

CONTENTS

PART I-MECHANISMS OF MICROBIAL ADHESION AND BIOFILM FORMATION

| | | |
|----|--|----|
| 1. | Mechanisms of Bacterial Adhesion and Pathogenesis of Implant and Tissue Infections | 1 |
| 2. | Molecular Basis of Bacterial Adhesion | 29 |
| 3. | Molecular Genetics of Bacterial Adhesion and Biofouling | 43 |
| 4. | Factors Influencing Bacterial Adhesion | 53 |
| 5. | Nonspecific Staphylococcus epidermidis Adhesion: | 73 |
| 6. | Effects of Surface Roughness and Free Energy on Oral Bacterial Adhesion | 91 |

PART II-GENERAL CONSIDERATIONS AND METHODS FOR STUDYING MICROBIAL ADHESION AND BIOFILM

| | | |
|-----|--|-----|
| 7. | Basic Equipment and Microbiological Techniques for Studying Bacterial Adhesion | 103 |
| 8. | General Considerations for Studying Bacterial Adhesion to Biomaterials | 121 |
| 9. | Laboratory Culture and Analysis of Microbial Biofilms | 133 |
| 10. | Monitoring the Organization of Microbial Biofilm Communities | 171 |
| 11. | Models and Measurement of Bacterial Growth Rates on Polymers | 189 |
| 12. | Analysis of Gene Expression in Biofilm Bacteria | 203 |

PART III-TECHNIQUES FOR STUDYING MICROBIAL ADHESION AND BIOFILM

| | | |
|-----|---|-----|
| 13. | Methods for Evaluating Attached Bacteria and Biofilms | 213 |
| 14. | Evaluating Adherent Bacteria and Biofilm Using Electron Microscopy | 235 |
| 15. | Confocal Laser Scanning Microscopy for Examination of Microbial Biofilms | 249 |
| 16. | Quantitation of Bacterial Adhesion to Biomaterials Using Radiolabeling Techniques | 259 |
| 17. | Evaluating Adherent Bacteria and Biofilm Using Biochemical and Immunochemical Methods | 273 |
| 18. | Evaluating Bacterial Adhesion Using Atomic Force Microscopy | 285 |
| 19. | Direct Measurement of Long-Range Interaction Force Microscopy | 285 |

PART IV-STUDYING MICROBIAL ADHESION TO BIOMATERIALS

| | | |
|-----|---|-----|
| 20. | Staphylococcal Factors Involved in Adhesion and Biofilm Formation on Biomaterials | 307 |
| 21. | Studying Bacterial Adhesion to Irregular Medical Devices | 345 |
| 22. | Studying Bacterial Colonization of Tubular Medical Devices | 345 |
| 23. | Studying Plaque Biofilms on Various Dental Surfaces | 353 |
| 24. | Studying Bacterial Adhesion to Biliary Stents | 371 |
| 25. | Studying Bacterial Adhesion to Hydrogel Contact Lenses | 389 |
| 26. | In Vivo Models for Studying Staphylococcal Adhesion to Biomaterials | 397 |

PART V-STUDYING MICROBIAL ADHESION TO HOST TISSUE

| | | |
|-----|---|-----|
| 27. | Characterization of Staphylococcal Adhesins for Adherence to Host Tissues | 411 |
| 28. | Studying Bacterial Adhesion to Tooth Surfaces | 445 |
| 29. | Studying Bacterial Adhesion to Respiratory Mucosa | 457 |

| | | |
|--|---|-----|
| 30. | Studying Bacterial Adhesion to Endothelial Cells | 487 |
| 31. | Studying Bacterial Adhesion to Gastric Epithelium | 497 |
| 32. | Studying Bacterial Adhesion in the Urinary Tract | 515 |
| 33. | Studying Candida albicans Adhesion | 527 |
| 34. | Studying Bacterial Adhesion to Cultured Cells | 541 |
| PART VI STRATEGIES FOR PREVENTION OF MICROBIAL ADHESION | | |
| 35. | Strategies for Preventing Group A Streptococcal Adhesion and Infection | 553 |
| 36. | Changing Material Surface Chemistry for Preventing Bacterial Adhesion | 581 |
| 37. | Antimicrobial Agent Incorporation for Preventing Bacterial Adhesion | 591 |
| 38. | Studying Bacterial Adhesion to Antibiotic Impregnated Polymethyl Methacrylate | 599 |
| 39. | Macromolecule Surface Coating for Preventing Bacterial Adhesion | 609 |
| | Appendix I | 627 |
| | Index | 629 |