

The Biofilm Primer Springer Series On Biofilms 1

Biofilm-based Healthcare-associated Infections Gianfranco Donelli.2014-11-03 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.

Productive Biofilms Kai Muffler,Roland Ulber.2014-10-15 This book review series presents current trends in modern biotechnology. The aim is to cover all aspects of this interdisciplinary technology where knowledge, methods and expertise are required from chemistry, biochemistry, microbiology, genetics, chemical engineering and computer science. Volumes are organized topically and provide a comprehensive discussion of developments in the respective field over the past 3-5 years. The series also discusses new discoveries and applications. Special volumes are dedicated to selected topics which focus on new biotechnological products and new processes for their synthesis and

purification. In general, special volumes are edited by well-known guest editors. The series editor and publisher will however always be pleased to receive suggestions and supplementary information. Manuscripts are accepted in English.

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.

Biomaterials and Tissue Engineering in Urology J Denstedt, A Atala. 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
Antibiofilm Strategies Katharina Richter, Kasper Nørskov Kragh. 2023-10-02 Bacteria and fungi are able to aggregate together or on surfaces in densely packed microcolonies, facilitated by extracellular polymeric substances for cell protection and stability. These biofilms have proven to be extremely hard to eradicate and remove once established. In chronic infections, this condition can result in a high degree of morbidity and mortality as regular antibiotic treatments are ineffective against biofilms. In industrial facilities, the formation of biofilms can ruin production and result in

enormous financial losses. In this book, the current state of antibiofilm research is presented by experts from around the world. Novel, cutting-edge techniques and new optimized strategies based on established methods are discussed in chapters focused on biofilm prevention, treatment and control for the application in clinical, industrial and veterinary settings. Antibiofilm strategies, such as chemical and enzymatic treatments, surface modification and coatings, quorum sensing inhibition and dispersal induction, phage therapy, cold plasma treatment, hyperbaric oxygen treatment, and metal-based nanomedicine are covered, among many others. This book contributes to the UN's Sustainable Development Goal 3: Good Health and Well-Being and is a valuable resource for healthcare professionals, microbiologists, academics and for educators to inform curricula of universities and colleges.

Biofilm and Materials Science Hideyuki Kanematsu, Dana M. Barry. 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.

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.

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.

Community Structure and Co-operation in Biofilms Society for General Microbiology.

Symposium, David G. Allison, Society for General Microbiology. 2000-10-23 The study of biofilm considers the close association of micro-organisms with each other at interfaces and is relevant to a variety of disciplines, including medicine, dentistry, bioremediation, biofouling, water technology, engineering and food science. Although the habitats studied differ widely, some common elements exist such as method of attachment, coadhesion and regulation of biofilm phenotype and architecture. This book aims to distil the common principles of biofilm physiology and growth for all interested disciplines.

Biofilm Control and Antimicrobial Agents S. M. Abu Sayen. 2014-02-24 This new book highlights some of the exciting research that has recently been done in the important and far-ranging field of biofilms and microbial agents. It discusses antimicrobial agents in relation to biofilm control and resistance. The book also introduces biofilm formation and mitigation strategies. It helps explore long-term solutions to the challenges imposed by biofilms.

Bacterial Biofilms Tony Romeo. 2008-02-26 Throughout the biological world, bacteria thrive predominantly in surface-attached, matrix-enclosed, multicellular communities or biofilms, as opposed to isolated planktonic cells. This choice of lifestyle is not trivial, as it involves major shifts in the use of genetic information and cellular energy, and has profound consequences for bacterial physiology and survival. Growth within a biofilm can thwart immune function and antibiotic therapy and thereby complicate the treatment of infectious diseases, especially chronic and foreign device-associated infections. Modern studies of many important biofilms have advanced well beyond the

descriptive stage, and have begun to provide molecular details of the structural, biochemical, and genetic processes that drive biofilm formation and its dispersion. There is much diversity in the details of biofilm development among various species, but there are also commonalities. In most species, environmental and nutritional conditions greatly influence biofilm development. Similar kinds of adhesive molecules often promote biofilm formation in diverse species. Signaling and regulatory processes that drive biofilm development are often conserved, especially among related bacteria. Knowledge of such processes holds great promise for efforts to control biofilm growth and combat biofilm-associated infections. This volume focuses on the biology of biofilms that affect human disease, although it is by no means comprehensive. It opens with chapters that provide the reader with current perspectives on biofilm development, physiology, environmental, and regulatory effects, the role of quorum sensing, and resistance/phenotypic persistence to antimicrobial agents during biofilm growth.

