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Books accompanied by the Garland Science Learning System have been highlighted with this icon.

Viewing this on a computer? You’ll find hyperlinks imbedded into cover images and bolded text to view content online!

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Dear Reader,

Garland Science is one of the leading textbook publishers in the life sciences, particularly in the fields of cell and molecular biology, immunology, genetics and protein science. Our exceptional authors, who are highly respected leaders in their fields, make the science accessible to students through clear and elegant writing that illuminates core concepts. Each textbook is beautifully illustrated, and every figure is carefully explained through detailed figure legends. Our books are supported by a wide array of ancillary resources for students and instructors. Some books are additionally supported by the Garland Science Learning System, which offers high-quality homework and assessment content designed to complement our textbooks.

This catalogue includes all of our major textbooks and highlights new textbooks published in 2017. We hope it serves as an effective introduction to our publications and that you will also explore our website or contact us directly for more information.

Best wishes,
The Team at Garland Science

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As the amount of information in biology expands dramatically, it becomes increasingly important for textbooks to distill the vast amount of scientific knowledge into concise principles and enduring concepts. As with previous editions, *Molecular Biology of the Cell*, Sixth Edition accomplishes this goal with clear writing and beautiful illustrations. The Sixth Edition has been extensively revised and updated with the latest research in the field of cell biology, and it provides an exceptional framework for teaching and learning.

The entire illustration program has been greatly enhanced. Protein structures better illustrate structure-function relationships, icons are simpler and more consistent within and between chapters, and micrographs have been refreshed and updated with newer, clearer, or better images. As a new feature, each chapter now contains intriguing open-ended questions highlighting “What We Don’t Know,” introducing students to challenging areas of future research. Updated end-of-chapter problems reflect new research discussed in the text, and these problems have been expanded to all chapters by adding questions on developmental biology, tissues and stem cells, pathogens, and the immune system.

**NEW IN THE SIXTH EDITION**

- Incorporates important new discoveries into a logical and cohesive narrative that provides a conceptual framework for cell biology.
- Explains newly discovered functions for RNA molecules.
- Includes the latest findings on the structure and function of the human genome.
- Explains recent insights into how low-complexity protein sequences help organize the cell interior.
- Describes powerful new methods, many invented since the last edition, that scientists use to visualize subcellular structures and analyze genes and proteins—with a new section emphasizing the need for mathematics to unravel the complexities of cell function.
- Incorporates new results that refine our understanding of intracellular organization, membrane structure, dynamics, and transport.
- Focuses on the fundamental concepts in cell signaling, with emphasis on key principles underlying the circuitry of signaling systems.
- Describes how the latest discoveries in cytoskeletal protein dynamics apply to key questions in cell structure and polarity.
- Covers new insights into the causes, genetics, and treatments of cancer—including a discussion of personalized therapies.
- Adds new sections on timing, growth control, and morphogenesis in the development of multicellular organisms.
# Molecular Biology of the Cell, Sixth Edition

## CONTENTS:

### INTRODUCTION TO THE CELL
1. Cells & Genomes
2. Cell Chemistry and Bioenergetics
3. Proteins

### BASIC GENETIC MECHANISMS
4. DNA, Chromosomes, and Genomes
5. DNA Replication, Repair, and Recombination
6. How Cells Read the Genome: From DNA to Protein
7. Control of Gene Expression

### WAYS OF WORKING WITH CELLS
8. Analyzing Cells, Molecules, and Systems
9. Visualizing Cells

### INTERNAL ORGANIZATION OF THE CELL
10. Membrane Structure
11. Membrane Transport of Small Molecules and the Electrical Properties of Membranes
12. Intracellular Compartments and Protein Sorting
13. Intracellular Membrane Traffic
14. Energy Conversion: Mitochondria and Chloroplasts
15. Cell Signaling
16. The Cytoskeleton
17. The Cell Cycle
18. Cell Death

### CELLS IN THEIR SOCIAL CONTEXT
19. Cell Junctions and the Extracellular Matrix
20. Cancer
21. Development of Multicellular Organisms
22. Stem Cells and Tissue Renewal
23. Pathogens and Infection
24. The Innate and Adaptive Immune Systems

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# PRAISE FOR THE FIFTH EDITION

"A quarter of a century after the first edition revolutionized cell biology textbooks, the new edition is as fresh, comprehensive and above all, as readable as ever."

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"MBoC has only improved over its several editions, growing with the rapid advances in the field to become an essential resource for students at all levels and a trusted first stop for researchers transitioning into unfamiliar areas of cell biology.... the MBoC5 package is a fantastic resource and well worth the upgrade."

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# Molecular Biology of the Cell: The Problems Book, Sixth Edition

**John Wilson**, Emeritus Baylor College of Medicine, USA, and **Tim Hunt**, Emeritus Researcher at The Francis Crick Institute, London

*The Problems Book* helps students appreciate the ways in which experiments and simple calculations can lead to an understanding of how cells work by introducing the experimental foundation of cell and molecular biology. Each chapter reviews key terms, tests for understanding basic concepts, and poses research-based problems. *The Problems Book* has been designed to correspond with the first twenty chapters of *Molecular Biology of the Cell*, Sixth Edition.

Garland Science
November 2014: 560pp: 511 illus
Paperback: 978-0-8153-4453-7: **£30.00**
Essential Cell Biology, Fourth Edition

Bruce Alberts, University of California, San Francisco, USA, Dennis Bray, University of Cambridge, UK, Karen Hopkin, Science Journalist and Biochemist, USA, Alexander Johnson, University of California, San Francisco, USA, Julian Lewis, formerly of Cancer Research, UK, Martin Raff, University College London, UK, Keith Roberts, Emeritus, University of East Anglia, UK, and Peter Walter, University of California, San Francisco, USA

Essential Cell Biology provides a readily accessible introduction to the central concepts of cell biology, and its lively, clear writing and exceptional illustrations make it the ideal textbook for a first course in both cell and molecular biology. The text and figures are easy-to-follow, accurate, clear, and engaging for the introductory student. Molecular detail has been kept to a minimum in order to provide the reader with a cohesive conceptual framework for the basic science that underlies our current understanding of all of biology, including the biomedical sciences. Garland Science Learning System homework modules are available for Essential Cell Biology, Fourth Edition, and are sold separately.

Garland Science
October 2013: 864pp: 860 illus
Hardback: 978-0-8153-4454-4: £117.00
Paperback: 978-0-8153-4455-1: £60.00
HB + GSLS Access: 978-0-8153-4573-2: £115.00
PB + GSLS Access: 978-0-8153-4574-9: £68.00

Essential Cell Biology, Fourth Edition is additionally supported by the Garland Science Learning System. This homework platform is designed to evaluate and improve student performance and allows instructors to select assignments on specific topics and review the performance of the entire class, as well as individual students, via the instructor dashboard. Students receive immediate feedback on their mastery of the topics, and will be better prepared for lectures and classroom discussions. The user-friendly system provides a convenient way to engage students while assessing progress. Performance data can be used to tailor classroom discussion, activities, and lectures to address students’ needs precisely and efficiently. For more information and sample material, visit http://garlandscience.rocketmix.com/.

Praise for the Fourth Edition
"[Essential Cell Biology] really ought to be an intrinsic part of every bioscience undergraduate's essential reading."
The Biochemist

Contents:
**Molecular Biology**

*Molecular Biology* illustrates the essential principles behind the transmission and expression of genetic information at the level of DNA, RNA, and proteins. This textbook emphasizes the experimental basis of discovery and the most recent advances in the field while presenting a structural, mechanistic understanding of molecular biology that is rigorous, yet concise. This text is written for advanced undergraduate or graduate-level courses in molecular biology and is additionally supported by the [Garland Science Learning System](#).

