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Fall 2014 Catalog

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# Molecular Neuroscience A Laboratory Manual

Edited by Rusty Lansford, *California Institute of Technology*

A wide variety of powerful molecular techniques have been applied to biology in recent decades, ranging from recombinant DNA technologies to state-of-the-art imaging methods. But the plethora of techniques available combined with the complexities of neurobiological systems can make it difficult for neuroscientists to select and carry out an experimental procedure to effectively address the question at hand.

This laboratory manual serves as a comprehensive practical guide to molecular and cellular methods for neuroscientists. It consists of five major sections: Working with Cells, Working with DNA, Working with RNA, Gene Transfer, and Imaging. Each includes step-by-step protocols and discussions of basic and cutting-edge procedures for working in that area. Fundamental techniques include maintaining a sterile working environment, purifying and culturing neural cells, isolating and manipulating DNA and RNA, and understanding and using a microscope. Advanced topics include single-neuron isolation and analysis, in vivo gene delivery and imaging, optogenetics, RNA interference, transgenic technologies, high-throughput analysis of gene expression (e.g., RNA-Seq), and constructing and imaging fluorescent proteins.

The manual includes protocols used in the Advanced Techniques in Molecular Neuroscience course offered annually at Cold Spring Harbor Laboratory, as well as protocols drawn from its best-selling lab manuals. It is an essential resource for all neuroscientists, from graduate students upward, who seek to use molecular techniques to probe the complexities of the nervous system.

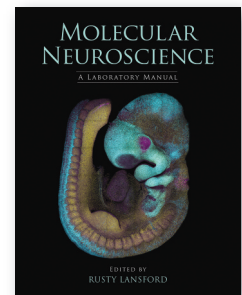
2014, 648 pp., illus. (64 4C, 50 B&W), index

Hardcover \$150 £94

Paperback \$72 £56

ISBN 978-1-621820-13-0

ISBN 978-1-621820-14-7



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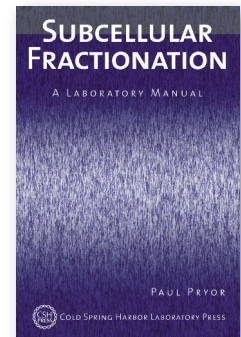


# Subcellular Fractionation

## A Laboratory Manual

By Paul Pryor, *Hull York Medical School*

The successful isolation of specific cellular structures permits in-depth studies of their function and composition. This laboratory manual provides step-by-step protocols for the extraction of subcellular components from animal tissues, yeasts, plants, and cultured cells. Each chapter describes methods for isolating a particular organelle, vesicle, membrane, or macromolecular complex. Strategies for breaking cells without damaging the component of interest, enriching for that component based on its physical and biochemical characteristics, and monitoring and ensuring the success of the purification procedure are provided.



Due November 2014, 300 pp. (approx.), illus., glossary, appendix, references, index  
 Hardcover \$150 £94  
 Paperback \$90 £56

ISBN 978-1-621820-38-3  
 ISBN 978-1-621820-42-0

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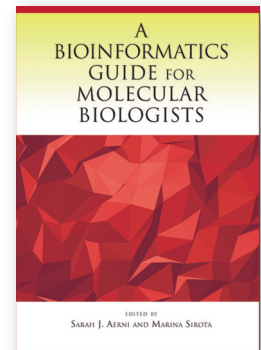
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# A Bioinformatics Guide for Molecular Biologists

Edited by Sarah Aerni, *Pivotal Software, Inc.*; Marina Sirota, *Systems Medicine, Stanford University*

Informatics can vastly assist progress in research and development in cell and molecular biology and biomedicine. However, many investigators are either unaware of the ways in which informatics can improve their research or find it inaccessible due to a feeling of “informatics anxiety.” This sense of apprehension results from improper communication of the principles behind these approaches and of the value of the many tools available. In fact, many researchers are inherently distrustful of these tools. A more complete understanding of bioinformatics offered in *A Bioinformatics Guide for Molecular Biologists* will allow the reader to become comfortable with these techniques, encouraging their use—thus helping to make sense of the vast accumulation of data. To make these concepts more accessible, the editors approach the field of bioinformatics from the viewpoint of a molecular biologist, (1) arming the biologist with a basic understanding of the fundamental concepts in the field, (2) presenting approaches for using the tools from the standpoint of the data for which they are created, and (3) showing how the field of informatics is quickly adapting to the advancements in biology and biomedical technologies. All concepts are paired with recommendations for the appropriate programming environment and tools best suited to solve the particular problem at hand. It is a must-read for those interested in learning informatics techniques required for successful research and development in the laboratory.



2014, 328 pp, illus. (64 4C, 26 B&W), index  
 Hardcover \$79 £50

ISBN 978-1-936113-22-4

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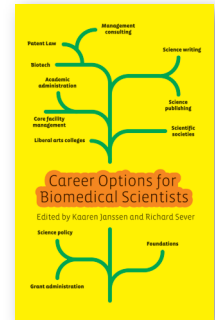




## Career Options for Biomedical Scientists

Edited by Kaaren Janssen, *Cold Spring Harbor Laboratory Press*; Richard Sever, *Cold Spring Harbor Laboratory Press*

The majority of PhDs trained in biomedical sciences do not remain in academia. They are now presented with a broad variety of career options, including science journalism, publishing, science policy, patent law, and many more. This book examines the numerous different careers that scientists leaving the bench can pursue, from the perspectives of individuals who have successfully made the transition. In each case, the book sets out what the job involves and describes the qualifications and skills sets required.



