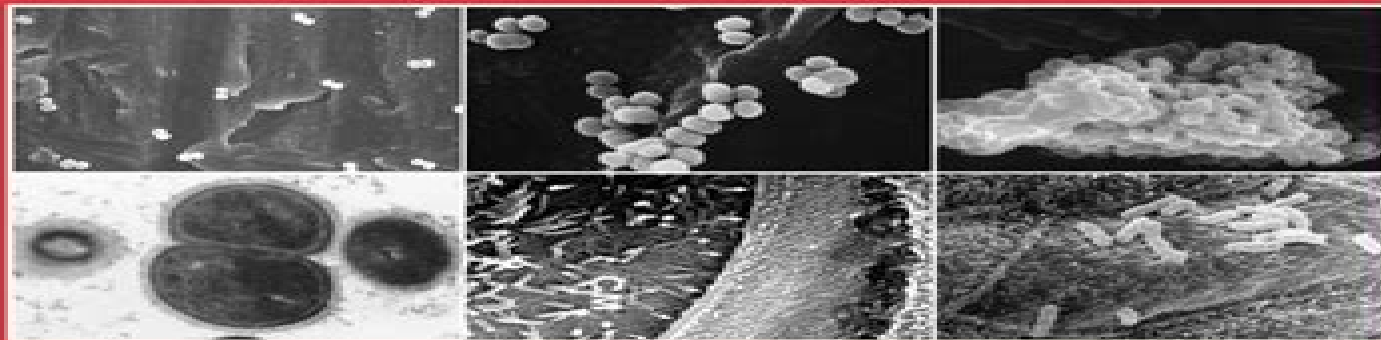


Handbook of Bacterial Adhesion

*Principles, Methods,
and Applications*



Edited by

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V. P. Torchilin



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Handbook of Bacterial Adhesion Yuehuei H. An, Richard J. Friedman, 2000-01-21 Research on bacterial adhesion and its significance is a major field involving many different aspects of nature and human life such as marine science soil and plant ecology most importantly the biomedical field The adhesion of bacteria to the food industry and human tissue surfaces and implanted biomaterial surfaces is an important step in the pathogenesis of infection Handbook of Bacterial Adhesion Principles Methods and Applications is an outgrowth of the editors own quest for information on laboratory techniques for studying bacterial adhesion to biomaterials bone and other tissues and more importantly a response to significant needs in the research community This book is designed to be an experimental guide for biomedical scientists biomaterials scientists students laboratory technicians or anyone who plans to conduct bacterial adhesion studies More specifically it is intended for all those researchers facing the challenge of implant infections in such devices as orthopedic prostheses cardiovascular devices or catheters cerebrospinal fluid shunts or extradural catheters thoracic or abdominal catheters portosystemic shunts or bile stents urological catheters or stents plastic surgical implants oral or maxillofacial implants contraceptive implants or even contact lenses It also covers research methods for the study of bacterial adhesion to tissues such as teeth respiratory mucosa intestinal mucosa and the urinary tract In short it constitutes a handbook for biomechanical and bioengineering researchers and students at all levels

In Vivo Glucose Sensing David D. Cunningham, Julie A. Stenzen, 2009-11-19 In Vivo Glucose Sensing is a key reference for scientists and engineers working on the development of glucose sensing technologies for the management of diabetes and other medical conditions It discusses the analytical chemistry behind the strategies currently used for measuring glucose in vivo It focuses on analyzing samples in the real world and discusses the biological complexities that make glucose sensing difficult Covering current implantable devices next generation implantable sensing methods and non invasive methods for measuring glucose this book concludes with an overview of possible applications other than diabetes