**CONTENTS:**
1. To the Cell and Beyond: The Realm of Molecular Biology
2. From Classical Genetics to Molecular Genetics
3. Proteins
4. Nucleic Acids
5. Recombinant DNA: Principles and Applications
6. Protein-Nucleic Acid Interactions
7. The Genetic Code, Genes, and Genomes
8. Physical Structure of the Genomic Material
9. Transcription in Bacteria
10. Transcription in Eukaryotes
11. Regulation of Transcription in Bacteria
12. Regulation of Transcription in Eukaryotes
13. Transcription Regulation in the Human Genome
14. RNA Processing
15. Translation: The Players
16. Translation: The Process
17. Regulation of Translation
18. Protein Processing and Modification
19. DNA Replication in Bacteria
20. DNA Replication in Eukaryotes
21. DNA Recombination
22. DNA Repair

**Cell Signaling**

*Cell Signaling* presents the principles and components that underlie all known signaling processes. It provides undergraduate and graduate students the conceptual tools needed to make sense of the dizzying array of pathways used by the cell to communicate. By emphasizing the common design principles, components, and logic that drives all signaling, the book develops a conceptual framework through which students can understand how thousands of diverse signaling proteins interact with each other in vast interconnected networks.

**CONTENTS:**
1. Introduction to Cell Signaling
2. Principles and Mechanisms of Protein Interactions
3. Signaling Enzymes and Their Allosteric Regulation
4. Role of Post-translational Modifications in Signaling
5. Subcellular Localization of Signaling Molecules
6. Second Messengers: Small Signaling Mediators
7. Membranes, Lipids, and Enzymes that Modify Them
8. Information Transfer Across the Membrane
9. Regulated Protein Degradation
10. Modular Architecture and Evolution of Signaling Proteins
11. Information Processing by Signaling Devices and Networks
12. How Cells Make Decisions
13. Methods for Studying Signaling Proteins and Networks
**The Biology of Cancer, Second Edition**

*Robert A. Weinberg*, Whitehead Institute for Biomedical Research, MIT, USA

*The Biology of Cancer* is a textbook for students studying the molecular and cellular bases of cancer at the undergraduate, graduate, and medical school levels. The clarity of writing, supported by an extensive full-color art program and numerous pedagogical features, makes the book accessible and engaging. The information unfolds through the presentation of key experiments that give readers a sense of discovery and provide insights into the conceptual foundation underlying modern cancer biology. The new Second Edition has been comprehensively revised and updated to include major advances in cancer biology over the past six years, including current information on the tumor microenvironment, mutation of cancer cell genomes, epigenetic contributions, and a greatly expanded treatment of traditional therapy.

**CONTENTS:**

_Praise for previous edition_

"*The Biology of Cancer* is no doubt the definitive statement on its topic today."

*Science*

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**Cell Biology by the Numbers**

*Ron Milo*, Weizmann Institute of Science, Israel, *Rob Phillips*, California Institute of Technology, USA

How much energy is released in ATP hydrolysis? How many mRNAs are in a cell? How genetically similar are two random people? What is faster, transcription or translation? *Cell Biology by the Numbers* explores these questions—and dozens of others—providing a richly illustrated and handy reference for students and researchers in molecular and cell biology, chemistry, and biophysics. The book features question-driven vignettes and “back of the envelope” calculations that investigate some of the key numbers in cell biology. Readers will learn about the sizes, concentrations, rates, energies, and other numbers that describe and drive the living world.

**CONTENTS:**

Garland Science

December 2015: 400pp: 181 illus

NEW EDITION

Cellular Signal Processing, Second Edition
An Introduction to the Molecular Mechanisms of Signal Transduction
Friedrich Marks, Ursula Klingmüller, Karin Müller-Decker, all at University of Heidelberg, Germany

Cellular Signal Processing offers a unifying view of cell signaling based on the concept that protein interactions act as sophisticated data processing networks that govern intracellular and extracellular communication. It is intended for use in signal transduction courses for undergraduate and graduate students working in biology, biochemistry, bioinformatics, and pharmacology, as well as medical students. The text is organized by three key topics central to signal transduction: the protein network, its energy supply, and its evolution. It covers all important aspects of cell signaling, ranging from prokaryotic signal transduction to neuronal signaling, and also highlights the clinical aspects of cell signaling in health and disease. This new edition includes expanded coverage of prokaryotes, as well as content on new developments in systems biology, epigenetics, redox signaling, and small, non-coding RNA signaling.

Garland Science
March 2017: 640pp: 483 illus
Paperback: 978-0-8153-4534-3: £57.00

CONTENTS:
1. The “Brain of the Cell”: Data Processing by Protein Networks
2. Supplying the Network with Energy: Basic Biochemistry of Signal Transduction
3. Evolution of Cellular Data Processing
4. Basic Equipment: G-Proteins, Second Messengers, and Protein Kinases
5. Signal Transduction by Receptors with Seven Transmembrane Domains
6. Signal Transduction by Serine/Threonine Kinase-Coupled Receptors
7. Signal Transduction by Tyrrosine Kinase- and Protein Phosphatase Coupled Receptors
8. Eukaryotic Gene Transcription: The Ultimate Target of Signal Transduction
9. Signals Controlling mRNA Translation
10. Signal Transduction by Small G-Proteins: The Art of Molecular Targeting
11. Mitogen-activated Protein Kinase and Nuclear Factor kB Modules
12. Regulation of Cell Division
13. Signal Transduction by Proteolysis, and Programmed Cell Death
14. Signal Transduction by Ions
15. Sensory Signal Processing
16. Signaling at Synapses: Neurotransmitters and their Receptors
17. Putting Together the Pieces: The Approach of Systems Biology

Biology of Aging
Roger B. McDonald, Emeritus University of California Davis, USA

Biology of Aging presents the biological principles that have led to a new understanding of the causes of aging and longevity and describes how these basic principles help one to understand the uniquely human experience of biological aging, longevity, and age-related disease. Intended for undergraduate biology students, it describes how the rate of biological aging is measured; explores the mechanisms underlying cellular aging; discusses the genetic pathways that affect longevity in various organisms; outlines the normal age-related changes and the functional decline that occurs in physiological systems over the lifespan; and considers the implications of modulating the rate of aging and longevity.

Garland Science
July 2013: 360pp: 241 illus
Paperback: 978-0-8153-4213-7: £50.00

CONTENTS:
1. Basic Concepts in the Biology of Aging
2. Measuring Biological Aging
3. Evolutionary Theories of Longevity and Aging
4. Cellular Aging
5. Genetics of Longevity
6. Plant Senescence
7. Human Longevity
8. The Physiology of Human Aging
9. Age-Related Disease in Humans
10. Modulating Aging and Longevity
Cell Membranes
Lukas K. Buehler, Southwestern College, USA

Cell Membranes provides a concise introduction to the structure and function of biological membranes. The book begins by explaining the composition and dynamics of cell membranes—discussing the diversity, structure, and distribution of lipids and membrane proteins and their effect on the shape and transformation of membranes. The text then explores the role of the membrane in transport, signaling, and metabolism. Cell Membranes is a valuable resource for advanced undergraduate students, graduate students, and professionals.

CONTENTS:

NEW
Developmental Neurobiology
Lynne M. Bianchi, Oberlin College, USA

Developmental Neurobiology tells the extraordinary process of neural development by showing how the scientific discoveries were made and how the hypotheses evolved over time. Each chapter explores the specific mechanisms of development while highlighting the key experiments and methods used to make those discoveries—including descriptions of, and experiments utilizing, both invertebrate and vertebrate animal models. This distinctive approach provides the essential facts while strengthening the reader’s appreciation of the scientific method. Discussions of neurodevelopmental disorders and therapeutic approaches to them will captivate those interested in the more clinical aspects of the field. With its clear illustrations and easy-to-follow writing style, Developmental Neurobiology presents an accessible approach to neural development for undergraduate students.