Due October 2014, 232pp., illus. (3 4C, 26 B&W), index  
Hardcover \$45 £28

ISBN 978-1-936113-72-9

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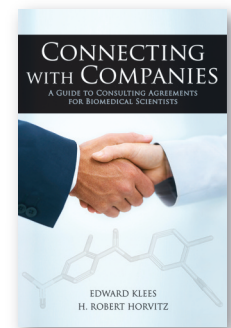




# Connecting with Companies

## A Guide to Consulting Agreements for Biomedical Scientists

By Edward Klees, J.D., *General Counsel at the University of Virginia Investment Management Company*; H. Robert Horvitz, Ph.D., *2002 Nobel Laureate in Physiology or Medicine; Professor of Biology, MIT; Member, McGovern Institute for Brain Research, MIT; Member, Koch Institute for Integrative Cancer Research, MIT; Investigator, Howard Hughes Medical Institute*



**An essential guide for academic scientists and physicians who are considering consulting work in biomedicine**

Before signing a consulting agreement, this must-have reference will help you understand the key issues to consider—from intellectual property, confidentiality, and compensation, to often overlooked issues such as indemnity, different classes of stock, and the relevance of insider trading and securities laws.

Read *Connecting with Companies* and you will:

- Gain invaluable, first-hand advice from the authors: a leading attorney and a Nobel Laureate in Physiology or Medicine, both with extensive experience reviewing and negotiating consulting agreements
- Receive guidance for academics, lawyers, accountants, auditors, venture capitalists, and technology transfer departments of universities, hospitals, and research organizations
- Understand crucial start-up issues such as 83b tax election and participating preferred stock

2014, 156 pp., glossary, index

Hardcover \$39 £24

ISBN 978-1-621821-07-6

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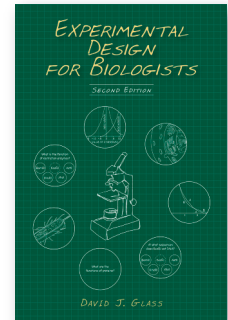
# Experimental Design for Biologists

## Second Edition

By David J. Glass, *Novartis Institutes for Biomedical Research, Cambridge, Massachusetts*

The effective design and analysis of experiments in biology are critical to success, yet graduate students in biological and medical sciences typically receive very little formal training in these steps. With feedback from readers of the first edition, colleagues, and students taking the very popular experimental design courses taught by the author, this second edition of *Experimental Design for Biologists* retains the engaging writing style while organizing the book around the four elements of experimental design: the framework, the system, the experiment, and the model. The approach has been tested in the classroom, where the author has taught numerous graduate students, MD/PhD students, and postdoctoral fellows. The goal of every scientist is to discover something new and with the aid of *Experimental Design for Biologists*, this task is made a little easier.

This handbook explains how to establish the framework for an experimental project, how to set up all of the components of an experimental system, design experiments within that system, determine and use the correct set of controls, and formulate models to test the veracity and resiliency of the data. This thoroughly updated edition of *Experimental Design for Biologists* is an essential source of theory and practical guidance for designing a research plan



2014, 304 pp., illus. (34 B&W), index  
Hardcover \$39 £24

ISBN 978-1-621820-41-3

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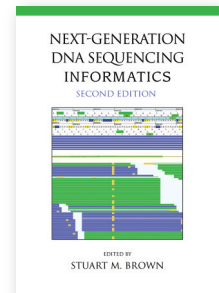


# Next-Generation DNA Sequencing Informatics

## Second Edition

Edited by Stuart M. Brown, *New York University School of Medicine*

Next-generation DNA sequencing (NGS) technology has revolutionized biomedical research, making genome and RNA sequencing an affordable and frequently used tool for a wide variety of research applications including variant (mutation) discovery, gene expression, transcription factor analysis, metagenomics, and epigenetics. Bioinformatics methods to support DNA sequencing have become and remain a critical bottleneck for many researchers and organizations wishing to make use of NGS technology. *Next-Generation DNA Sequencing Bioinformatics, Second edition*, provides thorough, plain language introduction to the necessary informatics methods and tools for analyzing NGS data as did the first edition, and provides detailed descriptions of algorithms, strengths and weaknesses of specific tools, pitfalls and alternative methods. Four new chapters in this edition cover: experimental design, sample preparation, and quality assessment of NGS data; Public databases for DNA Sequencing data; De novo transcript assembly; proteogenomics; and emerging sequencing technologies. The remaining chapters from the first edition have been updated with the latest information. This book also provides extensive reference to best-practice bioinformatics methods for NGS applications and tutorials for common workflows. The second edition of *Next-Generation DNA Sequencing Bioinformatics* addresses the informatics needs of students, laboratory scientists, and computing specialists who wish to take advantage of the explosion of research opportunities offered by new DNA sequencing technologies.



