Reviews and Resources

BOOK

Oral Microbiology and Immunology (2nd edition)

Interest in oral microbiology and immunology has significantly increased in recent years. A brief search in the PubMed database (www.ncbi.nlm.nih.gov) using keywords such as “oral infectious diseases,” “oral microbiology/immunology,” oral biofilm/microbial communities,” and “oral microbiome/microbiota” revealed a steady increase in publications over the years. Research in oral microbiology started with the important observation of oral bacteria scraped from teeth by Antonie van Leeuwenhoek in 1683 using primitive microscopes and continued with the realization today that there are many different kinds of infectious agents capable of colonizing the oral cavity and interacting with each other and the host, and causing diseases not only in the oral cavity but also at distant sites within a host.

The book under review is the second edition of Oral Microbiology and Immunology. The first edition, edited by R. J. Lamont, R. A. Burne, M. S. Lantz, and D. J. LeBlanc, and published by ASM Press in 2006, was praised as a very useful textbook for instructors and students (R. L. Sammons, Br. Dent. J. 202:429, 2007). Like the first edition, the current book has been divided into three sections, but it has been updated and expanded to a total of 22 chapters.

The first section constitutes almost half (226 pages) of the entire text. It contains 10 chapters and is entitled “General Principles of Oral Microbiology.” In the first two chapters, the reader can learn about the basic concepts in microbiology and immunology, including the differences between pro- and eukaryotes, bacterial architecture, the genetic organization of bacteria, microbial growth, and oral microbial ecology, as well as the immune system and host defenses.

The remaining eight chapters in Section I describe more specific aspects of oral microbiology and immunology. While the third chapter reviews the features and uniqueness of the oral cavity (which consists of mineralized hard tissue of the teeth and soft tissues of the oral mucosa), the fourth chapter discusses methods of isolation, classification, and identification of oral microorganisms. The authors of this latter chapter point out that although more than 700 species of bacteria have been identified in the oral cavity, many species have never been grown in culture. Chapters 5 and 6 provide information about oral microbial ecology and physiology, respectively. More specifically, the authors of Chapter 5 describe the acquisition of and colonization by oral bacteria, aspects of gene regulation, and issues associated with the communication of oral bacteria and host cells. The various challenging conditions microbes face in the oral environment, the metabolic activities, and the formation of biofilms as a survival strategy are discussed in Chapter 6.

The following three chapters deal with the genetics and molecular biology of oral microorganisms. Gene transfer, vectors and their utility, and plasmids in molecular analysis are the major topics in Chapter 7, and the results from gene expression, functional, and regulation studies, as well as genomic, transcriptomic, and proteomic approaches, are reviewed in Chapter 8. The ninth chapter is about oral population genetics, which includes information about bacterial population sizes, microbiota dynamics, and differences in virulence and pathogenicity of oral microbial strains. The last chapter in this section is about oral secretory immunity and subgingival immunity and inflammation.

The authors discuss in Section II, which contains nine chapters, the diseases caused by oral infectious agents. They introduce the reader to the general concepts of dental caries in Chapter 11 and to the pathogenic mechanisms in tooth decay in Chapter 12. There are three chapters about periodontal diseases. Chapter 13 deals with the general concepts of these diseases, Chapter 14 with the virulence factors of periodontal bacteria, and Chapter 15 with the immunopathogenic mechanisms.

Viruses and fungi of the oral cavity are the topics of Chapters 16 and 17, respectively. The chapter covering virology includes an introduction to viruses (e.g., virus structure, life cycle, and taxonomy) and the description of viruses which are known to cause pathologies as well as viruses which are present in the oral cavity but do not replicate in oral tissue. The authors also provide information about viral immune responses and evasion strategies, and antiviral vaccines and therapies. The chapter on oral fungi discusses the clinical conditions of candidiasis, aspergillosis, and blastomycosis, to name a few.

Chapter 18 is about endodontic microbiology, which means the study and
treatment of infectious diseases of the dental pulp tissue (e.g., root canal infections). Chapter 19 focuses on the routes of infectious agents from oral to systemic compartments, the description of systemic diseases, and the potential of commensal bacteria to behave as pathogens.

The final section (Section III) is about the control of oral diseases. This includes discussions about immunological interventions (e.g., mucosal vaccination) (Chapter 20), treatment with antibiotics (Chapter 21), and infection control approaches in dentistry (e.g., cross-infection risk identification and infection control measures) (Chapter 22).

This book provides comprehensive information about oral microbiology and immunology. I liked in particular that the chapters are self-contained and that the authors start in each chapter with a brief introduction to the topic and the terminology used before engaging in in-depth discussions. Very helpful are the highlighted boxes named “key points” located at the end of each chapter, which replace the summary/conclusion section often found in textbooks. The illustrations (most are in color) are outstanding. What I miss, however, are more discussions about future research possibilities. I found only a few chapters in which the authors provide this outlook (e.g., Chapter 12: Caries models in the future). Sammons (2007) mentioned that the first edition included a “complementary CD-ROM containing all the colored figures and tables.” The review copy I received did not come with the disk, but it would have been helpful.

Overall, I consider the second edition of Oral Microbiology and Immunology a well-developed textbook. I believe it is most suited for students, instructors, and professionals in dentistry, but other health care professionals and researchers interested in this field may also find this book useful.

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This totally revised second edition is a comprehensive volume presenting authoritative information on the management challenges facing today’s clinical laboratories.

- Provides thorough coverage of management topics such as managerial leadership, personnel, business planning, information management, regulatory management, reimbursement, generation of revenue, and more.
- Includes valuable administrative resources, including checklists, worksheets, forms, and online resources.
- Serves as an essential resource for all clinical laboratories, providing practical information in the fields of medicine and healthcare, clinical pathology, and clinical laboratory management, for practitioners, managers, and individuals training to enter these fields.