Biofilms in Medicine, Industry and Environmental Biotechnology Piet Lens, V. O'Flaherty, A. P. Moran, P. Stoodley, T. Mahony, 2003-04-30 Biofilms are of great practical importance for beneficial technologies such as water and wastewater treatment and bioremediation of groundwater and soil In other settings biofilms cause severe problems for example in 65% of bacterial infections currently treated by clinicians particularly those associated with prosthetics and implants accelerated corrosion in industrial systems oil souring and biofouling Until recently the structure and function of biofilms could only be inferred from gross measures of biomass and metabolic activity This limitation meant that investigators involved in biofilm research and application had only a crude understanding of the microbial ecology physical structure and chemical characteristics of biofilms Consequently opportunities for the exploitation and control of biofilms were very limited The past decade has witnessed the development of several new techniques to elucidate the structure and function of biofilms Examples include the use of molecular probes that identify different microbes

in complex communities as well as their metabolic functions the use of microsensors that show concentration gradients of key nutrients and chemicals the use of confocal laser scanning microscopy to describe the physical structure of biofilms and the development of a new generation of mathematical models that allow for the prediction of biofilm structure and function However much progress remains to be made in efforts to understand control and exploit biofilms This timely book will introduce its readers to the structure and function of biofilms at a fundamental level as determined during the past decade of research including Extracellular polymers as the biofilm matrix Biofilm phenotype differential gene expression interspecies signalling Biofilm ecology Biofilm monitoring Resistance of biofilms to antimicrobial agents and Biofilm abatement Biofilms in Medicine Industry and Environmental Technology offers a holistic and multi disciplinary description of the topic including biofilm formation and composition but also biofilm monitoring disinfection and control All these aspects are presented from three points of views medical industrial and environmental biotechnological in a compact easy to read format

Glycoscience and Microbial Adhesion Thisbe K. Lindhorst, Stefan Oscarson, Julie Bouckaert, 2009-06-23 bacterial carbohydrate recognition are conveyed covering Gram positive as well as Gram negative bacteria in Chapter 4 Streptococci and Staphylococci and in Chapter 5 carbohydrate binding specificities of Helicobacter pylori In Chapter 6 Bitter sweetness of complexity the collected reflections on microbial adhesion are expanded by a perspective on a broader impact of glycosylation on cellular adhesion motility and regulatory processes paralleling the complexity of N glycan structures on cell surfaces It highlights particularly how structural details of N glycans have been causally related to pathological scenarios with a focus on 1 6 N acetylglucosaminyltransferase In the final chapter biofilm formation is reviewed covering knowledge about structure and biosynthesis of polysaccharide intercellular adhesins PIAs which are central to biofilm formation This comprehensive chapter explains all PIA related principles of medical device associated infections It is our hope that this collection of expert articles ranging from structural chemistry and structural biology to biochemistry and medicine will be a stimulation and motivation for our colleagues in the life sciences At the same time we hope that these reflections on microbial adhesion will awake interest in and promote understanding of the complex processes associated with the glycocalyx and the multifaceted interactions between the host cell and its guest as well as the biological consequences resulting from this mutual interplay

Handbook of Natural Fibres Ryszard M. Kozłowski, 2012-09-21 Growing awareness of environmental issues has led to increasing demand for goods produced from natural products including natural fibres The two volume Handbook of natural fibres is an indispensable tool in understanding the diverse properties and applications of these important materials Volume 2 Processing and applications focuses on key processing techniques for the improvement and broader application of natural fibres Part one reviews processing techniques for natural fibres Silk production and the future of natural silk manufacture are discussed as well as techniques to improve the flame retardancy of natural fibres and chemical treatments to improve natural fibre properties Ultraviolet blocking properties enzymatic treatment and

electrokinetic properties are also discussed Part two goes on to investigate applications of natural fibres including automotive applications geotextiles paper and packaging and natural fibre composites NFCs for the construction and automotive industries The use of flax and hemp textiles made from jute and coir antimicrobial natural fibres and biomimetic textile materials are also considered before a final discussion of enhancing consumer demand for natural textile fibres With its distinguished editor and international team of expert contributors the two volumes of the Handbook of natural fibres are essential texts for professionals and academics in textile science and technology Focuses on key processing techniques for the improvement and broader application of natural fibres Reviews processing techniques for natural fibres including silk production and the future of natural silk manufacture Discusses ultraviolet blocking properties enzymatic treatment and electrokinetic properties among other topics

Medical Biofilms Jana Jass,Susanne Surman,James Walker,2003-04-02 Biofilms are formed by microorganisms growing on surfaces and comprise a series of microcolonies interspersed with spaces through which fluids and other microorganisms move In medicine the primary problems are biofilms associated with implants infections are increasingly difficult to treat with traditional antibiotics and removal of the implant often becomes essential frequently leading to higher morbidity and mortality This will be the first book dedicated to medical biofilms It will cover much recent information on the problems of biofilms how to detect them and how to control their presence