Due March 2015, 350 pp. (approx.), illustrated, index

Hardcover \$61 £38

ISBN 978-1-621821-23-6

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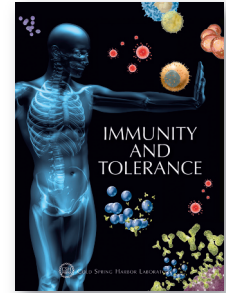
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# Immunity and Tolerance

*(Cold Spring Harbor Symposia on Quantitative Biology LXXVIII)*

Edited by Anne O'Garra, *MRC National Institute of Medical Research, London, UK*; Michel Nussenzweig, *HHMI/The Rockefeller University, New York*; Stephen Smale, *University of California, Los Angeles*; David Stewart, *Cold Spring Harbor Laboratory*; Bruce Stillman, *Cold Spring Harbor Laboratory*



The 78th Symposium covers many aspects of the immune system including the genetics, biochemistry, molecular and cell biology, and developmental biology of immune responses. Fundamental biological insights are described as well as new approaches intended to harness the immune system to treat disease, particularly cancer. The specific topics addressed in this volume include:

- Stem cells and cell fate decisions
- Regulation of immune cell development
- Antigen receptor gene assembly and modification
- Signal transduction
- Regulation of lymphocyte function
- Innate immune response and inflammation
- Adaptive immunity
- Mucosal immunity
- Organ specific immunity
- Immune regulation and tolerance
- Autoimmunity and allergy
- Immunity and cancer
- Pathogen-immune system interactions
- Vaccine development
- Novel strategies to engineer/harness immunity

2014, 304 pp, illus. (65 4C, 39 B&W), Index  
 Hardcover \$318 £199  
 Paperback \$129 £81

ISBN 978-1-621820-84-0  
 ISBN 978-1-621820-85-7

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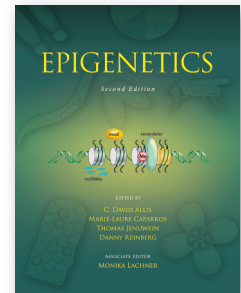




## Epigenetics

### Second edition

Edited by C. David Allis, *The Rockefeller University, London*; Marie-Laure Caparros, *London*; Thomas Jenuwein, *Max-Planck Institute of Immunobiology and Epigenetics*; Danny Reinberg, *Howard Hughes Medical Institute, New York University School of Medicine-Smilow Research Center*; Associate Editor Monika Lachlan, *Max-Planck Institute of Immunobiology and Epigenetics*



An understanding of epigenetics is central to research in transcriptional regulation, development, and disease. The second edition of the best-selling Epigenetics textbook builds on the strong foundation of the first edition, expanding from 24 to 36 expertly written chapters. Revised chapters from the first edition cover the basic molecular mechanisms underpinning epigenetic regulation, discussing many cellular processes that rely on this kind of regulation, and survey the studies carried out in the whole spectrum of model organisms in which it has been most examined.

New to the book is the inclusion of the expanding structural data on the machinery that modifies histones and DNA, giving weight and understanding to the molecular workings of chromatin and epigenetics. Also new is the inclusion of studies showing how chromatin remodeling machinery, and the higher order 3-D organization of the nucleus, are contributing to epigenetic regulation. A chapter is dedicated to the mounting evidence in mouse models of transgenerational epigenetic inheritance. Findings from studies of development, reprogramming, and disease highlight not only the importance of epigenetics but also the potential for epigenetic therapy, as illustrated in chapters covering the immune and neuronal systems, and cancer.

This book is a major resource for those working in the field, as well as a suitable text for advanced undergraduate and graduate courses on gene regulation.

Due February 2015, 930 pp. (approx.), illus., index  
Hardcover \$165 £103

ISBN 978-1-936113-59-0

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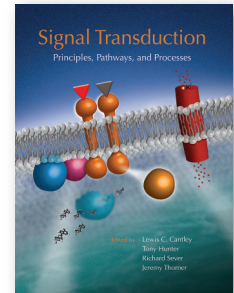






# Signal Transduction

Edited by Lewis Cantley, *Harvard Medical School*; Tony Hunter, *The Salk Institute*,  
Richard Sever, *Cold Spring Harbor Laboratory*; Jeremy Thorner, *University of  
California, Berkeley*



Cells must respond to a wide variety of signals. These include hormones, growth factors, morphogens, and environmental stress, as well as signals from internal regulators and checkpoints. A complex network of signal transduction pathways within the cell ensures that these signals are relayed to the correct molecular targets and that the cell responds appropriately.

This textbook provides a comprehensive view of signal transduction, covering both the fundamental mechanisms involved and their roles in key biological processes. Taking a novel approach, it first lays out the basic principles of signal transduction, explaining how different receptors receive information and transmit it via signaling proteins, ions, and second messengers. It then surveys the major signaling pathways that operate in cells, before examining in detail how these function in processes such as cell growth and division, cell movement, metabolism, development, reproduction, the nervous system, and immune function.

The book is essential reading for students learning about signal transduction for the first time. It will also be a vital reference for all cell, molecular, and developmental biologists and pharmacologists, neurobiologists, and immunologists studying processes regulated by cell signaling.

2014, 452 pp., illus. (143 color, 5 B&W), index  
Hardcover \$165 £110

ISBN 978-0-879699-01-7

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## Human Variation

### A Genetic Perspective on Diversity, Race, and Medicine

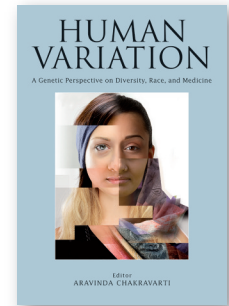
Edited by Aravinda Chakravarti, *Johns Hopkins University School of Medicine, Institute of Genetic Medicine*

Since the appearance of modern humans in Africa around 200,000 years ago, we have migrated around the globe and accumulated genetic variations that affect various traits, including our appearance, skin color, food tolerance, and susceptibility to different diseases. Large-scale DNA sequencing is now allowing us to map the patterns of human genetic variation more accurately than ever before, trace our ancestries, and develop personalized therapies for particular diseases. It is also reinforcing the idea that human populations are far from homogeneous, are highly intermixed, and do not fall into distinct races or castes that can be defined genetically.

