# Cold Spring Harbor Laboratory Press

## Spring 2014 Catalog

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New Books

# Cold Spring Harbor Laboratory Press Spring 2014 Catalog
## NEW BOOKS

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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 ~200,000 years ago, we have migrated around the globe and accumulated genetic variations that affect our appearance, skin color, food tolerance, and susceptibility to different diseases. 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, and discussing how this new knowledge can be used to improve human health in the era of personalized medicine.

**Due June 2014, 200 pp. (approx.), illus., index**
**Paperback $59 £37**
**ISBN 978-1-936113-25-5**

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# Endocytosis

Edited by Sandra L. Schmid, *University of Texas Southwestern Medical Center; University of Pittsburgh School of Medicine;* and 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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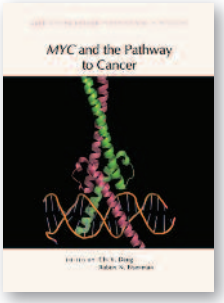
# MYC and the Pathway to Cancer




Edited by Chi V. Dang, *University of Pennsylvania* and 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 its 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.

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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 a continually renewing organ that acts as a protective barrier isolating us from the external environment. This book examines the cells that make up the skin and their functions, as well as diseases such as psoriasis that affect the skin and new molecular strategies for treating these.

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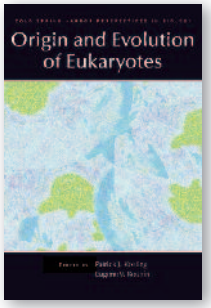
# Origin and Evolution of Eukaryotes




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*

Eukaryotes—organisms whose cells possess a nucleus and internal membranes—first appeared on earth around two billion years ago, when one prokaryotic cell engulfed another. The resulting cells went on to give rise to all fungi, animals, and plants. This book discusses the evolutionary processes that led to the appearance of eukaryotes and how they subsequently evolved.

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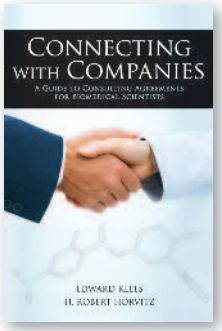
# Connecting with Companies

## A Guide to Consulting Agreements for Biomedical Scientists




By Edward Klees, J.D., *General Counsel at the University of Virginia Investment Management Company, former Associate General Counsel of the Howard Hughes Medical Institute;* and 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

**Due April 2014, 144 pages (approx.)**
**Hardcover $39 £24** **ISBN 978-1-621821-07-6**

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"This is the book I wish had been available when I started my first company. I learned an enormous amount from it."
*—Roger Tsien, University of California at San Diego, Nobel Laureate in Chemistry, 2008*

"I loved this book and all potential consultants in the biomedical field will find it enlightening. I highly recommend it."
*—Katherine Ku, Director of the Office of Technology Licensing, Stanford University*

"The book is exceptionally to the point—and useful. I've recommended it to our senior staff for themselves and for the faculty they deal with." *—Lita Nelsen, Director, Technology Licensing Office, Massachusetts Institute of Technology*

"Consulting agreements between academic scientists and corporations protect discoveries and intellectual property and address legal aspects of their commercial development. In this book, the authors apply academic rigor to the principles and subtleties of these agreements, making it worthwhile reading for any academic scientist with an interest in the corporate world." *—Ansbert K. Gadicke, Managing Director, MPM Capital*

"In this valuable guide, the authors provide a crisp introduction to key issues in academic-industry interactions, making it a must-read for any academic contemplating entry into a consulting agreement.."
*—Marc Tessier-Lavigne, President, The Rockefeller University*

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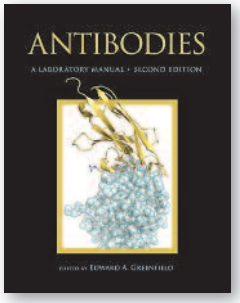
# Antibodies

## A Laboratory Manual, Second Edition




Edited by Edward A. Greenfield, *Dana-Farber Cancer Institute*

This second edition of the now-classic lab manual *Antibodies,* by Harlow and Lane, has been revised, extended, and updated by Edward Greenfield of the Dana-Farber Cancer Center, with contributions from other leaders in the field. This manual continues to be an essential resource for molecular biology, immunology, and cell culture labs on all matters relating to antibodies. The chapters on hybridomas and monoclonal antibodies have been recast with extensive new information and there are additional chapters on characterizing antibodies, antibody engineering, and flow cytometry. As in the original book, the emphasis in this second edition is on providing clear and authoritative protocols with sufficient background information and troubleshooting advice for the novice as well as the experienced investigator.

