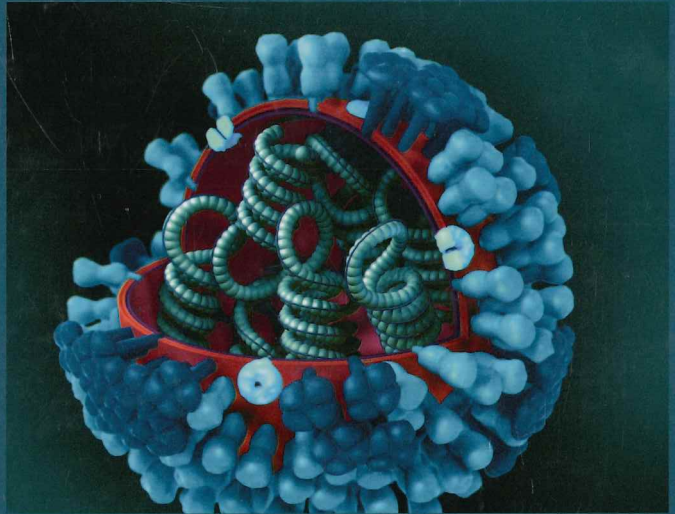


THIRD EDITION

Microbe



MICHELE S. SWANSON | ELIZABETH A. JOYCE | RACHEL E.A. HORAK

สำนักหอสมุด มหาวิทยาลัยเชียงใหม่

6R66
6,000

6 1662485
'02 55618'
1 22611604

THIRD EDITION

Microbe

MICHELE S. SWANSON

Department of Microbiology &
Immunology
University of Michigan
Ann Arbor, Michigan

ELIZABETH A. JOYCE

Department of Microbiology and
Immunology
University of California at
San Francisco
San Francisco, California

RACHEL E. A. HORAK

Education Department
American Society for Microbiology
Washington, DC



2325 .A.6 2
จุฬาลงกรณ์มหาวิทยาลัย



**ASM
PRESS**

Washington, DC

WILEY

Contents

Preface	ix
Acknowledgments	xi
About the Authors	xiii

PART I FUNDAMENTALS OF MICROBIAL LIFE 1

1	A Microbial Planet	2
2	Microbial Cell Exterior: <i>Envelopes and Appendages</i>	22
3	Microbial Cell Interior	52
4	Microbial Cell Growth and Division	72
5	Microbial Metabolism	96
6	Bioenergetics of Fueling	114
7	Synthesis of Building Blocks	144
8	Building Macromolecules	180
9	Building the Cell Envelope	212
10	Inheritance and Information Flow	234
11	Coordination of Cell Processes	268
12	Succeeding in the Environment	292
13	Differentiation and Development in <i>Bacteria</i>	324

PART II MICROBIAL DIVERSITY 347

14	<i>Bacteria</i> and <i>Archaea</i>	348
15	The Fungi	376
16	Protists	392
17	The Viruses	414
18	Viral Latency	450

PART III MICROBIAL ECOLOGY 471

- 19 Microbial Communities 472
- 20 Cycles of Elements 504
- 21 Microbial Interactions 536
- 22 The Human Gut Microbiome 570

PART IV MICROBIAL PATHOGENESIS 585

- 23 Infection: *The Vertebrate Host* 586
- 24 Opportunistic Infections by Microbiota: *MRSA* 610
- 25 Intracellular Pathogens: *Listeria* and *Mycobacterium* 626
- 26 Toxins and Epidemic Cholera: *Phage Giveth, and Phage Taketh Away* 646
- 27 Zoonoses: *How Plague Emerged from a Foodborne Illness* 662

Coda 675

Glossary 677

Index 705