This book provides a state-of-the-art view of human genetic variation and what we can infer from it, surveying the genetic diversity seen in Africa, Europe, the Americas, and India. The contributors discuss what this can tell us about human history and how it can be used to improve human health. They also caution against assumptions that differences between individuals always stem from our DNA, stressing the importance of nongenetic forces and pointing out the limits of our knowledge. The book is thus essential reading for all human geneticists and anyone interested in how we differ and what this means.

144 pp., illus. (21 4C, 5B&W), index  
Paperback \$59 £37

ISBN 978-1-936113-25-5



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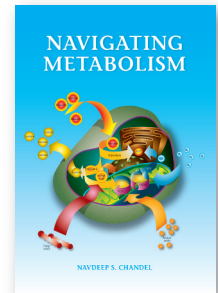




## Navigating Metabolism

By Navdeep Chandel, *Northwestern Medical School, Department of Medicine/Division of Pulmonary & Critical Care Medicine*

Metabolic pathways used to be ‘road maps’ most biologists learnt as undergraduates and then promptly forgot. Recent work has revealed how changes in metabolism are closely linked to many aspects of cell behavior and the development of cancer and other diseases. This book represents both a new look at metabolism and a refresher course. It surveys the major metabolic pathways, places these in biological context, and highlights the key control points that control cell behavior and can become dysregulated in disease.



Due November 2014, 264 pp., illus. (4C & B&W), index  
Hardcover \$79 £49  
Paperback \$49 £31

ISBN 978-1-621820-40-6  
ISBN 978-1-621821-29-8

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# Quickstart Molecular Biology

## An Introductory Course for Mathematicians, Physicists, and Engineers

By Philip N. Benfey, *Duke Center for Systems Biology*

As biology becomes more quantitative and computational, increasing numbers of physical scientists, mathematicians, and engineers are moving into areas such as genomics, developmental biology, neuroscience, and systems biology. The science of molecular biology underpins all these subjects, and an understanding of its fundamental concepts and the key experimental techniques used is essential.

This book provides an introductory course in molecular biology that is designed specifically for mathematicians, physicists, and computational scientists. It starts by introducing the basic features of DNA, genes, proteins, and cells, before moving on to organismal development, genetic traits, and human evolution. In each case, basic concepts are described in the context of recent technological advances, such as next-generation sequencing, mass spectrometry, and high-throughput screens. The book thus enables readers to move rapidly from the basics of molecular biology to an understanding of cutting-edge techniques used in cell and developmental biology, genomics, and synthetic biology.

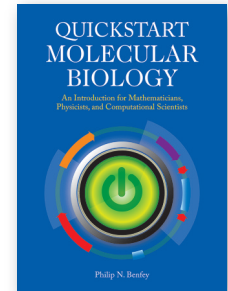
2014, 168 pp., Illus. (14 C, 31 B&W), index

Hardcover \$79 £49

Paperback \$45 £28

ISBN 978-1-621820-33-8

ISBN 978-1-621820-34-5



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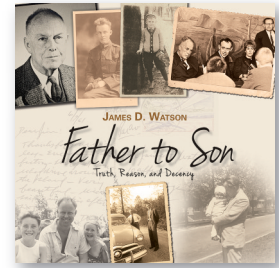




# Father to Son

## Truth, Reason, and Decency

By James D. Watson, *Cold Spring Harbor Laboratory*



At the age of 24, James Watson had a scientific discovery to his credit—the structure of DNA—that would win a Nobel Prize and forever change our understanding of genes and inheritance. Now, after a lifetime of accomplishment in research, writing, education, and science advocacy, Watson has delved for the first time publicly into his own lineage to chronicle an archetypical American family from before the Civil War to Vietnam. With its portraits of many memorable characters, illustrated with previously unpublished photographs and period documents, *Father To Son* brilliantly illuminates the fundamental truth that who we become as individuals is determined by both our genetic and cultural heritage.

2014, 285 pages, illustrated, dust jacket  
Hardcover \$29 £18

ISBN 978-1-621820-35-2

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## Biology of Heart Disease

Edited by Kenneth R. Chien, *Massachusetts General Hospital*; Margaret Buckingham, *Institut Pasteur*; Christine L. Mummery, *Leiden University Medical Center*

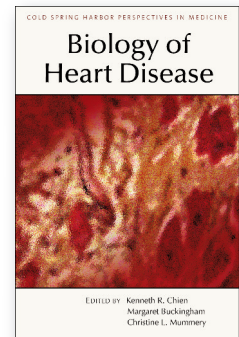
The heart is the first organ to form in a developing embryo, and all subsequent life processes depend on its proper function. But a range of genetic and environmental factors can lead to its failure. Inherited mutations give rise to congenital heart disease, the most common birth defect, and abnormalities of the adult heart are a leading cause of illness and death in industrialized countries.

