, Oseanografi dan bidang atau mata kuliah lain yang berkaitan dengan Sumberdaya dan Lingkungan Perairan.

Renal Stone Disease 2 - Andrew P. Evan 2008-11-04

Indianapolis, Indiana, 17-18 April 2008

Biofilms, quand les microbes s'organisent - Romain Briandet 2012

La découverte des microbes des biofilms, de leur "habitat" et de l'organisation qu'ils mettent en place, notamment pour devenir plus résistants.

Periprosthetic Joint Infection of the Hip and Knee - Bryan D. Springer 2013-09-06

Periprosthetic Joint Infection of the Hip and Knee is a practical reference for the diagnosis and treatment of total joint infections following hip and knee arthroplasty. In addition to useful chapters presenting common tests and algorithms used for diagnosis, the book gives background on the epidemiology, risk factors, and prevention strategies of periprosthetic joint infection. Additionally, practical clinical information is given, including antibiotic treatment strategies and delivery methods and medical optimization techniques for physicians to follow for patient care and follow-up. Covering a topic that is currently underrepresented in the medical literature, Periprosthetic Joint Infection of the Hip and Knee will be useful to orthopedic surgeons, rheumatologists, and other physicians involved in the care of patients with hip and knee prosthetic implants.

Biofilm and Materials Science - Hideyuki Kanematsu 2015-04-09

This book explains the formation of biofilm on materials surfaces in an industrial setting. The authors describe new developments in understanding of biofilm formation, detection, and control from the viewpoint of materials science and engineering. The book details the range of issues caused by biofilm formation and the variety of affected industries.

Application of Biofilms in Applied Microbiology - Maulin P. Shah 2022-08-15

Application of Biofilms in Applied Microbiology gives a complete overview on the structure, physiology and application of biofilms produced by microbes, along with their potential application in biotechnology. Sections cover new technologies for biofilm study, physiology of microorganisms in biofilms, bacterial biofilms, biofilm development, and fungal biofilms, summarizing various technologies available for biofilm study. Subsequent chapters describe biofilm developments with *Bacillus subtilis*, *Escherichia coli*, and *Pseudomonas putida*, along with several chapters on the study of microbial biofilm and their advantages and disadvantages in the area of environmental biotechnology. The book closes with a chapter on the rapid development of new sequencing technologies and the use of metagenomics, thus

revealing the great diversity of microbial life and enabling the emergence of a new perspective on population dynamics. Summarizes various technologies available for biofilm study Describes the physiological study of bacteria, fungi and algae present in biofilms Provides the potential parameters on biofilm development Gives insights on the ability to construct and maintain a structured multicellular bacterial community that critically depends on the production of extracellular matrix components Reveals the rapid development of new sequencing technologies and the use of metagenomics, the great diversity of microbial life, and the emergence of a new perspective on population dynamics

The Life World: Herman's Adventures in Sustainability - Shari Anker 2008-12-20

An unusual visitor teaches a young college student a radical new sustainability paradigm in this lighthearted fable. From the smallest to the largest living systems, from cells and bacteria to the human body to

ecosystems to the planet as a whole, readers will learn how it is all connected. For students of sustainability of all ages looking to envision a new Big Picture, The Life World explores very different assumptions about how evolution works in living systems. Just Three Principles of Life are used to accomplish this both simple and yet most challenging paradigm change. Not satisfied with outlining this new philosophy alone, the author tackles its application to the Florida Everglades, global warming, pollution, and human health. Prepare to be surprised. Prepare to see the world differently. Begin the work of true sustainability as a "W'ecologist."

OKU: Musculoskeletal Infection - George C. Cierny III, MD 2018-08-30

The increasing responsibility placed on physicians and hospitals to reduce postoperative infection makes this OKU specialty topic particularly relevant. Developed in partnership with the Musculoskeletal Infection Society, OKU: Musculoskeletal Infection is the first orthopaedic literature survey devoted to the identification, prevention, and treatment of bone, joint, and soft-tissue infections.