CONTENTS:
Principles of Neurobiology presents the major concepts of neuroscience with an emphasis on how we know what we know. The text is organized around a series of key original experiments to illustrate how scientific progress was made and helps upper-level undergraduate and graduate students to discover the relevant primary literature. Written by a single author in a clear and consistent writing style, each topic builds in complexity from electrophysiology to molecular genetics to systems level in a highly integrative approach. Students can fully engage with the content via thematically linked chapters and will be able to read the book in its entirety in a semester-long course.

Garland Science
July 2015: 645pp: 625 illus
Hardback: 978-0-8153-4492-6: £103.00
Paperback: 978-0-8153-4494-0: £60.00
PB + GSLS Access: 978-0-8153-4580-0: £68.00

Principles of Neurobiology is supported by the Garland Science Learning System, and is accompanied by a rich package of online student and instructor resources including animations, quizzes and tutorials, journal club suggestions, figures in PowerPoint® format, and a Question Bank for adopting instructors.

KEY FEATURES:
• Integrates molecular, cellular, circuit, systems, and behavioral approaches within each subject.
• Includes many cross-chapter references to further integrate concepts across chapters.
• The description of key experiments, the figures with data from experiments, and the references of primary papers provide a good resource for students to understand and utilize primary research.
• Includes many examples of the use of animal models in research, including invertebrates, and of new technologies in investigating neural circuits developed as part of the BRAIN Initiative.
• Dedicated chapters on evolution and on techniques are unique among neurobiology textbooks.
• Concept headings descriptively introduce each section and provide an outline of the key ideas presented in the chapter.
• End-of-chapter summaries provide an overview of material presented allowing students to review and assess their understanding of what they have read.

CONTENTS:

“Luo shares with us the belief that students should not be taught just facts and knowledge but also how knowledge is obtained and how principles are derived....In 13 chapters and 645 pages, he provides a masterpiece highlighting principles of how the nervous system transforms and governs our sensation, action, memory, and thought. Reading Principles of Neurobiology is like enjoying a beautiful piece of music....[Luo] has set an example of how an outstanding scientist cares about education and writes a textbook to inspire students to pursue discoveries. We hope that students will follow this pied piper, happily and fruitfully.”
NEW EDITION

Genomes 4

T.A. Brown, University of Manchester, UK

The Fourth Edition of Genomes has been completely revised and updated to make it a thoroughly modern textbook about genomes and how they are investigated. As with Genomes 3, techniques come first, then genome anatomies, followed by genome function, and finally genome evolution. The genomes of all types of organism are covered: bacteria, plants, and animals including humans and other hominids.

Genomes 4 is the ideal text for upper level courses focused on genomes and genomics.

Garland Science
April 2017: 700pp: 500 illus
Paperback: 978-0-8153-4508-4: £57.00

CONTENTS:

PART I: HOW GENOMES ARE STUDIED

1. Genomes, Transcriptomes and Proteomes
2. Studying DNA
3. Mapping Genomes
4. Sequencing Genomes
5. Genome Annotation
6. Identifying Gene Functions

PART II: GENOME ANATOMIES

7. Eukaryotic Nuclear Genomes
8. Genomes of Prokaryotes and Eukaryotic Organelles
9. Virus Genomes and Mobile Genetic Elements

PART III: HOW GENOMES ARE EXPRESSED

10. Accessing the Genome
11. The Role of DNA-Protein Interactions in Genome Expression
12. Transcriptomes
13. The Proteome

PART IV: HOW GENOMES REPLICATE AND EVOLVE

14. Replicating the Genome
15. Microevolution of Genomes
16. A Brief History of Genome Evolution
17. Using Genomes to Study the Evolution of Species and Populations

Biochemical Evolution, Second Edition

The Pursuit of Perfection

Athel Cornish-Bowden, National Center for Scientific Research, France

Biochemical Evolution: The Pursuit of Perfection, Second Edition by Athel Cornish-Bowden describes the relationship between biochemistry and evolutionary biology, arguing that each depends on the other to be properly understood. There are many aspects of evolution that make sense only in the light of biochemical knowledge, just as there are many aspects of biochemistry that make sense only in the light of evolution.

Garland Science
May 2016: 282pp
Paperback: 978-0-8153-4552-7: £31.95

CONTENTS:

1. Some Basic Biochemistry
2. The Nuts and Bolts of Evolution
3. Adaptation and Accidents
4. Metabolism and Cells
5. The Games Cells Play
6. The Perfect Molecule
7. Fear of Phantoms
8. Living on a Knife Edge
9. Brown Eyes and Blue
10. An Economy That Works
11. Failures of Natural Selection
12. A Small Corner of the Universe
13. Aspects of Cancer
14. The Meaning of Life
15. The Age of Endarkenment
Human Evolutionary Genetics, Second Edition

Mark Jobling and Edward Hollox, both at University of Leicester, UK, Toomas Kivisild, University of Cambridge, UK, Chris Tyler-Smith and Matthew Hurles, both at Wellcome Trust Sanger Institute, UK

Now in full color, the Second Edition of Human Evolutionary Genetics has been completely revised to cover the rapid advances in the field since the publication of the highly regarded First Edition. Written for upper-level undergraduate and graduate students, it is the only textbook to integrate genetic, archaeological, and linguistic perspectives on human evolution, and to offer a genomic perspective, reflecting the shift from studies of specific regions of the genome towards comprehensive genomewide analyses of human genetic diversity.

CONTENTS:
1. An Introduction to Human Evolutionary Genetics
Section I: How Do We Study Genetic Variation?
2. Organization and Inheritance of the Human Genome
3. Human Genome Variation
4. Finding and Assaying Genome Diversity
Section II: How Do We Interpret Genetic Variation?
5. Processes Shaping Diversity
6. Making Inferences from Diversity
Section III: Where and When Did Humans Originate?
7. Humans as Apes
8. What Genetic Changes Have Made Us Human?
9. Origins of Modern Humans
Section IV: How Did Humans Colonize the World?
10. The Distribution of Diversity
11. The Colonization of the Old World and Australia
12. Agricultural Expansions
13. Into New Found Lands
14. What Happens When Populations Meet?
Section V: How Is an Evolutionary Perspective Helpful?
15. Understanding the Past, Present and Future of Phenotypic Variation
16. Evolutionary Insights into Simple Genetic Diseases
17. Evolution and Complex Diseases
18. Identity and Identification

Gene Control, Second Edition

David S. Latchman, Birkbeck, University of London, UK

The new edition of Gene Control has been updated to include significant advances in the roles of the epigenome and regulatory RNAs in gene regulation. The chapter structure remains the same: the first part consists of pairs of chapters that explain the mechanisms involved and how they regulate gene expression, and the second part deals with specific biological processes (including diseases) and how they are controlled by genes. Coverage of methodology has been strengthened by the inclusion of more explanation and diagrams.

CONTENTS:
1. Level of Gene Control
2. Structure of Chromatin
3. The Epigenome: Role of Chromatin Structure in Gene Control
4. The Process of Transcription
5. Transcription Factors and Transcriptional Control
6. Post-transcriptional Processes
7. Post-transcriptional Regulation
8. Gene Control and Cellular Signaling Pathways
9. Gene Control in Embryonic Development
10. Control of Cell Type-specific Gene Expression
11. Gene Regulation and Cancer
12. Gene Regulation and Human Disease
13. Conclusion and Future Prospects
Epigenetics
Lyle Armstrong, Newcastle University, UK

*Epigenetics* is a new textbook that brings together the structure and machinery of epigenetic modification, how epigenetic modification controls cellular functions, and the evidence for the relationship between epigenetics and disease. It is a valuable source of information about all aspects of the subject for undergraduate students, graduate students, and professionals.