Written and edited by experts in the field, this collection from *Cold Spring Harbor Perspectives in Medicine* describes how recent advances in genetics, stem cell biology, and developmental biology are transforming the way we understand and treat heart disease. Contributors review the various cell lineages and molecular networks involved in heart development; the genetic basis of inherited cardiac conditions such as congenital heart disease, cardiomyopathies, and aortic aneurysm; and how various cutting-edge technologies and models are being employed to study heart biology, uncover disease-related processes, and identify therapeutic targets. Topics include tissue engineering, genome editing, stem cells, cardiomyocyte reprogramming, chemically modified RNA, and next-generation DNA sequencing.

The authors also consider the process of drug discovery and development, and the potential for patient-specific treatments and therapies. This volume is a valuable reference for cardiologists, geneticists, and cell and developmental biologists interested in this complex, vital organ and the future of cardiovascular medicine.

Due November 2014, 320 pp. (approx.), illus. (47 4C, 3 B&W), index  
Hardcover \$135 £85

ISBN 978-1-936113-86-6



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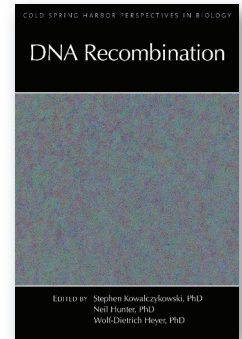




# DNA Recombination

Edited by Stephen Kowalczykowski, PhD, *University of California, Davis*; Neil Hunter, PhD, *University of California, Davis*; Wolf-Dietrich Heyer, PhD, *University of California, Davis*

Recombination mechanisms allow cells to break and reattach DNA sequences. They are important for repair of damaged DNA. They also help generate additional genetic diversity in sperm and eggs cells by mixing DNA sequences from maternal and paternal chromosomes. This volume explores the molecular details of recombination and their roles in genome maintenance and meiosis.



Due January 2015, 350 pp. (approx.), index  
Hardcover \$135 £85

ISBN 978-1-621820-09-3

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# Endocytosis

Edited by Sandra L. Schmid, *University of Texas Southwestern Medical Center; University of Pittsburgh School of Medicine*; Marino Zerial, *Max Planck Institute of Molecular and Cell Biology*

During endocytosis, extracellular molecules and plasma membrane components are selectively internalized by cells. This fundamental process of “cellular ingestion” is required for diverse activities such as nutrient uptake, cell adhesion and migration, signal transduction, cytokinesis, neurotransmission, and antigen presentation. Pathogens (e.g., HIV) exploit endocytic pathways to gain entry into cells, and defects in the endocytic machinery can lead to diseases such as cancer.

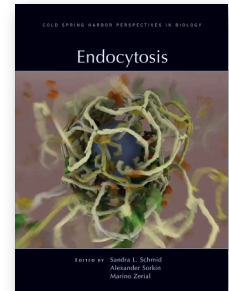
Written and edited by experts in the field, this collection from *Cold Spring Harbor Perspectives in Biology* covers all of the major pathways of endocytosis and post-endocytic trafficking, and how they regulate cellular and organismal physiology. Contributors describe how cargo enters the cell via clathrin-mediated and clathrin-independent pathways, including caveolar endocytosis, micropinocytosis, cholesterol-sensitive endocytosis, phagocytosis, and the CLIC/GEEC pathway. They review the numerous machineries (e.g., Rab GTPases, tethering factors, and retromer) that transport cargo through endosomes and deliver it to lysosomes or recycle it back to the cell surface, and the signals and mechanisms governing these sorting decisions. Topics such as lysosomal dynamics, the biophysical challenges of bending membranes, and the evolution of endocytic systems are also covered.

This volume also includes substantial discussion of the roles of endocytic trafficking in organismal development, physiology, and disease. It is thus an indispensable reference for cell biologists, but also neuroscientists, immunologists, developmental biologists, microbiologists, and others concerned with the physiological and therapeutic implications of this key cellular process.

2014, 590 pp., illus., index

Hardcover \$135 £85

ISBN 978-1-621820-24-6



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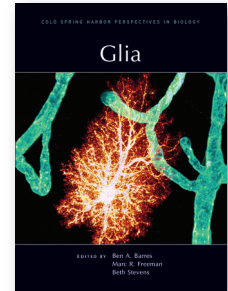
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# Glia

Edited by Ben A. Barres, *Stanford University School of Medicine*; Marc R. Freeman, *Howard Hughes Medical Institute, University of Massachusetts Medical School*; Beth Stevens, *Boston Children's Hospital, Harvard University*



**G**lia are cells that serve to nourish and support the neuronal cells that relay electrical signals through the nervous system. They also play critical roles in development and synapse formation, helping to establish neural circuits. This book examines our understanding of the basic biology of glia and their roles in diseases such as Alzheimer's and cancer. What emerges from this work is new insight into the importance of glial cells, especially an appreciation that the development, function, and malfunction of our brains can only be understood as a signaling interplay between neurons and glial cells.

