# Contents

*About the authors*  vii  
*Preface*  ix  

**Chapter 1 Introduction to oral microbiology**  2  
Commensals and pathogens  
Oral diseases  

**Chapter 2 In the beginning**  4  
The first microbes  
Microbial basis of infectious disease  
Miller and the chemoparasitic theory of caries  
Oral and dental research  

**Chapter 3 Caries as an infectious disease**  6  
Dental caries as a transmissible disease  
*Streptococcus mutans*  
Mutans group streptococci  
Link between *S. mutans* and dental caries  
Immunity to caries  

**Chapter 4 General properties of saliva**  8  
Saliva production  
Protective role of saliva  
Salivary pellicle  
Saliva as a nutrient  

**Chapter 5 Salivary mucins and agglutinins**  10  
Composition of mucins  
Properties of mucins  
Bacterial agglutination  

**Chapter 6 Secretory Immunoglobulin A**  12  
Production of S-IgA  
Functions of S-IgA  
Inactivation of salivary defenses  
Development of S-IgA  
The window of infectivity  
Selective IgA deficiency  

**Chapter 7 Anti-microbial properties of saliva**  14  
Anti-microbial components in saliva  

**Chapter 8 Innate defenses**  16  
Anti-microbial peptides (AMPs)  
Human AMPs  

**Chapter 9 Microbes in the oral cavity**  18  
Primary colonizers  
Beneficial effects of bacterial colonizers  
Ecological plaque hypothesis  
Ecology and disease  

**Chapter 10 Molecular microbial taxonomy**  20  
Molecular taxonomy  
Denaturing gradient gel electrophoresis  
DNA chips  

**Chapter 11 Systems approaches to oral microbiology**  22  
Transcriptomics  
Proteomics  
Gene ontology  
Post-translational networks  
Tiled arrays  

**Chapter 12 Oral streptococci**  24  
The genus *Streptococcus*  
Viridans streptococci  
Lancefield grouping  
Relatedness and pathogenicity of streptococci  

**Chapter 13 Microbial adherence**  26  
Adherence  
Long-range adherence  
Specific adhesion  
Oral bacterial adhesins and receptors  

**Chapter 14 Complex communities**  28  
Inter-microbial reactions  
Co-adhesion  
Metabolic associations  
Antagonism  

**Chapter 15 Biofilms**  30  
Biofilm development  
Microbial recognition of surfaces and interbacterial communication  
The biofilm matrix, resilience and resistance  

**Chapter 16 Bacterial polysaccharides**  32  
Extracellular polysaccharide production  
Glycosyltransferases and fructosyltransferases  
Glucan binding proteins  
EPS produced by oral Gram-negatives  

**Chapter 17 Microbiology of caries**  34  
Structure of teeth  
Dental caries  
Types of dental caries  
Important bacteria in caries  
Emerging and polymicrobial pathogens  

**Chapter 18 Virulence factors of *S. mutans***  36  
Initial attachment to tooth surfaces  
Polysaccharide production  
Acid production  
Acid tolerance  
Biofilm adaptation  

**Chapter 19 Host and environmental factors in caries**  38  
Host factors  
Dietary factors  
Caries risk assessment  

**Chapter 20 Fluoride**  40  
Modes of action of fluoride  
Strategies for fluoride delivery  
Anti-microbial effects of fluoride  
Enhancing anti-microbial effects  

**Chapter 21 Anti-caries strategies**  42  
Inhibitors