Advanced Materials Forum V Luis Guerra Rosa,Fernanda Margarido,2010-01-12 Selected peer reviewed papers from the V International Materials Symposium MATERIAiS 2009 14th meeting of SPM Sociedade Portuguesa de Materiais Instituto Superior Tecnico Technical University of Lisbon April 5 8 Lisbon Portugal 2009

Novel Biocomposite Engineering and Bio-Applications Gary Chinga Carrasco,2019-01-17 This book is a printed edition of the Special Issue Novel Biocomposite Engineering and Bio Applications that was published in Bioengineering

Antimicrobials, Antibiotic Resistance, Antibiofilm Strategies and Activity Methods Sahra Kirmusaoğlu,2019-04-03 To prevent bacterial adherence invasion and infection antimicrobials such as antibiotics are being used and vastly researched nowadays Several factors such as natural selection mutations in genes the presence of efflux pumps impermeability of the cell wall structural changes in enzymes and receptors biofilm formation and quorum sensing cause microorganisms to develop resistance against antimicrobials Isolates that synthesize extended spectrum lactamases ESBL induced lactamases IBL carbapenamases metallo lactamases MBLs and New Delhi metallo lactamases NDM have emerged Determining virulence factors such as biofilms and the level of antimicrobial activities of antimicrobial agents alone and in combination with appropriate doses against microorganisms is very important for the diagnosis inhibition and prevention of microbial infection The goal of this book is to provide information on all these topics

Biointerfaces Dietmar Hutmacher,Wojciech Chrzanowski,2015 An up to date overview of the knowledge and methods used to control living organism responses to implantable devices

Perioperative Medical Management for Total Joint Arthroplasty Andrea Baldini,Patrizio Caldora,2014-11-01 This volume describes the most recent medical

guidelines for perioperative management in arthroplasty with the aim of facilitating excellent control of bleeding thrombosis pain and infection For each area hemostasis control pain control and infection control hot topics of key practical importance are discussed and contrasting perspectives are presented on controversial issues covering the views of different practitioners and specialties Using the information contained in this book the practitioner will be in an excellent position to meet the principal goals of perioperative medical management The information provided will assist in the choice of a multimodal guideline that minimizes the complication rate regarding bleeding and thromboembolism while not interfering with the patient's recovery Similarly effective means of pain control and an optimized pain control protocol are discussed with a view to shortening hospital stay and achieving functional milestones that meet the patient's expectations Finally host wound and environmental factors relevant to infection and its prevention are explained with discussion of the best means of prophylaxis treatment and imaging Surgeons anesthesiologists and all medical practitioners and staff involved in the field of total hip and knee arthroplasty will find this book to be of value in their daily clinical practice It will assist in the provision of enhanced medical management that ensures quicker recovery of the patient with fewer complications

Biofilm Eradication and Prevention Tamilvanan Shunmugaperumal, 2010-12-28 Biofilm Eradication and Prevention presents the basics of biofilm formation on medical devices diseases related to this formation and approaches pharmaceutical researchers need to take to limit this problem Split into three parts the first deals with the development and characterization of biofilm on the surfaces of implanted or inserted medical devices Questions as to why biofilms form over medical device surfaces and what triggers biofilm formation are addressed In the second section the author discusses biofilm mediated chronic infections occurred in various organs eyes mouth wounds and pharmaceutical and drug delivery knowledge gained from research in these areas The third part explores pharmaceutical approaches like lipid and polymer based drug delivery carriers for eradicating biofilm on device related infections In addition this section also explores the topic of novel small molecule like iron and its complexes metal chelators and a quorum sensing inhibitors to control medical biofilm formation

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 **Biological and Pharmaceutical Applications of Nanomaterials** Polina Prokopovich, 2015-06-26 Biological and Pharmaceutical Applications of Nanomaterials presents the findings of cutting edge research activities in the field of nanomaterials with a particular emphasis on biological and pharmaceutical applications Divided into four sections nanomaterials for drug delivery antimicrobial nanomaterials nanomaterials in biosensors and safety

