Changes to the Fourth Edition

New to Microbiology, A Systems Approach

Brand new

- **Every disease table now contains national and worldwide epidemiological information for each causative agent**

Global changes throughout the fourth edition

- Disease Connections have been added to nondisease chapters
- Learning Outcomes have been class tested and improved
- All new case studies
- 75% of the Insight boxes are new

In end-of-chapter section:

- Chapter summary is tagged with new American Society for Microbiology curricular guidelines
- All questions are labeled with Bloom's levels
- New feature: Concept Connections in each chapter
- All new Critical Thinking Questions

Major chapter changes

Chapter 1

- Revised discussion of history of cellular life on earth and the three domains

Chapter 3

- Simplified and clarified discussion of resolution; added a figure showing wavelengths

Chapter 4

- New information added on microcompartments and S layers

Chapter 5

- Updated protist classification
- Added O & P testing

Chapter 6

- Discussion of the new proposed viral domain
- Virus phage introduced
- DRACO broad-spectrum antiviral treatment described

Chapter 7

- Improved presentation of molecular transport
- Additional information on biofilms

Chapter 8

- Explanations of metabolic processes written in simpler language
- Illustrations greatly improved

Chapter 9

- Streamlined discussions of replication and translation by putting text right next to visuals and highlighting important terms in text
- Added proteomics
- Added figure on transformation so that there are three figures for three processes of horizontal gene transfer

Chapter 10

- Chapter almost completely new! Topics rewritten/updated/added
- Cloning, synthetic biology, miRNA strategies, sequencing and proteomics
- Many new figures

Chapter 11

- New figures and tables to make content more manageable
- Description of critical, semicritical, and noncritical medical devices
- Added discussion of disinfecting biofilms

Chapter 12

- Discussion of how new drugs may target host cell factors and still be selectively toxic
- More discussion of treating biofilm bacteria
- Changed the order of discussion to reflect clinical sequence
- Role of smartphone apps in selecting drugs
- New drugs added
- New tables for better organization
- Fecal therapy described

Chapter 13

- All new human microbiome section added
- Lots of information on gut microbiome
- New figure and information on newborn colonization
- More information of quorum sensing
- Added "the built environment" to reservoirs
- Updated section on healthcare-associated infection
- Added molecular Koch's postulates
- Added use of technology and social media in disease tracking
- Improved section on emerging diseases

Chapter 14

- Discussion of microbiome's role as first line of defense
- New research on platelets being involved in immunity
- Added information on collectins

Chapter 15

- Changed order of presentation: T cells first
- Much updated art
- Added information on CD80/CD28
- More emphasis on adult vaccines

Chapter 16

- More emphasis on hygiene hypothesis
- New research on autoimmunity

Chapter 17

- New section: "Breakthrough Methodologies" (deep sequencing, imaging, etc.)

Chapter 18

- MRSA, VRSA updated
- Vaccine information (i.e., MMRV) updated
- Leishmaniasis' creep into the United States discussed

Chapter 19

- Information on gut-brain axis added

Chapter 20

- Chagas disease added

Chapter 21

- Normal biota radically updated due to Human Microbiome Project
- Whooping cough epidemic addressed
- Much new information on both influenza and TB
- Causes of community-acquired pneumonia ranked as to frequency

Chapter 22

- Added information on 2010 mumps outbreak
- New information on non-O157:H7 STECs
- Added figure on most common causes of food-borne disease

Chapter 23

- Normal biota radically updated due to Human Microbiome Project
- Added information about head and neck cancers in males from HPV
- Added a figure summarizing incidence of *all* STIs

Chapter 24

- More bioremediation information
- More information on extreme environments
- Named *Prochlorococcus* as responsible for massive amounts of photosynthesis
- Two new figures: distribution of water on earth's surface and CO_2 levels over time

Chapter 25

- More emphasis on the transition from early biotech to genetically engineered organisms
- More detail about how coliform tests are not optimal
- More detail on HACCP, and new information about the Food Safety Modernization Act
- Updates on biofuels