The Role of Biofilms in Device-Related Infections Mark Shirtliff, Jeff G. Leid. 2008-12-19

Approximately 60% of all hospital-associated infections, over one million cases per year, are due to biofilms that have formed on indwelling medical devices. Device-related biofilm infections increase hospital stays and add over one billion dollars/year to U.S. hospitalization costs. Since the use and the types of indwelling medical devices commonly used in modern healthcare are continuously expanding, especially with an aging population, the incidence of biofilm infections will also continue to rise. The central problem with microbial biofilm infections of foreign bodies is their propensity to resist clearance by the host immune system and all antimicrobial agents tested to date. In fact, compared to their free floating, planktonic counterparts, microbes within a biofilm are 50 - 500 times more resistant to antimicrobial agents. Therefore, achieving therapeutic and non-lethal dosing

regimens within the human host is impossible. The end result is a conversion from an acute infection to one that is persistent, chronic, and recurrent, most often requiring device removal in order to eliminate the infection. This text will describe the major types of device-related infections, and will explain the host, pathogen, and the unique properties of their interactions in order to gain a better understanding of these recalcitrant infections.

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.

Advances and Applications in Microbial Physiology Sunita Devi,Kavita Rana,Neeraj Sankhyan,Rimple Kaul.2022-12-09 This book provides a comprehensive and critical review of the work and advancements made so far in the field of microbial physiology. It is divided into five chapters and contains comprehensive information on topics such as bacterial virulence, mechanisms and regulation, bioluminescence, and heat shock proteins, among others. This book shall be of great use to students, research scholars, and teachers pursuing their career in the fields of microbiology, medical sciences and life sciences.

Biofilm Highlights Hans-Curt Flemming,Jost Wingender,Ulrich Szewzyk.2011-08-02 Living in biofilms is the common way of life of microorganisms, transiently immobilized in their matrix of extracellular polymeric substances (EPS), interacting in many ways and using the matrix as an

external digestion and protection system. This is how they have organized their life in the environment, in the medical context and in technical systems - and has helped make them the oldest, most successful and ubiquitous form of life. In this book, hot spots in current biofilm research are presented in critical and sometimes provocative chapters. This serves a twofold purpose: to provide an overview and to inspire further discussions. Above all, the book seeks to stimulate lateral thinking.

Biofilms .1999-10-27 Volume 310 of Methods in Enzymology is the first volume devoted solely to biofilm research methods. It provides a contemporary source book for virtually any kind of experimental approach involving biofilms. It includes bioengineering, molecular, genetic, microscopic, chemical, continuous culture, and physical methods. This volume will serve as a starting point for future developments. The critically acclaimed laboratory standard for more than forty years, Methods in Enzymology is one of the most highly respected publications in the field of biochemistry. Since 1955, each volume has been eagerly awaited, frequently consulted, and praised by researchers and reviewers alike. Now with more than 300 volumes (all of them still in print), the series contains much material still relevant today--truly an essential publication for researchers in all fields of life sciences.

Antibiofilm Agents Kendra P. Rumbaugh,Iqbal Ahmad.2014-05-08 This book provides a survey of recent advances in the development of antibiofilm agents for clinical and environmental applications. The fact that microbes exist in structured communities called biofilms has slowly become accepted within the medical community. We now know that over 80% of all infectious diseases are biofilm-related; however, significant challenges still lie in our ability to diagnose and treat these extremely recalcitrant infections. Written by experts from around the globe, this book offers a valuable

resource for medical professionals seeking to treat biofilm-related disease, academic and industry researchers interested in drug discovery and instructors who teach courses on microbial pathogenesis and medical microbiology.