Due December 2014, 350 pp. (approx.), illus. (4C & B&W), index  
Hardcover \$135 £85

ISBN 978-1-621820-27-7

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# Human Fungal Pathogens

Edited by Arturo Casadevall, *Albert Einstein College of Medicine of Yeshiva University*; Aaron P. Mitchell, *Carnegie Mellon University*; Judith Berman, *Tel Aviv University*; Kyung J. Kwon-Chung, *National Institute of Allergy and Infectious Diseases*; John R. Perfect, *Duke University Mycology Research Unit*; Joseph Heitman, *Duke University Medical Center*

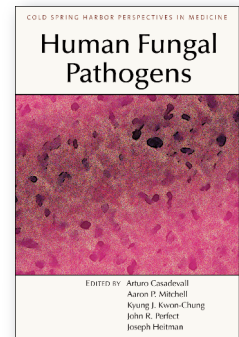
Some yeasts and molds that are common in the environment can infect humans and cause a range of diseases, from superficial (e.g., athlete's foot) to severe (e.g., cryptococcal meningitis). These pathogenic fungi pose a particular threat to immunocompromised individuals, such as those living with HIV/AIDS, and are becoming a leading cause of morbidity and mortality worldwide.

Written and edited by experts in the field, this collection from *Cold Spring Harbor Perspectives in Medicine* provides a comprehensive review of the biology and diseases of fungal pathogens. Contributors examine their life cycles, nutritional and metabolic requirements, and morphological characteristics, as well as their interactions with humans—their modes of dissemination and penetration, the mechanisms they use to evade the immune system, and their effects on target organs. Specific chapters are devoted to the major disease-causing fungi, such as *Candida*, *Aspergillus*, and *Cryptococcus* species. The ecology, evolution, and epidemiology of human fungal pathogens are also explored.

This volume includes discussions about options for diagnosing and treating fungal infections, as well as challenges presented by emerging drug-resistant strains. It is therefore an essential reference for all fungal biologists and medical professionals who wish to understand and manage these difficult pathogens.

Due December 2014, 350 pp. (approx.), illus., index  
Hardcover \$135 £85

ISBN 978-1-621820-75-8



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# Innate Immunity & Inflammation

Edited by Ruslan Medzhitov, *Yale University School of Medicine*

The innate immune system is rapidly activated in response to infection and injury. It is a generic rather than pathogen-specific response that recruits immune cells, promotes inflammation, and mobilizes the adaptive immune system. Excessive or chronic inflammation may cause tissue damage, so a careful balance is required to restore homeostasis.

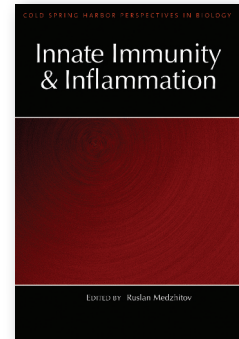
Written and edited by experts in the field, this collection from *Cold Spring Harbor Perspectives in Biology* reviews the cellular and molecular mechanisms involved in innate immunity and all types of inflammation. The contributors examine the cell types that make up the innate immune system, their use of pattern recognition receptors (e.g., Toll-like receptors) to identify pathogens and damaged tissues, and how they trigger signaling pathways that culminate in inflammation, pathogen destruction, and tissue repair. The numerous chemical signals and factors involved in innate immunity and inflammation are described, as are those that keep inflammation in check.

The authors also discuss the diseases that can result when these processes go awry, such as rheumatoid arthritis and cancer. This volume is therefore a valuable reference for all immunologists, cell biologists, and medical scientists wishing to understand these protective processes and their implications for human health and disease.

Due November 2014, 350 pp. (approx.), illus. (41 4C), index

Hardcover \$135 £85

ISBN 978-1-621820-29-1



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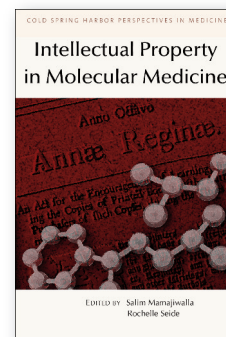
# Intellectual Property in Molecular Medicine

Edited by Salim Mamajiwalla, *In(sci)te IP Inc.*; Rochelle Seide, *RKS Consulting*

As universities increasingly spin off biotech companies and academics work more closely with these companies and the pharma industry, it is essential that they gain an understanding of intellectual property law and patenting. This book introduces the basic ideas and discusses how they apply to biomedical research and product development in the age of genomics.

Due January 2015, 350 pp. (approx.), illus., index  
Hardcover \$135 £85

ISBN 978-1-621820-83-3



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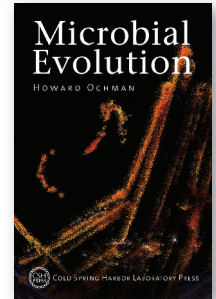




## Microbial Evolution

Edited by Howard Ochman, *University of Texas*

Bacteria are ancient organisms that represent most life on Earth. They evolve extremely rapidly, often exchanging genetic material through a process termed lateral DNA transfer. Consequently it's often unclear how to define individual species and phylogenetic trees. This book examines our understanding of bacterial evolution. Focusing on how genomics is revolutionizing our approach to studying these organisms.



Topics include:

- Epidemiological genetics
- Evolution of new functions de novo and from pre-existing genes
- How microbial genes evolve
- Mutation—the Engine of Evolution: Studying Mutation and Its Role in the Evolution of Bacteria
- Paleobiological Perspectives on Early Microbial Evolution
- The Evolution of *Campylobacter jejuni* and *Campylobacter coli*
- Co-Evolution of the Organization and Structure of Prokaryotic Genomes

Due December 2014, 300 pp. (approx.), illus., index  
Hardcover \$135 £84

ISBN 978-1-621820-37-6





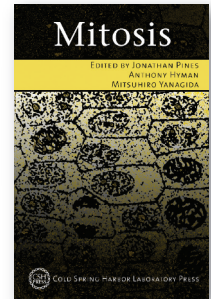
## Mitosis

Edited by Jonathan Pines, *Wellcome/Cancer Research UK Gurdon Institute*; Anthony Hyman, *Max Planck Institute of Molecular Cell Biology and Genetics*; Mitsuhiro Yanagida, *Okinawa Institute of Science and Technology Promotion Corporation*

**M**itosis—division of a cell to produce two daughter cells—is a complicated process that must be highly coordinated to ensure events such as chromosome separation take place at the right time and in the right order. This book provides a state-of-the-art examination of the mechanics of mitosis, how the process is regulated, and the different checkpoints and quality-control steps involved.

