Foreword

The new textbook *Microbial Biofilms: Omics Biology Antimicrobials and Clinical Implications* authored by renowned world experts and edited by Dr. Chaminda Jayampath Seneviratne is most welcome and relevant. Concepts of microbiome and 'omics' in general have changed the paradigm in infectious diseases and microbial ecology in many areas, including the mouth. The earlier concept where one infectious agent was thought to cause a certain disease seems outdated in many cases, being now replaced by the better understanding of complex microbial communities. There, individual microbes work together and also communicate with each other. Modern research techniques have enabled scrutinising the mysteries of the microbial communities, and we have learnt a lot about their genetics, metabolism and behaviour. These aspects are thoroughly covered in this new textbook.

In many regards, research on oral microbiota has been pioneering in investigating 'dental plaque' and understanding indeed that only seldom can one micro-organism be pointed out as the culprit of a certain condition. Similarly it has been important to realise that most micro-organisms harbouring the human being are not pathogens but, on the contrary, needed and beneficial to health. The homeostasis between the microbiome and the host is prerequisite for healthy life as we understand it. Taken into consideration the fact that micro-organisms have been there millions of years before man, research in this co-existence cannot be over-emphasised. The new textbook elegantly summarises current knowledge of microbial biofilms in the perspective of oral health and clinical implications. The book is going to be an invaluable tool in the hands of students and researchers interested in this highly relevant topic.

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Preface

The field of microbiology has indeed come a long way from the very first observation of microbes by Antonie van Leeuwenhoek in 1663 to the science of the twenty-first century. The study of 'microbial biofilms' is, however, a relatively new discipline in the field of microbiology, consolidated in the 1980s. Consequently, there are only a handful of books on the topic. Moreover, as the field of microbial biofilms encompasses both clinical and environmental microbiology, the spectrum of topics that can be covered in this area is very diverse. A closer look at the available resources shows that books on clinical implications of microbial biofilms, keeping in mind a target audience of medical, dental and pharmacology students and researchers, are relatively sparse. This book attempts to fill this resource gap for the educators, researchers and clinicians working on biofilms.

One of the most promising vistas of our book is the ready information available on exploratory omics of microbial biofilms. The chapters dedicated to metagenomics, proteomics and metabolomics analysis of microbial biofilms are intended to provide a simple and holistic view of current knowledge, examples and applications of these cutting-edge technologies in the field of microbial biofilms. The next-generation and futuristic omics approaches that could be applied in biofilm research are also briefly discussed at the conclusion of these chapters. The book starts with two introductory chapters on microbial biofilms and their clinical implications, subsequently expanding into the topics of oral biofilms and their compositional and diversity mapping using metagenomics, drug resistance mechanisms observed in microbial biofilms and their characterisation using proteomics approaches, metabolomics characterisation of microbial biofilms, molecular mechanisms and strategies for tackling persister cells, host–microbial interactions at mucosal surfaces and finally concluding with a chapter on the application of novel therapeutic approaches such as synbiotics and biogenics against biofilms. Both bacterial and fungal biofilms have been discussed in this book along with their clinical implications. An overview of the cutting-edge technologies in metagenomics, proteomics and metabolomics characterisation of biofilms has been provided for readers to appreciate the value of these approaches in future research. An insight into the higher drug resistance of microbial biofilms as well as a discussion of 'persisters', which are highly drug-resistant populations found in microbial biofilms, will shed light on the clinical problems associated with biofilm infections. The diversity of microbial communities associated with different mucosal surfaces and their interplay with the host can provide an idea of the multitude of possibilities that can arise from host–microbial interactions. Finally, some very interesting therapeutic options including prebiotics, probiotics and synbiotics are described to give an idea of the direction towards which the future treatment of biofilms is heading. Overall, the book has been tailored in a way such as to have an equal appeal to both researchers and clinicians.

Publishing a tome of this proportion involves teamwork that encompasses editor, contributors and publisher. I was fortunate to have thoughtful and enthusiastic contributors for the chapters, to whom I am earnestly grateful. I would like to convey

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The book promises to provide a foundational knowledge on microbial biofilms to its readers. However, researchers and clinicians should keep abreast of this evolving, dynamic field of microbial biofilms. We hope that readers will find the chapters informative and that the information presented in the book may provide a stimulus to them to venture into devising new solutions for the clinical problems associated with microbial biofilms, ultimately benefitting patients' health.

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