Bacterial Biofilms Sadik Dincer, Melis Sümengen Özdenefe, Afet Arkut. 2020-10-07 This book examines biofilms in nature. Organized into four parts, this book addresses biofilms in wastewater treatment, inhibition of biofilm formation, biofilms and infection, and ecology of biofilms. It is designed for clinicians, researchers, and industry professionals in the fields of microbiology, biotechnology, ecology, and medicine as well as graduate and postgraduate students.

Culture Negative Orthopedic Biofilm Infections Garth D. Ehrlich, Patrick J. DeMeo, J. William Costerton, Heinz Winkler. 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.

Microbial Biofilms Bakrudeen Ali Ahmed Abdul.2020-11-05 This book provides a broad range of applications and recent advances in the search for biofilm materials in nature. It also explains the future implications for biofilms in the areas of advanced molecular genetics, pharmaceuticals, pharmacology, and toxicology. This book is comprised of 20 chapters from leading experts in the field and it examines immunology and microbiological studies derived from biofilms as well as explores environmental, agricultural, and chemical impacts on biofilms. It is divided into five subdivisions: biofilms and its complications, biofilm infections in human body, detection of biofilm-forming pathogens, antibiofilm chemotherapy, and biofilms production tools in aquaculture. This book may be used as a text or reference for everyone interested in microbial biofilms and their current applications. It is also highly recommended for environmental microbiologists, 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. This book includes chapter

homework problems and case studies. Powerpoints are also available for adopting instructors. Discusses and clarifies the resource of isolation and chemical properties from biofilms Discusses the latest pharmaceutical, pharmacological, and medicinal approaches toward the treatment of chronic and uncured diseases, such as Alzheimer's osteoporotic, sexual dysfunction, sleep sickness, allergy treatment, asthma, hair loss, AIDS, hypertension, antiaging, etc. Examines immunology and microbiological studies derived from biofilms Explores environmental, agricultural, and chemical impacts on biofilms. Dr. Bakrudeen Ali Ahmed Abdul is an Associate Professor, the Head of the Department of Biochemistry and Dean of the School of Life Sciences, Centre for Research and Development (CRD), PRIST Deemed University, Vallam, Thanjavur, Tamil Nadu, India. His research areas include the application of plant biochemistry, bioactive compound production, biotechnological methods, development of pharmaceutical products and pharmacological studies.

American Book Publishing Record .2007

Multispecies Biofilms Karishma S. Kaushik,Sophie E. Darch.2022-12-18 In an age of antibiotic resistant infections, the study of biofilms is increasingly important. Microbes more than often exist in complex multi-species or polymicrobial communities, making infections difficult to detect, diagnose and treat. Given the increased focus on studying biofilms in research and laboratory settings, particularly under conditions that closely mimic the clinical state, it is important to get an overview of the recent methods, model systems and tools being developed and employed in this context. This book offers readers the opportunity to learn more about current methods being used in the investigation of multi-species biofilms, both in vivo and in vitro. For this, the book highlights new technologies built and designed for the study of multiple species within biofilm communities, including those that can be leveraged for the evaluation of antimicrobial treatment approaches. The

application of these state-of-the-art techniques to further our understanding of multi-species biofilms will be discussed and the reader will learn how the clinical microenvironment and the development of biofilm communities are considered when developing such tools. With cutting-edge contributions from experts in the respective domains, this book will benefit translational and basic research scientists, as well as clinicians, and is an informative resource for educators and their students. *Biofilm Highlights* Hans-Curt Flemming, Jost Wingender, Ulrich Szewzyk. 2011-07-23 Living in biofilms is the common way of life of microorganisms, transiently immobilized in their matrix of extracellular polymeric substances (EPS), interacting in many ways and using the matrix as an external digestion and protection system. This is how they have organized their life in the environment, in the medical context and in technical systems - and has helped make them the oldest, most successful and ubiquitous form of life. In this book, hot spots in current biofilm research are presented in critical and sometimes provocative chapters. This serves a twofold purpose: to provide an overview and to inspire further discussions. Above all, the book seeks to stimulate lateral thinking.