Due February 2015, 400 pp. (approx.), illus., index  
Hardcover \$135 £84

ISBN 978-1-621820-15-4



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## MYC and the Pathway to Cancer

Edited by Chi V. Dang, *University of Pennsylvania*; Robert N. Eisenman, *Fred Hutchinson Cancer Research Center*

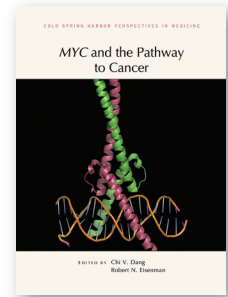
The *MYC* gene family plays essential roles in normal development and in multiple cellular functions. Moreover aberrant *MYC* gene activation is profoundly involved in the etiology of a wide range of cancers. *MYC* encodes a transcriptional regulator that modulates expression of genes controlling cell growth, proliferation, metabolism, differentiation, and death. Deregulation of these expression programs has been linked to *MYC*'s function in tumor initiation, progression, and survival.

Written and edited by experts in the field, this collection from *Cold Spring Harbor Perspectives in Medicine* covers all aspects of *MYC* biology. The contributors discuss its normal functions in the control of cell growth, cell competition, pluripotency, and development, as well as the molecular basis for the effects of the *MYC* protein on transcription. In addition, they examine how *MYC* interacts with other proteins, induces apoptosis, and impacts metabolism, genomic stability, and microRNA expression.

The authors also provide a detailed analysis of the role of *MYC* in tumor initiation and progression. Its involvement in cancers such as medulloblastoma, neuroblastoma, and Burkitt's lymphoma is examined, as are the prospects for anti-*MYC* therapies in cancer treatment. This book is essential reading for all cancer biologists, as well as researchers studying the regulation of gene expression.

2014, 429 pp., illustrated (74 Color, 9 B&W)  
Hardcover \$135 £85

ISBN 978-1-621820-08-6



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# Origin and Evolution of Eukaryotes

Edited by Patrick J. Keeling, *Canadian Institute for Advanced Research, Botany Department University of British Columbia* and Eugene V. Koonin, *Senior Investigator, NCBI, NLM, NIH*

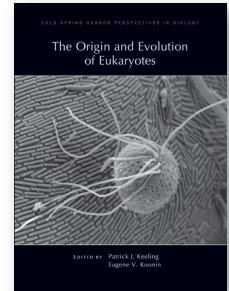
All protists, fungi, animals, and plants on Earth are eukaryotes. Their cells possess membrane-bound organelles including a nucleus and mitochondria, distinct cytoskeletal features, and a unique chromosome structure that permits them to undergo mitosis or meiosis. The emergence of eukaryotic cells from prokaryotic ancestors about 2 billion years ago was a pivotal evolutionary transition in the history of life on Earth. But the change was abrupt, and few clues exist as to the nature of the intermediate stages.

Written and edited by experts in the field, this collection from *Cold Spring Harbor Perspectives in Biology* examines evolutionary scenarios that likely led to the emergence and rapid evolution of eukaryotes. Contributors review the mechanisms, timing, and consequences of endosymbiosis, as well as molecular and biochemical characteristics of archaea and bacteria that may have contributed to the first eukaryotic lineage. They explore all of the available evidence, including clues from the fossil record and comparative genomics, and formulate ideas about the origin of genomic characteristics (e.g., chromatin and introns) and specific cellular features (e.g., the endomembrane system) in eukaryotes. Topics such as the origins of multicellularity and sex are also covered.

This volume includes discussion of multiple evolutionary models that warrant serious attention, as well as lively debate on some of the most contentious topics in the field. It will thus be fascinating reading for evolutionary biologists, cell and molecular biologists, paleobiologists, and all who are interested in the history of life on Earth.

2014, 416 pp., illus. (47 color, 12 B&W), index  
Hardcover \$135 £85

ISBN 978-1-621820-28-4



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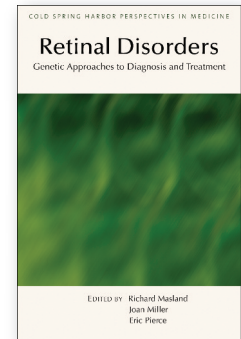


# Retinal Disorders

## Genetic Approaches to Diagnosis and Treatment

Edited by Richard Masland, *Harvard Medical School, Massachusetts Eye and Ear Infirmary*; Joan Miller, *Massachusetts Eye and Ear Infirmary*; Eric Pierce, *Massachusetts Eye and Ear Infirmary*

Retinal disorders are a leading cause of blindness. This book examines the molecular basis of these diseases, focusing on genetic approaches that are improving both our understanding of the disease process and their diagnosis, as well as advances in gene therapy that have been used to cure patients and provide a model for treatment of other conditions.