CONTENTS:
1. Introduction to the Study of Epigenetics
2. The Basis of the Transcription Process
3. DNA Packaging and Chromatin Architecture
4. Modifying the Structure of Chromatin
5. DNA Methylation
6. Post-Translational Modification of Histones
7. Histone Modification Machinery
8. Locus-Specific Control of Histone-Modifying Enzyme Action
9. Epigenetic Control of Cell-Specific Gene Expression
10. Epigenetic Control of the Mitotic Cell Cycle
11. The Epigenetic Basis of Gene Imprinting
12. Epigenetic Control of Cellular Differentiation
13. Reversibility of Epigenetic Modification Patterns
14. Epigenetic Predisposition to Disease and Imprinting-Based Disorders
15. Epigenetics of Memory, Neurodegeneration, and Mental Health
16. Epigenetics of Cancer

Genetics of Complex Disease
Peter Donaldson, Newcastle University, UK, Ann Daly, Newcastle University, UK, Luca Ermini, University of Copenhagen, Denmark, Debra Bevitt, Newcastle University, UK

*Genetics of Complex Disease* is a concise text for advanced undergraduate and first year graduate students. Healthcare professionals and other biomedical scientists adjusting to the impact of the new genetics will also find the book useful. After explaining genetic variation and defining complex diseases, the next three chapters explain how and why complex diseases are investigated (including a chapter on statistics). The text then concentrates on selected areas where there is strong evidence for the genes/alleles involved: the MHC, infectious diseases, pharmacogenetics, cancer, and diabetes. The important ethical, social, and personal consequences raised by increasing knowledge of the genetics of complex diseases are covered in a way that offers the reader the chance to think and reflect. The final chapter discusses the technology involved.

CONTENTS:
1. Genetic Basis of Complex Disease
2. Defining Complex Disease
3. How to Investigate Complex Disease Genetics
4. Why Investigate Complex Disease Genetics?
5. Statistical Considerations for the Planning and Analysis of Genetic Studies in Complex Disease
6. The MHC
7. Genetics of Infectious Disease
8. Pharmacogenetics
9. Cancer as a Complex Disease: Genetic Factors Affecting Cancer Susceptibility and Cancer Treatment
10. Genetic Studies on Susceptibility to Diabetes
11. Ethical, Social and Personal Consequences
12. Sequencing Technology and the Future of Complex Disease Genetics
**The Principles of Evolution**
*Systems, Species, and the History of Life*

Jonathan Bard, University of Oxford, UK

*The Principles of Evolution* is a textbook designed for upper-level undergraduate and graduate students which considers evolution in the context of systems biology. Evolution needs this systems perspective for three reasons. First, most activity in living organisms is driven by complex networks of proteins and this has direct implications, particularly for understanding evo-devo and for seeing how variation is initiated. Second, it provides the natural language for discussing phylogenetic trees. Third, evolutionary change involves events at levels ranging from the genome to the ecosystem and systems biology provides a context for integrating material of this complexity.

Jonathan Bard,
University of Oxford, UK

CONTENTS:


**Genome Stability**
*DNA Repair and Recombination*

James E. Haber, Brandeis University, USA

*Genome Stability: DNA Repair and Recombination* describes the various mechanisms of repairing DNA damage by recombination, most notably the repair of chromosomal breaks. The text presents a definitive history of the evolution of molecular models of DNA repair, emphasizing current research. The book introduces the central players in recombination. An overview of the four major pathways of homologous recombinational repair is followed by a description of the several mechanisms of nonhomologous end-joining.

James E. Haber,
Brandeis University, USA

CONTENTS:


Appendix Evolution of Models of Homologous Recombination
Human Molecular Genetics, Fourth Edition

Tom Strachan, Newcastle University, UK, and Andrew Read, University of Manchester, UK

*Human Molecular Genetics* is an established and class-proven textbook for upper-level undergraduates and graduate students which provides an authoritative and integrated approach to the molecular aspects of human genetics.

Garland Science
2010: 781pp: 610 illus
Paperback: 978-0-8153-4149-9: £59.00

CONTENTS:

1. Nucleic Acid Structure and Gene Expression
2. Chromosome Structure and Function
3. Genes in Pedigrees and Populations
4. Cells and Cell-Cell Communication
5. Principles of Development
6. Amplifying DNA: Cell-based DNA Cloning and PCR
7. Nucleic Acid Hybridization: Principles and Applications
8. Analyzing the Structure and Expression of Genes and Genomes
9. Organization of the Human Genome
10. Model Organisms, Comparative Genomics and Evolution
11. Human Gene Expression
12. Studying Gene Function in the Post-Genome Era
13. Human Genetic Variability and its Consequences
14. Genetic Mapping of Mendelian Characters
15. Mapping Genes Conferring Susceptibility to Complex Disease
16. Identifying Human Disease Genes and Susceptibility Factors
17. Cancer Genetics
18. Genetic Testing of Individuals
19. Pharmacogenetics, Personalized Medicine, and Population Screening
20. Genetic Manipulation of Animals for Modeling Disease and Investigating Gene Function
21. Genetic Approaches to Treating Disease

Introducing Genetics, Second Edition

Alison Thomas, Anglia Ruskin University, UK

The new edition of *Introducing Genetics* is a clear, concise, and accessible guide to inheritance and variation in individuals and populations. It first establishes the principles of Mendelian inheritance and the nature of chromosomes, before tackling quantitative and population genetics. The final three chapters introduce the molecular mechanisms that underlie genetics, including the techniques responsible for the current genetic revolution.

Garland Science
November 2014: 262pp: 117 illus
Paperback: 978-0-8153-4509-1: £26.00

CONTENTS:

1. Introduction
2. Monohybrid Inheritance
3. Extensions to Monohybrid Inheritance
4. Dihybrid Inheritance
5. The Chromosomal Basis of Inheritance
6. Sex Determination and Sex Linkage
7. Linkage and Chromosome Mapping
8. Variation in Chromosomal Number and Structure
9. The Principles of Quantitative Genetics
10. An Introduction to Population Genetics
11. Heredity at the Molecular Level
12. From Genes to Proteins
13. Manipulating DNA
Introduction to Genetics
A Molecular Approach
Terry A. Brown, University of Manchester, UK

The theme of Introduction to Genetics is the progression from molecules (DNA and genes) to processes (gene expression and DNA replication) to systems (cells, organisms, and populations). This progression reflects both the basic logic of life and the way in which modern biological research is structured.

Garland Science
2011: 554pp: 656 illus
Paperback: 978-0-8153-6509-9: £59.00

 CONTENTS:
PART 1 - GENES AS UNITS OF BIOLOGICAL INFORMATION
1. The Scope of Modern Genetics
2. DNA
3. Genes
4. Transcription of DNA to RNA
5. Types of RNA Molecule: Messenger RNA
6. Types of RNA Molecule: Noncoding RNA
7. The Genetic Code
8. Protein Synthesis
9. Control of Gene Expression
PART 2 - GENES AS UNITS OF INHERITANCE
10. DNA Replication
11. Inheritance of Genes During Eukaryotic Cell Division
12. Inheritance of Genes in Bacteria
13. Inheritance of Genes During Virus Infection Cycles
15. Inheritance of Genes During Eukaryotic Sexual Reproduction
16. Mutation and DNA repair
17. Inheritance of genes in Populations
PART 3 - GENETICS IN OUR MODERN WORLD
18. Genes in Differentiation and Development
19. The Human Genome
20. Genes and Medicine
21. DNA in Forensics and Studies of Human History
22. Genes in Industry and Agriculture
23. The Ethical Issues Raised by Modern Genetics

Genetics and Genomics in Medicine
Tom Strachan, Judith Goodship, Patrick Chinnery, all at Newcastle University, UK

Genetics and Genomics in Medicine is a new textbook written for undergraduate students, graduate students, and medical researchers that explains the science behind the uses of genetics and genomics in medicine today. Rather than focusing narrowly on rare inherited and chromosomal disorders, it is a comprehensive and integrated account of how genetics and genomics affect the whole spectrum of human health and disease.