Nanoparticulates as Drug Carriers V. P. Torchilin, 2006 Written by key experts in the field of nanomedicine this book provides a broad introduction to the important field of nanomedicine and application of nanotechnology for drug delivery It covers up to date information regarding various nanoparticulate drug delivery systems describes the various opportunities for the application of nanoparticulate drug carriers in different areas of clinical medicine and analyzes already available information on their clinical applications This book can be used as an advanced textbook by graduate students and young scientists and clinicians at the early stages of their career It is also suitable for non experts from related areas of chemistry biochemistry molecular biology biomedical engineering physiology experimental and clinical medicine and pharmaceutical sciences who are interested in general problems of drug delivery and drug targeting as well as in more specialized topics of using nanoparticulate mediated drug delivery approaches in the individual areas of clinical medicine Prof Torchilin is an expert in Nanomedicine and a recipient of numerous awards including the Lenin Prize in Science Polymer Micelles as Drug Carriers E V Batrakova et al Lipoproteins as Pharmaceutical Carriers S Liu et al Dendrimers as Nanoparticulate Drug Carriers S Svenson Cells and Cell Ghosts as Drug Carriers J M Lanao Magnetic Nanoparticles as Drug Carriers U O Hnfeli Liposomal Drug Carriers in Cancer Therapy A A Gabizon Delivery of Nanoparticles to the Cardiovascular System B A Khaw Nanoparticles for Targeting Lymphatics W Phillips Nanoparticulate Carriers for Ocular Drug Delivery A Sanchez and other papers Readership Graduate students academics in nanomedicine clinicians pharmacologists pharmacists bioengineers researchers in biotechnology and diagnostic imaging *Handbook of Biosensors and Biosensor Kinetics* Ajit Sadana, Neeti Sadana, 2010-08-26 Biosensors are essential to an ever expanding range of applications including healthcare drug design detection of biological chemical and toxic agents environmental monitoring biotechnology aviation physics oceanography and the protection of civilian and engineering infrastructures This book like the previous five books on biosensors by this author and one by the co author addresses the neglected areas of analyte receptor binding and dissociation kinetics occurring on biosensor surfaces Topics are covered in a comprehensive fashion with homogeneous presentation for the benefit of the reader The contributors address the economic aspects of biosensors and incorporate coverage of biosensor fabrication and nanobiosensors among other topics The comments comparison and discussion presented provides a better perspective of where the field of biosensors is heading Serves as a comprehensive resource on biosensor analysis Examines timely topics such as biosensor fabrication and nanobiosensors Covers economic aspects and medical applications e g the role of analytes in controlling diabetes *Dormancy and Low Growth States in Microbial Disease* Anthony R. M. Coates, 2003-06-02 All

cellular life forms can exist in replicating and non replicating states Organisms replicate only when the conditions are beneficial and when not replicating they concentrate on survival of these environmental stresses Many bacteria harmful to humans survive the period of infection in a low growth state This 2003 book addresses the basic science of microbial dormancy and low growth states putting this in the context of human medicine Such fundamental topics as bacterial growth and non growth culturability and viability are covered as well as survival of the host s immune response and inter bacterial signalling Following this introduction more medically focused topics are discussed namely antibiotic resistance arising during stationary phase biofilms the bacteria which cause gastric ulcers and tuberculosis as the classic persistent bacterial infection This book will interest graduate students and researchers in medical microbiology immunology and infectious disease medicine who are interested in bacterial dormancy in relation to disease

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

Advances in Applied Microbiology, 2010-02-19 Published since 1959 *Advances in Applied Microbiology* continues to be one of the most widely read and authoritative review sources in microbiology The series contains comprehensive reviews of the most current research in applied microbiology Recent areas covered include bacterial diversity in the human gut protozoan grazing of freshwater biofilms metals in yeast fermentation processes and the interpretation of host pathogen dialogue through microarrays Eclectic volumes are supplemented by thematic volumes on various topics including Archaea and sick building syndrome Impact factor for 2008 1 658 Contributions from leading authorities and industry experts Informs and updates on all the latest developments in the field Reference and guide for scientists and specialists involved in advancements in applied microbiology

Biofilm-biomaterial interactions: understanding, preventing, and eradicating attachment in infection Jessica Amber Jennings, Lauren B. Priddy, Mark Smeltzer, 2022-12-28

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