Due December 2014, 400 pp. (approx.), index  
Hardcover \$135 £85

ISBN 978-1-621820-17-8

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## Retinal Disorders

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## Skin and Its Diseases

Edited by Anthony Oro, *Professor, Dermatology, Stanford University School of Medicine, Department of Dermatology / Oro Lab* and Fiona Watt, *Director, Centre for Stem Cells and Regenerative Medicine, King's College London*

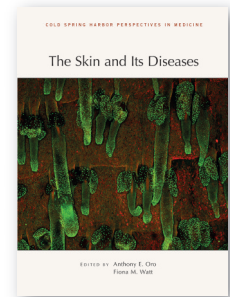
The skin is the largest organ in the human body, and it is constantly bombarded with external stimuli. It offers protection and insulation, prevents dehydration, and senses the environment. But irritants, infections, and inherited genetic mutations cause hundreds of skin disorders, ranging from mild cosmetic conditions to serious diseases such as cancer.

Written and edited by experts in the field, this collection from *Cold Spring Harbor Perspectives in Medicine* provides a comprehensive review of the biology of the skin, its numerous functions, and the diseases that affect it. Contributors discuss the various components of the epidermis, dermis, hair follicles, glands, and nerve endings that make up the skin, the molecular pathways and processes that underlie their development and function, and what happens when these processes go awry. The important functions of skin stem cell populations in tissue development, homeostasis, and repair are described, as are the roles of resident and recruited cells in inflammatory responses. Several chapters are devoted to cutaneous disorders, including alopecias, carcinomas, melanomas, psoriasis, and genetic diseases such as epidermolysis bullosa.

Topics such as age-related changes to the skin, the roles of resident microbes in skin health and disease, and advances in therapies for cutaneous disorders are also covered. This volume is therefore a vital reference for dermatologists, cancer biologists, cell and developmental biologists, immunologists, and all who seek to understand the numerous functions and diseases of this major organ.

2014, 490 pp., illus. (82 color, 6 B&W), index  
Hardcover \$135 £85

ISBN 978-1-621820-23-9



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# The Genetics and Biology of Sexual Conflict

Edited by William Rice, *University of California, Santa Barbara*; Sergey Gavrilets, *National Institute for Mathematical and Biological Synthesis*

The genetic interests of males and females often diverge; traits favored by one sex can be costly to the other. Over time, this “battle of the sexes,” or sexual conflict, has important evolutionary consequences (e.g., speciation).

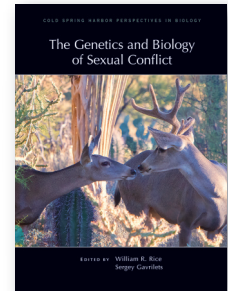
Written and edited by experts in the field, this collection from *Cold Spring Harbor Perspectives in Biology* examines the underlying biology of sexual conflict—from the molecular to the behavioral levels—and its role as an important driver of evolution. Contributors review multiple examples of sexual antagonism (e.g., parental care and mating rate), its genetic basis, the various and sometimes dramatic ways that it is manifested (e.g., infanticide and copulatory wounding), and its evolutionary impacts, especially on male–female coevolution and reproductive isolation. Topics such as hermaphroditism and homosexuality are also covered.

This volume includes discussion of the evolutionary origins of sexual conflict and its relationship to other evolutionary forces (e.g., sexual selection). It will thus be fascinating reading for all geneticists and biologists who are interested in the evolution of sexual reproduction.

2014, 432 pp., illus. (26 4C, 18 B&W), index

Hardcover \$135 £85

ISBN 978-1-621820-59-8



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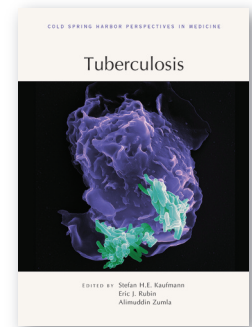
# Tuberculosis

Edited by Stefan H.E. Kaufmann, *Max Planck Institute for Infection Biology*; Eric Rubin, *Harvard School of Public Health*; Ali Zumla, *University College London Medical School*

**T**uberculosis (TB) is a serious infectious disease of the lungs that is usually caused by the bacterium *Mycobacterium tuberculosis*. Nearly one-third of the world's population is currently infected with latent TB, and millions of individuals develop the active, potentially fatal form of the disease each year. The continuing emergence and spread of drug-resistant TB strains is one of the most difficult challenges facing control of the disease.

Written and edited by experts in the field, this collection from *Cold Spring Harbor Perspectives in Medicine* examines all aspects of *M. tuberculosis* biology, transmission, and infection, as well as ongoing strategies to treat and control it. Contributors explore the biological characteristics of *M. tuberculosis*, its complex interactions with the human immune system, and factors that influence the progression from latent to active TB disease (e.g., coinfection with HIV/AIDS). The clinical manifestations of TB, both pulmonary and extrapulmonary, are fully described and illustrated.

This volume also includes discussions of recent advances in the development of diagnostics, drugs, and vaccines, as well as strategies for enhanced implementation of existing interventions. It is an essential reference for microbiologists, immunologists, pathologists, epidemiologists, and clinicians, and all who wish to understand and combat this global health burden.



Due November 2014, 664 pp., illus. (52 4C, 71 B&W), index  
Hardcover \$135 £85

ISBN 978-1-621820-73-4

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