Garland Science
April 2014: 500pp: 270 illus
Paperback: 978-0-8153-4480-3: £61.00

 CONTENTS:
1. Fundamentals of DNA, Chromosomes, and Cells
2. Fundamentals of Gene Structure, Gene Expression, and Human Genome Organization
3. Principles Underlying Core DNA Technologies
4. Principles of Genetic Variation
5. Single-gene Disorders: Inheritance Patterns, Phenotype Variability, and Allele Frequencies
6. Principles of Gene Regulation and Epigenetics
7. Genetic Variation Producing Disease-Causing Abnormalities in DNA and Chromosomes
8. Identifying Disease Genes and Genetic Susceptibility to Complex Disease
9. Genetic Approaches to Treating Disease
10. Cancer Genetics and Genomics
11. Genetic Testing From Genes to Genomes, and the Ethics of Genetic Testing and Therapy
Genetic Association Studies
A Practical Guide to Basic Genetic Epidemiology

Tefik Dorak, Florida International University, USA

Genetic Association Studies will demystify the key concepts of genetic epidemiology for geneticists, medical residents, clinical researchers, and public health professionals. The focus is on genetic association studies, but taking genetic association in its broadest sense to include SNPs, copy number variations, and epigenetic changes. The role of the environment in genetic epidemiology will also be highlighted. Genetic Association Studies emphasizes practical applications rather than theoretical background and will enable readers to understand and critique genetic association studies and setting them on the way to designing, executing, analyzing, interpreting, and reporting their own.

Garland Science
November 2016: 250pp: 75 illus
Paperback: 978-0-8153-4463-6: £52.00

CONTENTS:

Phylogenomics
A Primer

Rob DeSalle and Jeffrey Rosenfeld, both at American Museum of Natural History, USA

Phylogenomics introduces undergraduate and graduate students to the field of phylogenomics, the discipline that integrates evolutionary biology and genomics. The book presents an overview of the interlinking aspects of molecular biology, systematics, and bioinformatics; describes phylogenomic techniques such as PCR, CLUSTAL, and neighbor joining; and provides guidelines for navigating relevant databases such as GenBank, BLAST, and EDGAR.

Garland Science
2012: 352pp: 160 illus
Paperback: 978-0-8153-4211-3: £49.00

CONTENTS:
Parasitology
A Conceptual Approach

Eric S. Loker and Bruce V. Hofkin, both at University of New Mexico, USA

*Parasitology: A Conceptual Approach* focuses on the conceptual basis of parasitology, with the goal of providing students with an expanded view of parasites and their biology. Concentrating on concepts will enable readers to gain a broader perspective that will increase their ability to think critically about all kinds of parasitic associations. Studying individual parasites is an essential part of parasitology so *Parasitology: A Conceptual Approach* contains an appendix (the Rogues' Gallery) which provides a concise overview of the biology of important human and veterinary parasites.

“I shall recommend this book for anyone dealing with any aspect of parasitology. It is a rich source of updated information on emerging issues in parasitology, including parasite-host interactions, parasite ecology and evolution. I will certainly put my hardcopy in my bookshelf “must have books on parasitology.”

Parasites and Vectors

**CONTENTS:**
1. An Introduction to Parasitism
2. An Overview of Parasite Diversity
3. The Parasite’s Way of Life
4. Host Defense and Parasite Evasion
5. Parasite vs. Host: Pathology and Disease
6. The Ecology of Parasitism
7. The Evolutionary Biology of Parasitism
8. Parasites and Conservation Biology
9. The Challenge of Parasite Control
10. The Future of Parasitology

**ROGUES' GALLERY:** Protozoa • Platyhelminths • Nematodes • Arthropods

Viruses
Biology, Applications, and Control

David R. Harper, Biocontrol Limited, UK

*Viruses: Biology, Applications, and Control* is a concise, advanced undergraduate and graduate textbook covering the essential aspects of virology included in biomedical science courses. It is an updated and expanded version of David Harper’s *Molecular Virology*, Second Edition.

“...a good text for an advanced undergraduate course in virology.”

**Doody's Review**

**CONTENTS:**
1. Virus Structure and Infection
2. Virus Classification and Evolution
3. Virus Replication
4. Immune Response and Evasion
5. Vaccines and Immunotherapy
6. Antiviral Drugs
7. Beneficial Use of Viruses
8. Emergence and Extinction of Viruses
9. Virus Culture, Detection and Diagnosis
As with the first edition, this new edition of Living In A Microbial World is written for students taking a general microbiology course, or a microbiology-based course for non-science majors. The conversational style and use of practical, everyday examples make the essential concepts of microbiology accessible to a wide audience. While using this approach, the text maintains scientific rigour with clear explanations spanning the breadth of microbiology, including health, evolution, ecology, food production, biotechnology, and industrial processes.

Each chapter contains a series of case studies based on microbiology in the news, in history, and in literature. There are questions at the end of each case study and the end of each chapter, as well as an online quiz with help on answering the questions. The text, questions, and cases have been updated to reflect the changing influence of microbiology in the world today, from the microbiome, to new disease outbreaks (Ebola and Zika) and antibiotic resistance, to new biotechnology tools (CRISPR-Cas).

Garland Science
March 2017: 450pp: 428 illus
Student Paperback: 978-0-8153-4601-2: £53.00
Instructor Paperback: 978-0-8153-4514-5

CONTENTS:

NEW TO THE SECOND EDITION:
Images available in PowerPoint and JPEG
Online quiz with answers and feedback provided through the Garland Science Learning System
Extra modules provided through the Garland Science Learning System
Help answering the end-of-chapter questions
Online glossary
Flashcards
As with the successful First Edition, the new edition of Microbiology: A Clinical Approach is written specifically for pre-nursing and allied health students. It is clinically-relevant throughout and uses the theme of infection as its foundation. Microbiology is student-friendly: its text, figures, and electronic resources have been carefully designed to help students understand difficult concepts and keep them interested in the material. The textbook is supported by the Garland Science Learning System, with a robust ancillary package for instructors which will easily allow them to incorporate the book’s new approach into their lectures. Students working towards careers in the healthcare professions will achieve success with Microbiology: A Clinical Approach.

CONTENTS:
Janeway’s Immunobiology, Ninth Edition

Kenneth Murphy, Washington University School of Medicine, USA, Casey Weaver, University of Alabama Medical School, Birmingham, USA

Janeway’s Immunobiology is a textbook for students studying immunology at the undergraduate, graduate, and medical school levels. As an introductory text, all students will appreciate the book’s clear writing and informative illustrations, and advanced students and working immunologists will appreciate its comprehensive scope and depth. Janeway’s Immunobiology presents immunology from a consistent point of view throughout—that of the host’s interaction with an environment full of microbes and pathogens. The Ninth Edition has been thoroughly revised bringing the content up-to-date with significant developments in the field, especially on the topic of innate immunity, and improving the presentation of topics across chapters for better continuity.