Analytical Methodologies for Biofilm Research Moupriya Nag, Dibyajit Lahiri. 2022-07-24 The book provides the readers of various discipline an easy understanding of the latest biophysical techniques pertaining to microbiology. Biofilm associated chronic infection is a major health problem and a serious concern to doctors, scientists and other health workers as it develops antibiotic and multi-drug resistance. This book describes various protocols utilized in the detection of the biofilm. The book has been divided into six sub sections which provides pertinent information about the various biophysical techniques and instruments that are used for detecting and analyzing the biofilm formation upon biotic and abiotic surfaces. The readers will be able to identify the techniques that

can best cater information to solve the problem at hand. This book attempts to compile the latest information on the recent advances in the various functional aspects of microbial biofilms, their pathogenesis, present day treatments as well as detection strategies. This book is meant for researchers in the field of microbiology and interested in understanding microbial pathogenesis, quorum sensing and biofilm formation.

Biofilm-Mediated Diseases: Causes and Controls Rina Rani Ray, Moupriya Nag, Dibyajit Lahiri. 2021-05-05 This book reviews the current concepts in biofilm formation and its implications in human health and disease. The initial chapters introduce the mechanisms of biofilm formation and its composition. Subsequently, the chapters discuss the role of biofilm in acute and chronic infections. It also explores the pivotal role of both innate and adaptive immunity on the course of biofilm infection. In addition, the book elucidates the bacterial biofilm formation on implantable devices and the current approaches to its treatment and prevention. It analyzes the possible relationship between antimicrobial resistance and biofilm formation. Finally, the book also summarizes the current state-of-the-art therapeutic approaches for preventing and treating biofilms. This book is a useful resource for researchers in the field of microbiology, clinical microbiology, and also medical practitioners.

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.

Microbial Biofilms Gianfranco Donelli.2014-03-25 The discovery that most of the chronic infections in humans, including the oral, lung, vaginal and foreign body-associated infections, are biofilm-based, has prompted the need to design new and properly focused preventive and therapeutic strategies for these diseases. Microbial Biofilms: Methods and Protocols provides a detailed description of the currently available methods and protocols to investigate bacterial and fungal biofilms, exhaustively illustrated and critically annotated in 25 chapters written by authors well known for their experience in the respective fields. The book has joined together microbiologists and specialists in infectious diseases, hygiene and public health involved in exploring different aspects of microbial biofilms as well as in designing new methods and/or developing innovative laboratory protocols. Written in the successful Methods in Molecular Biology series format, chapters include introductions to their respective topics, lists of the necessary materials and reagents, step-by-step, readily reproducible protocols and notes on troubleshooting and avoiding known pitfalls.

Authoritative and easily accessible, Microbial Biofilms: Methods and Protocols presents readers with the most established and validated experimental procedures to investigate microbial biofilms.

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.

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.

Topics in Ecological and Environmental Microbiology Thomas M. Schmidt,Moselio Schaechter.2011-09-28 This book provides an overview of ecological aspects of the metabolism and behavior of microbes, microbial habitats, biogeochemical cycles, and biotechnology. It was designed by selecting relevant chapters from the comprehensive Encyclopedia of Microbiology, 3rd edn., and inviting the original authors to update their material to include key developments and advances in the field.

Biofilms - Science and Technology L. Melo,T.R. Bott,M. Fletcher,B. Capdeville.2012-12-06

Biofilms -- Science and Technology covers the main topics of biofilm formation and activity, from basic science to applied aspects in engineering and medicine. The book presents a masterly discussion of microbial adhesion, the metabolism of microorganisms in biofilms, modelling of mass transfer and biological reaction within biofilms, as well as the behaviour of these microbial communities in industry (waste water treatment, heat exchanger biofouling, membranes, food processing) and in medicine (teeth, implants, prosthetic devices). Laboratory techniques and industrial monitoring methods are also presented. The book is directed at readers at the postgraduate level and is organised as a textbook, containing 11 chapters, a glossary, and a detailed subject index.

