CONTENTS

Contributors *ix*
Preface *xiii*

1. Competition for Manganese at the Host–Pathogen Interface **1**
J.L. Kelliher, T.E. Kehl-Fie

1. Introduction 2
2. Imposition of Manganese Starvation by the Host 3
3. Bacterial Adaptation to Manganese Limitation 10
4. Impact of Manganese Limitation on Invading Microbes 15
5. Conclusions and Broader Impacts 16
References 17

2. Microbial Virulence and Interactions With Metals **27**
N. German, F. Lüthje, X. Hao, R. Rønn, C. Rensing

1. Iron 31
2. Copper 35
3. Manganese 38
4. Zinc 42
References 44

3. Virulence Program of a Bacterial Plant Pathogen: The *Dickeya* Model **51**
S. Reverchon, G. Muskhelisvili, W. Nasser

1. Introduction 52
2. *Dickeya* Ecology 53
3. The Virulence Determinants of *D. Dadantii* 55
4. Plant–Pathogen Interaction Process 65
5. Regulatory Mechanisms Coordinating the Virulence Program 74
6. Concluding Remarks 82
References 83

4. Metabolism and Virulence Strategies in *Dickeya*–Host Interactions 93
N. Hugouvieux-Cotte-Pattat

1. Introduction 94
2. The *Dickeya* Virulence Strategy 95
3. The *Dickeya* Catabolic Capacities 103
4. The Major Carbon Sources Assimilated by Bacteria in Plant Tissues 112
5. The Regulators Coordinating Virulence and Metabolism 116
6. Concluding Remarks 122
Acknowledgments 123
References 123

5. Multidrug Efflux Pumps in the Genus *Erwinia*: Physiology and Regulation of Efflux Pump Gene Expression 131
J. Thekkiniath, R. Ravirala, M. San Francisco

1. Introduction 132
2. Bacterial efflux pumps 132
3. Efflux pumps in *Erwinia* 133
4. Mechanism of regulation of efflux pump gene expression 140
5. Future directions 144
Acknowledgements 144
References 144

6. In Vitro Analysis of *Pseudomonas aeruginosa* Virulence Using Conditions That Mimic the Environment at Specific Infection Sites 151
J.A. Colmer-Hamood, N. Dzvova, C. Kruczek, A.N. Hamood

1. Introduction 152
2. Virulence Factors Produced by *P. aeruginosa* 153
3. Specific Virulence Factors Affected By Host Conditions 155
4. Synthetic Media That Mimic Specific Host Environments 158
5. Conclusions 180
References 180

7. Host Responses to Biofilm 193
C. Watters, D. Fleming, D. Bishop, K.P. Rumbaugh

1. Host Immune Responses to Biofilm Constituents 194
2. Pathogenic Biofilms and Host Cells 206
3. Interactions of Commensal Biofilms With the Immune System 216
Acknowledgments 228
References 229

8. Viral interactions with components of the splicing machinery **241**
F. Meyer

1. Introduction 242
2. The Spliceosome 243
3. The Splicing Reaction 246
4. Viruses and Alternative Splicing 248
5. Retroviruses 250
6. Herpesviruses 253
7. Influenza Viruses 256
8. Concluding Remarks 259
Acknowledgments 260
References 260

9. Insights From Genomics Into Spatial and Temporal Variation in *Batrachochytrium dendrobatidis* **269**
A.Q. Byrne, J. Voyles, G. Rios-Sotelo, E.B. Rosenblum

1. Insights From Genomics Into Bd Variation 271
2. New Frontiers in Bd Genomics 277
3. Conclusions 284
References 286

10. Translational Activities to Enable NTD Vaccines **291**
S.A. Gray, R.N. Coler, D. Carter, A.A. Siddiqui

1. Introduction 292
2. Current Landscape of Vaccines for NTDs 299
3. Developmental Process for NTD Vaccines 305
4. Vaccine Embodiment—Going From an Antigen to a Deployable Vaccine 310
5. Concluding Remarks 312
Acknowledgments 313
References 313

Index 317