Garland Science
April 2016: 900pp: 624 illus
New! Hardback: 978-0-8153-4445-2: £220.00
Loose-leaf: 978-0-8153-4551-0: £60.00

NEW IN THE NINTH EDITION

- Now organized around the concept of modular immune responses, combining innate and adaptive immunity into effector modules and explaining the integration of the innate and adaptive immune response.
- Updated with the latest developments on innate lymphoid cells and innate sensing mechanisms, including cycling GMP-SMP synthase (cGAS) and activation of the STING pathway.
- Incorporates the new mechanisms of class switch recombination involving RNA guides for AID.
- Includes an expanded, updated coverage of CD4 T cell subsets, including an in-depth handling of follicular helper T cells and their role in B cell class switching and affinity maturation.
- Improved coverage of chemokine networks and their role in coordinating immunity.
- Includes new content on cytoskeletal reorganization and integrin activation in antigen receptor signaling and expanded coverage on Akt and mTOR signaling.
- Revised and updated sections on mechanisms of immune evasion by pathogens and HIV/AIDS.
- Updated and more detailed consideration of mechanisms of immune-mediated disease.
- Expanded coverage of cancer immunotherapy, including chimeric antigen receptor T cell (CAR T cell) therapy.
- Comprehensive update to Appendix I: The Immunologist’s Toolbox, with the addition of many new techniques, including mass spectrometry, in vivo administration of antibodies, RNAi, and the CRISPR/Cas9 system.
- Illustration program has been thoroughly updated with over 100 new figures and improved with newer and better images of protein structures and micrographs.
- Completely updated end-of-chapter questions, in a variety of types, that review each chapter’s concepts.
- New Question Bank written by Leslie Berg (University of Massachusetts Medical School) provides a comprehensive collection of questions that require the student to reflect upon and synthesize concepts in each chapter and can be used by instructors for the creation of exams.
IMMUNOLOGY

CONTENTS:

Case Studies in Immunology, Seventh Edition
A Clinical Companion
Raif Geha, Harvard Medical School, USA, Luigi Notarangelo, National Institute of Health Bethesda, MD

Case Studies in Immunology highlights major common disorders of immunity, including genetic disorders of the immune system, immune-complex diseases, immune-mediated hypersensitivity reactions, and autoimmune and alloimmune diseases.

Garland Science
March 2016: 358pp: 255 illus
Paperback: 978-0-8153-4512-1: £43.00

CONTENTS:
The Immune System, Fourth Edition

Peter Parham, Stanford University, USA

The Immune System, Fourth Edition emphasizes the human immune system and presents immunological concepts in a coherent, concise, and contemporary account of how the immune system works. Written for undergraduate, medical, veterinary, dental, and pharmacy students, it makes generous use of medical examples to illustrate points. This classroom-proven textbook offers clear writing, full-color illustrations, and section and chapter summaries that make the book accessible and easily understandable to students. The Immune System is additionally supported by the Garland Science Learning System.

CONTENTS:
1. Elements of the Immune System and their Roles in Defense
2. Innate Immunity: The Immediate Response to Infection
3. Innate Immunity: The Induced Response to Infection
4. Antibody Structure and the Generation of B-Cell Diversity
5. Antigen Recognition by T Lymphocytes
6. The Development of B Lymphocytes
7. The Development of T Lymphocytes
8. T Cell-Mediated Immunity
9. Immunity Mediated by B Cells and Antibodies
10. Preventing Infection at Mucosal Surfaces
11. Immunological Memory and Vaccination
12. Coevolution of Innate and Adaptive Immunity
13. Failures of the Body’s Defenses
14. IgE-Mediated Immunity and Allergy
15. Transplantation of Tissues and Organs
16. Disruption of Healthy Tissue by the Immune Response
17. Cancer and Its Interactions with the Immune System

NEW IN THE FOURTH EDITION:
• Increased coverage of innate immunity, now in two chapters.
• New chapter dedicated to mucosal immunology.
• Immunological memory and vaccination combined in Chapter 11, including new approaches to vaccination.
• Chapter 12 is dedicated to lymphocytes that contribute to innate and adaptive immunity.
• Parasite immunology is covered for the first time, integrated with allergy in Chapter 14.
• Appreciation of the active interaction between the immune system and commensal organisms involving co-development and co-evolution.
• New marginal icons indicate topics which correlate to Case Studies in Immunology by Geha and Notarangelo.
• The Question Bank has been greatly revised and greatly expanded.

"...Appealing and relevant for those students who approach the study of the immune system through a clinical lens, including students of medicine and pharmacology...it would also be appropriate in an introductory immunology course."

Clinical Immunology

"The overall structure of the book is well thought out and follows a logical path from basic principles to clinical applications. Written in a good, clear, easily flowing style, it has the right balance between text and illustrations. It also contains just the right amount of clinical and laboratory science to keep it all real and interesting, and this will mean that it will appeal to the broad spectrum of students currently enrolled in immunology classes."

Immunology News
Immunology: An Illustrated Outline, Fifth Edition

David Male, The Open University, UK

*Immunology: An Illustrated Outline* is both a review guide to the essential principles of immunology and a concise dictionary of immunological terms. It can be used as a review tool in preparation for course exams and medical licensing exams, or as a refresher when this content is encountered in related life science areas, such as microbiology and virology. The book also enables readers to look up specific terms in the index and locate the definitions, making it a powerful reference for interns, residents, and physicians in clinical practice.

Garland Science
July 2013: 146pp
Paperback: 978-0-8153-4501-5: £18.00

**CONTENTS:**

1. The Immune System
2. Immune Recognition
3. Immune Responses
4. Immunopathology
5. Immunological Techniques

Case Studies in Infectious Disease

Peter Lydyard, Royal Free and University College Medical School, UK, Michael Cole, Georgetown University Medical Center, USA, John Holton, Royal Free and University College Medical School, UK, Will Irving, University of Nottingham, UK, Nino Porakishvili, University of Westminster, UK, Pradhib Venkatesan, Nottingham University Hospital, UK, and Kate Ward, Royal Free and University College Medical School, UK

*Case Studies in Infectious Disease* presents forty case studies featuring the most important human infectious diseases worldwide. Written for students of microbiology and medicine, this book describes the natural history of infection from point of entry of the pathogen through pathogenesis, clinical presentation, diagnosis and treatment.

Garland Science
2009: 608pp: 270 illus
Paperback: 978-0-8153-4142-0: £41.00

Case Studies in Allergic Disorders

Hans Oettgen and Raif Geha, both at Harvard Medical School, USA

*Case Studies in Allergic Disorders* describes the basic cellular and molecular mechanisms involved in the pathogenesis of commonly occurring allergic diseases and introduces the rationale for targeted intervention in these mechanisms in the treatment of allergy. It is intended for medical students and undergraduate and graduate students in immunology as well as residents in internal medicine and pediatrics.

Garland Science
2012: 176pp: 100 illus
Paperback: 978-0-8153-4436-0: £35.00
Case Studies in Veterinary Immunology
Laurel Gershwin, University California Davis, USA

Case Studies in Veterinary Immunology presents basic immunological concepts in the context of actual cases seen in clinics. It is intended for veterinary medicine students, interns, residents, and veterinarians, and serves as a valuable supplement and companion to a variety of core immunology textbooks and courses. The book includes cases describing primary immune system defects, secondary immune system defects, and hypersensitivity and autoimmune disorders, as well as dysproteinemias and lymphoid neoplasia. Drawing on the successful approach of Geha’s Case Studies in Immunology, each representative case is preceded by a discussion of the principles underlying that specific immunological mechanism.

CONTENTS:

Principles of Mucosal Immunology
Society for Mucosal Immunology. Edited by Phillip D. Smith, University of Alabama Medical School Birmingham, USA, Thomas T. MacDonald, Barts and the London School of Medicine and Dentistry, UK, and Richard S. Blumberg, Harvard Medical School, USA

Principles of Mucosal Immunology is for graduate students, postdoctoral fellows and investigators in immunology and microbiology, and medical and dental students. Thirty-two chapters contained in seven sections present the basic and clinical aspects of the mucosal immune system, focusing on the major components of the mucosal barrier—the gastrointestinal, upper and lower respiratory, ocular, and genitourinary mucosal immune systems.