Medical Implications of Biofilms Michael Wilson, Deirdre Devine. 2003-09-01 Human tissues often support large, complex microbial communities growing as biofilms that can cause a variety of infections. As a result of an increased use of implanted medical devices, the incidence of these biofilm-associated diseases is increasing: the non-shedding surfaces of these devices provide ideal substrata for colonisation by biofilm-forming microbes. The consequences of this mode of growth are far-reaching. As microbes in biofilms exhibit increased tolerance towards antimicrobial agents and decreased susceptibility to host defence systems, biofilm-associated diseases are becoming increasingly difficult to treat. Not surprisingly, therefore, interest in biofilms has increased dramatically. The application of microscopic and molecular techniques has revolutionised our understanding of biofilm structure, composition, organisation, and activities, resulting in important advances in the prevention and treatment of biofilm-related diseases. The purpose of this book, which was first published in 2003, is to bring these advances to the attention of clinicians and medical researchers.

Microbial Biofilms in Healthcare Karen Vickery.2020-03-16 Biofilms are ubiquitous and their presence in industry can lead to production losses. However, nowhere do biofilms impact human health and welfare as much as those that are found contaminating the healthcare environment, surgical instruments, equipment, and medical implantable devices. Approximately 70% of healthcare-associated infections are due to biofilm formation, resulting in increased patient morbidity and mortality. Biofilms formed on medical implants are recalcitrant to antibiotic treatment, which leaves implant removal as the principal treatment option. In this book, we investigate the role of biofilms in breast and dental implant disease and cancer. We include in vitro models for investigating treatment of chronic wounds and disinfectant action against *Candida* sp. Also included are papers on the most recent strategies for treating biofilm infection ranging from antibiotics incorporated into bone void fillers to antimicrobial peptides and quorum sensing.

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.

Biofilm Infections Thomas Bjarnsholt, Peter Østrup Jensen, Claus Moser, Niels Høiby. 2014-10-11 This book will cover both the evidence for biofilms in many chronic bacterial infections as well as the problems facing these infections such as diagnostics and treatment regimes. A still increasing interest and emphasis on the sessile bacterial lifestyle biofilms has been seen since it was realized that that less than 0.1% of the total microbial biomass lives in the planktonic mode of growth. The term was coined in 1978 by Costerton et al. who defined the term biofilm for the first time. In 1993 the American Society for Microbiology (ASM) recognised that the biofilm mode of growth was relevant to microbiology. Lately many articles have been published on the clinical implications of bacterial biofilms. Both original articles and reviews concerning the biofilm problem are available.

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

New and Future Developments in Microbial Biotechnology and Bioengineering: Microbial Biofilms

Mukesh Kumar Yadav, Bhim Pratap Singh. 2019-10-10 *New and Future Developments in Microbial Biotechnology and Bioengineering: Microbial Biofilms* is divided into three sections: microbial adhesion/biofilms in medical settings, microbial adhesion/biofilms in agriculture, and microbial adhesion/biofilm in the environment and industry. Chapters cover adhesion and biofilm formation by pathogenic microbes on tissue and on indwelling medical devices, including sections on human infections, microbial communication during biofilm mode of growth, host defense and antimicrobial resistance, and more. Other sections cover the biofilms of agriculturally important and environmental friendly microbes, including biofilm formation on plants, in soil, and in aquatic environments. Finally, the latest scientific research on microbial adhesion and biofilm formation in the environment and in industry is covered. Provides an overview on the growth, structure, cell-to-cell interactions, and control/dispersal of bacterial and fungal of in vitro and in vivo biofilms Presents an overview on the microbial adhesion, biofilm formation and structures of single-species and multi-species biofilms on human tissues/medical devices, agriculture, environment and chemical industries Includes chapters on microbial biofilms of pathogenic microbes on human tissues and in medical indwelling devices Covers factors affecting microbial biofilm, adhesion and formation *Fossil and Recent Biofilms* W.E. Krumbein, D.M. Paterson, G.A. Zavarzin. 2013-11-11 MICROBIAL BIOFILMS: PROTECTIVE NICHEs IN ANCIENT AND MODERN GEOMICROBIOLOGY J. W. Costerton and Paul Stoodley Center for Biofilm Engineering Montana State University As this book is published based on discussions of a conference that was held in 2001, it may be useful to provide