CONTENTS:
**Principles of Proteomics, Second Edition**

**Richard M. Twyman**, WriteScience, UK

*Principles of Proteomics, Second Edition* provides a concise and user-friendly introduction to the diverse technologies used for the large-scale analysis of proteins, as well as their applications, and their impact in areas such as drug discovery, agriculture, and the fight against disease. *Principles of Proteomics* has been fully updated to reflect the most recent developments in the field without losing its focus on the underlying principles.

*Garland Science*  
September 2013: 260pp: 293 illus  
Paperback: 978-0-8153-4472-8: **€57.00**

**CONTENTS:**  
1. The Origin and Scope of Proteomics  
2. Strategies for Protein Separation  
3. Strategies for Protein Identification  
4. Strategies for Protein Quantitation  
5. The Analysis of Protein Sequences  
6. The Analysis of Protein Structures  
7. Interaction Proteomics  
8. Protein Modification in Proteomics  
9. Protein Microarrays  
10. Applications of Proteomics

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**The Molecules of Life**

**Physical and Chemical Principles**

**John Kuriyan**, University of California, Berkeley, USA, **Boyana Konforti**, Simons Foundation, USA, and **David Wemmer**, University of California, Berkeley, USA

*The Molecules of Life* is a textbook that provides an integrated physical and biochemical foundation for undergraduate students majoring in biology or health sciences. The book integrates fundamental concepts in thermodynamics and kinetics with an introduction to biological mechanism at the level of molecular structure.

*Garland Science*  
2012: 1032pp: 900 illus  
Paperback: 978-0-8153-4188-8: **€60.00**

**CONTENTS:**  
**Part I. Biological Molecules**  
1. From Genes to RNA and Proteins  
2. Nucleic Acid Structure  
3. Glycans and Lipids  
4. Protein Structure  
5. Evolutionary Variation in Proteins  
**Part II. Energy and Entropy**  
6. Energy and Intermolecular Forces  
7. Entropy  
9. Free Energy  
10. Chemical Potential and the Drive to Equilibrium  
11. Voltages and Free Energy  
**Part IV. Molecular Interactions**  
12. Molecular Recognition: The Thermodynamics of Binding  
13. Specificity of Macromolecular Recognition  
14. Allostery  
**Part V. Kinetics and Catalysis**  
15. The Rates of Molecular Processes  
16. Principles of Enzyme Catalysis  
17. Diffusion and Transport  
**Part VI. Assembly and Activity**  
18. Folding  
19. Fidelity in DNA and Protein Synthesis

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"With its quantitative approach and step-by-step derivations of key equations, this book prepares students in biology and health sciences well for the increasingly quantitative approaches in biology."

Quarterly Review of Biology

"*The Molecules of Life* certainly provides a fine reference book for those trying to keep up with the vast amount of new information becoming available in this important area of biological science."

The Biologist
How Proteins Work is an up-to-date and authoritative account of protein function in living systems, explained within the governing parameters of physics, chemistry, and evolution. It will enable advanced undergraduate students in biochemistry and biophysics to understand the relationships among protein function, structure, and dynamics and will also serve as a valuable resource for graduate students and researchers.

"...very good coverage of domain structure and the assembly of proteins from basic functional units, and an excellent discussions of the evolution of proteins..."

Choice

CONTENTS:

Introduction to Protein Structure, Second Edition
Carl Branden (deceased), and John Tooze, Cancer Research, UK

Introduction to Protein Structure provides an account of the principles of protein structure, with examples of key proteins in their biological context generously illustrated in full-color to illuminate the structural principles described in the text.

"The strength of the book lies in its beautiful art work and its logical dissection of the baffling complexities of protein structures...admirably concise, lucid and accurate presentations of difficult concepts...invaluable for students."

Nature

CONTENTS:
Biomolecular Crystallography
Principles, Practice, and Application to Structural Biology
Bernhard Rupp, q.e.d. life science discoveries, California, USA

Synthesizing over thirty years of advances into a comprehensive textbook, *Biomolecular Crystallography* describes the fundamentals, practices, and applications of protein crystallography. Deftly illustrated in full color, the text describes mathematical and physical concepts in accessible and accurate language.

Garland Science
2009: 800pp: 448 illus
Hardback: 978-0-8153-4081-2: £79.00

CONTENTS:

I: FROM SEQUENCE TO CRYSTALS
1. Introduction: Preparing Your Study
2. Protein Structure
3. Protein Crystallization
4. Proteins for Crystallography

II: FUNDAMENTALS OF PROTEIN CRYSTALLOGRAPHY
5. Crystal Geometry
6. Diffraction Basics
7. Statistics and Probability in Crystallography

III: FROM CRYSTALS TO DATA
8. Instrumentation and Data Collection

IV: DETERMINING YOUR STRUCTURE
9. Reconstruction of Electron Density and the Phase Problem
10. Experimental Phasing
11. Non-Crystallographic Symmetry and Molecular Replacement
12. Model Building and Refinement

V: MAKING SENSE OF YOUR STRUCTURE
13. Structure Validation, Analysis, and Presentation

“This book will be an essential part of the library of any department that claims to make contributions to modern biology.”
Tom Blundell, Journal of Applied Crystallography

Proteins
Concepts in Biochemistry
Paulo Almeida, University of North Carolina Wilmington, USA

Proteins: Concepts in Biochemistry teaches the biochemical concepts underlying protein structure, evolution, stability and folding, and explains how interactions in macromolecular structures determine protein function. Intended for a one-semester course in biochemistry or biophysical chemistry with a focus on proteins, this textbook emphasizes the logic underlying biophysical chemical principles. Problems throughout the book encourage statistical and quantitative thinking. The text is ideal for senior undergraduates, first year graduate students, and practitioners in chemistry, biochemistry, biology, and biophysics.

Garland Science
March 2016: 396pp: 350 illus
Paperback: 978-0-8153-4502-2: £52.00

CONTENTS:

1. Statistical Thermodynamics of Biological Molecules
2. Protein Structure
3. Evolution of Protein Sequence and Structure
4. Protein Stability
5. Protein Folding
6. Binding, Allostery, and Cooperativity
7. Enzyme Kinetics
Appendix A. Calculation of the Excess Heat Capacity Curve of Protein Thermal Denaturation
Appendix B. Calculation of the Average Helicity from the Partition Function
Appendix C. Solution of Rate Equations for Two-State System
Protein Actions: Principles and Modeling

Ivet Bahar, University of Pittsburgh, USA, Robert Jernigan, Iowa State University, USA, Ken Dill, Stony Brook University, USA

Protein Actions: Principles and Modeling is aimed at researchers involved in biophysical studies of proteins and graduate students taking courses in protein biophysics. Broadly accessible to biophysicists and biochemists, it will be particularly useful to student and professional structural biologists and molecular biophysicists, bioinformaticians and computational biologists, biological chemists (particularly drug designers) and molecular bioengineers.

The book begins by introducing the basic principles of protein structure and function. Some readers will be familiar with aspects of this, but the authors build up a more quantitative approach than their competitors. Emphasizing concepts and theory rather than experimental techniques, the book shows how proteins can be analyzed using the disciplines of elementary statistical mechanics, energetics, and kinetics. These chapters illuminate how proteins attain biologically active states and the properties of those states. The book ends with a synopsis the roles of computational biology and bioinformatics in protein science.

Garland Science
February 2017: 336pp: 251illus
Hardback: 978-0-8153-4177-2: £60.00

CONTENTS:
Physical Biology of the Cell, Second Edition

Rob Phillips, California Institute of Technology, USA, Jane Kondev, Brandeis University, USA, Julie Theriot, Stanford University, USA, and Hernan Garcia, University of California, Berkeley, USA

Physical Biology of the Cell takes key cell biology experiments through a quantitative treatment to demonstrate how models can help refine our understanding and prediction of biological phenomena. Updated for the latest developments and now in full color, the Second Edition includes two new chapters on photosynthesis and pattern formation.