an update on the most recent revelations about biofilms, so that this excellent exposition of the contribution of microbial biofilms to geological processes may be placed in a modern context. The importance of the contribution of microbial biofilms to global processes is only now being appreciated as it is revealed that all terrestrial surfaces are teeming with microbial life in the form of biofilm communities. These communities live on soil particles, in rock fissures, marine and river sediments and at the very extremes of terrestrial habitats from inside Antarctic ice to the walls of deep sea hydrothermal vents. The contribution of these biofilm communities generally went unrecognized because it was the water that was where microbiologists looked for life, not the surfaces, although, evidence of the early association of microbes with surfaces was in fact present in the fossil record (Rasmussen, 2000; Reysenbach, and Cady, 2001). It is also revealing that biofilm formation is found in prokaryotes from the most deeply rooted branches of the phylogenetic tree in both the Archaea and Bacteria kingdoms, the Korarchaeota and Aquificales respectively (Jahnke et al. 2001; Reysenbach et al. 2000).

Antimicrobial Coatings and Modifications on Medical Devices Zheng Zhang, Victoria E. Wagner. 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.

Application of Biofilms in Applied Microbiology Maulin P Shah.2022-08-09 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 book delves into The Biofilm Primer Springer Series On Biofilms 1. The Biofilm Primer Springer

Series On Biofilms 1 is a crucial topic that needs to be grasped by everyone, from students and scholars to the general public. The book will furnish comprehensive and in-depth insights into The Biofilm Primer Springer Series On Biofilms 1, encompassing both the fundamentals and more intricate discussions. The book is structured into several chapters, namely: Chapter 1: Introduction to The Biofilm Primer Springer Series On Biofilms 1 Chapter 2: Essential Elements of The Biofilm Primer Springer Series On Biofilms 1 Chapter 3: The Biofilm Primer Springer Series On Biofilms 1 in Everyday Life Chapter 4: The Biofilm Primer Springer Series On Biofilms 1 in Specific Contexts Chapter 5: Conclusion In chapter 1, this book will provide an overview of The Biofilm Primer Springer Series On Biofilms 1. The first chapter will explore what The Biofilm Primer Springer Series On Biofilms 1 is, why The Biofilm Primer Springer Series On Biofilms 1 is vital, and how to effectively learn about The Biofilm Primer Springer Series On Biofilms 1. In chapter 2, the author will delve into the foundational concepts of The Biofilm Primer Springer Series On Biofilms 1. This chapter will elucidate the essential principles that must be understood to grasp The Biofilm Primer Springer Series On Biofilms 1 in its entirety. In chapter 3, this book will examine the practical applications of The Biofilm Primer Springer Series On Biofilms 1 in daily life. This chapter will showcase real-world examples of how The Biofilm Primer Springer Series On Biofilms 1 can be effectively utilized in everyday scenarios. In chapter 4, this book will scrutinize the relevance of The Biofilm Primer Springer Series On Biofilms 1 in specific contexts. The fourth chapter will explore how The Biofilm Primer Springer Series On Biofilms 1 is applied in specialized fields, such as education, business, and technology. In chapter 5, this book will draw a conclusion about The Biofilm Primer Springer Series On Biofilms 1. The final chapter will summarize the key points that have been discussed throughout the book. The book is crafted in an easy-to-understand language

and is complemented by engaging illustrations. It is highly recommended for anyone seeking to gain a comprehensive understanding of The Biofilm Primer Springer Series On Biofilms 1.

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