Garland Science
2012: 1,057pp: 742 illus
Paperback: 978-0-8153-4450-6: £69.00

CONTENTS:
**Molecular Driving Forces**, Second Edition
Statistical Thermodynamics in Biology, Chemistry, Physics, and Nanoscience
Ken A. Dill, Stony Brook University, USA, and Sarina Bromberg, Pescadero, California, USA

*Molecular Driving Forces*, Second Edition is an introductory statistical thermodynamics text that describes the principles and forces that drive chemical and biological processes.

Garland Science  
2011: 778pp: 690 illus  
Paperback: 978-0-8153-4430-8: **£65.00**

CONTENTS:
1. Principles of Probability  
2. Extremum Principles Predict Equilibria  
3. Heat, Work & Energy  
4. Math Tools: Multivariate Calculus  
5. Entropy & the Boltzmann Law  
6. Thermodynamic Driving Forces  
7. The Logic of Thermodynamics  
8. Laboratory Conditions & Free Energies  
9. Maxwell’s Relations & Mixtures  
10. The Boltzman Distribution Law  
11. The Statistical Mechanics of Simple Gases & Solids  
13. Chemical Equilibria  
14. Equilibria Between Liquids, Solids, & Gases  
15. Solutions & Mixtures  
16. The Solvation & Transfer of Molecules Between Phases  
17. Physical Kinetics: Diffusion, Permeation & Flow  
18. Microscopic Dynamics  
19. Chemical Kinetics & Transition States  
20. Coulomb’s Law of Electrostatic Forces  
21. The Electrostatic Potential  
22. Electrochemical Equilibria  
23. Salt Ions Shield Charged Objects in Solution  
24. Intermolecular Interactions  
25. Phase Transitions  
27. Adsorption, Binding & Catalysis  
28. Multisite & Cooperative Ligand Binding  
29. Bio & Nano Machines  
30. Water  
31. Water as a Solvent  
32. Polymer Solutions  
33. Polymer Elasticity & Collapse  
34. Polymers Resist Confinement & Deformation

**Introduction to Cell Mechanics and Mechanobiology**

Christopher R. Jacobs and Hayden Huang, both at Columbia University, USA, and Ronald Y. Kwon, University of Washington, USA

*Introduction to Cell Mechanics and Mechanobiology* teaches advanced undergraduate students a quantitative understanding of the way cells detect, modify, and respond to the physical properties within the cell environment. Coverage includes the mechanics of single-molecule polymers, polymer networks, two-dimensional membranes, whole-cell mechanics, and mechanobiology, as well as primer chapters on solid, fluid, and statistical mechanics.

Garland Science  
2012: 350pp: 250 illus  
Paperback: 978-0-8153-4425-4: **£57.00**

CONTENTS:
1. Introduction to Cell Mechanics  
2. Introduction to Cell Biology  
3. Primer to Solid Mechanics  
4. Primer to Fluid Mechanics  
5. Primer to Statistical Mechanics  
6. Experimental Techniques and Analyses  
7. Biopolymers  
8. Polymer Networks and the Cytoskeleton  
9. Biomembranes  
10. Mechanobiology  
11. Cellular Mechanotransduction

"This excellent [book]... meets a real existing need in contemporary bioengineering education, and it does it effectively and successfully."

Computer Methods in Biomechanics and Biomedical Engineering
Garland Science LEARNING SYSTEM

garlandscience.rocketmix.com
A First Course in Systems Biology, Second Edition
Eberhard O. Voit, Georgia Institute of Technology, USA

A First Course in Systems Biology is an introduction for advanced undergraduate and graduate students to the growing field of systems biology. Its main focus is the development of computational models and their applications to diverse biological systems. The book begins with the fundamentals of modeling, then reviews features of the molecular inventories that bring biological systems to life and discusses case studies that represent some of the frontiers in systems biology and synthetic biology. In this way, it provides the reader with a comprehensive background and access to methods for executing standard systems biology tasks, understanding the modern literature, and launching into specialized courses or projects that address biological questions using theoretical and computational means.

New topics in this edition include: default modules for model design, limit cycles and chaos, parameter estimation in Excel, model representations of gene regulation through transcription factors, derivation of the Michaelis-Menten rate law from the original conceptual model, different types of inhibition, hysteresis, a model of differentiation, system adaptation to persistent signals, nonlinear nullclines, PBPK models, and elementary modes.

The format is a combination of instructional text and references to primary literature, complemented by sets of small-scale exercises that enable hands-on experience, and large-scale, often open-ended questions for further reflection.

Garland Science
June 2017: 490pp: 351 illus
Paperback: 978-0-8153-4568-8: £63.00

CONTENTS:
Practical Bioinformatics
Michael Agostino, Pfizer Bioinformatics and Merrimack College, USA

Practical Bioinformatics is specifically designed for biology majors and is written for courses that have a practical, hands-on element. It contains many exercises to complement the straightforward and practical topics and is focused on the analysis of DNA, RNA, and protein sequences. It is designed to be the student’s first text for learning how to perform bioinformatics sequence analysis.

Garland Science
2012: 394pp: 240 illus
Paperback: 978-0-8153-4456-8: £35.00

"This [Practical Bioinformatics] is an excellent introductory book for bioinformatics, yet it contains enough detail to help both a serious researcher as well as a beginner in the field."

Science Books & Films

CONTENTS:

Understanding Bioinformatics
Marketa Zvelebil, Visiting Researcher at the Institute of Cancer Research, UK, and Jeremy O. Baum, Imperial College London, UK

Suitable for advanced undergraduates and postgraduates, Understanding Bioinformatics provides a definitive guide to this vibrant and evolving discipline.

Garland Science
2007: 798pp: 414 illus
Paperback: 978-0-8153-4024-9: £57.00

"...provides an outstanding introduction to the main bioinformatics problems and tools, well-balanced between applications to biological problems and theory behind data processing methods..."

Computer Methods and Programs in Bioinformatics

CONTENTS:
NEW

Clinical Chemistry
David White, University of Nottingham Medical School, UK Nigel Lawson, Derby Royal Hospital, UK Daniel McLaughlin, Durham University School of Medicine, Pharmacy & Health, USA Paul Masters, Chesterfield Royal Hospital, UK

Clinical Chemistry is a comprehensive textbook covering the area of medical science variously known as chemical pathology, clinical chemistry, medical biochemistry and clinical biochemistry. The biochemical processes and physiological interrelationships of tissues, organs, and molecules are discussed in the context of disease processes and related to the diagnosis, monitoring, and management of disease. Also included are analytical processes, such as immunoassay, and how these relate to clinical practice.

Contemporary Science
October 2016: 650pp: 320 illus
Paperback: 978-0-8153-6510-5: £60.00

CONTENTS:

Introduction to Bioorganic Chemistry and Chemical Biology
David Van Vranken and Gregory A. Weiss, both at University of California, Irvine, USA

Introduction to Bioorganic Chemistry and Chemical Biology is the first textbook to blend modern tools of organic chemistry with concepts of biology, physiology, and medicine. With a focus on human cell biology and a problems-driven approach, the text explains the combinatorial architecture of biooligomers (genes, DNA, RNA, proteins, glycans, lipids, and terpenes) as the molecular engine for life.

Garland Science
2012: 504pp: 547 illus
Paperback: 978-0-8153-4214-4: £58.00

CONTENTS:

"This book provides important information on the organic chemistry of biooligomers and their interactions in the functioning of cells. Advanced undergraduate students, graduate students in chemistry and molecular biology, as well as medical students will find this book of value."

Doody's Review
NEW

Medicinal Chemistry
Norma K. Dunlap, Middle Tennessee State University, USA, Donna M. Huryn, University of Pennsylvania, USA

Garland Science
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