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**Hardcover $260 £160** **ISBN 978-1-936113-80-4**
**Paperback $175 £108** **ISBN 978-1-936113-81-1**

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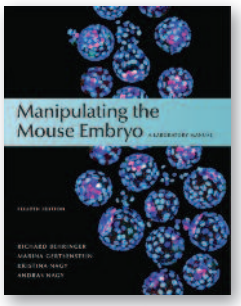
# Manipulating the Mouse Embryo

## A Laboratory Manual, Fourth Edition




By Richard Behringer, *University of Texas, M.D. Anderson Cancer Centre;* Marina Gertsenstein, *Toronto Centre for Phenogenomics, Transgenic Core and Specialty Resources;* Kristina Nagy, *Samuel Lunenfeld Research Institute, Mount Sinai Hospital, Toronto;* and Andras Nagy, *Samuel Lunenfeld Research Institute, Mount Sinai Hospital, Toronto*

The fourth edition of the "Mouse Manual"—*Manipulating the Mouse Embryo*—appears 28 years after the first edition and once again is the definitive reference source on mouse development, transgenesis techniques, and molecular biology. Authors Richard Behringer, Marina Gertsenstein, Kristina Nagy, and Andras Nagy—pre-emininent leaders in their fields—have reorganized and updated this edition to include new information and protocols on:

- assisted reproduction techniques for sperm and embryo cryopreservation
- generation of induced pluripotent stem cells
- isolation, generation, and transplantation of spermatogonial stem cell lines
- in utero electroporation of gene constructs into post-implantation embryos
- vibratome sectioning of live and fixed tissues for imaging thick tissue sections
- whole-mount fluorescent staining methods for three-dimensional visualization.

Techniques regarding recombinant DNA technology and mouse embryonic development from the previous editions have been updated and recast, as has the wealth of information on mouse laboratory strains, mouse housing and breeding, surgical procedures, assisted reproduction, handling of embryos, and micromanipulation setups. The first edition of *Manipulating the Mouse Embryo* appeared in 1986 as an outgrowth of Cold Spring Harbor Laboratory courses on the molecular embryology of the mouse held in the early 1980s, and authors of the first two editions included Brigid Hogan, Rosa Beddington, Frank Costantini, and Liz Lacy. Mouse embryo manipulation techniques have developed exponentially since the first edition, but then, as now, *Manipulating the Mouse Embryo* remains the essential practical and theoretical guide for anyone working with mice—students, lab technicians, and investigators.

**2014, 814 pp., illus. (42 4C, 134 B&W), index**
**Hardcover $240 £150** **ISBN 978-1-936113-00-2**
**Paperback $165 £104** **ISBN 978-1-936113-01-9**

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## Manipulating the Mouse Embryo

### A Laboratory Manual, Fourth Edition

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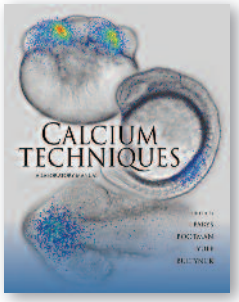
# Calcium Techniques

## A Laboratory Manual




Edited by Jan B. Parys, *University of Leuven*; Martin Bootman, *The Babraham Institute*; David I. Yule, *University of Rochester*; and Geert Bultynck, *University of Leuven*

Life begins with a surge of calcium ions (Ca2+) at fertilization, and thereafter, Ca2+ signaling influences nearly every aspect of mammalian development and physiology, from gene expression and cell proliferation to muscle contraction and nerve impulses. To create spatiotemporally distinct Ca2+ signals, cells use a variety of mechanisms to recognize, transport, and buffer Ca2+. Thus, a diverse range of reliable experimental techniques is necessary to study the movement of Ca2+ and the various effectors involved.

This laboratory manual provides step-by-step protocols for studying many facets of Ca2+ signaling, as well as background information on the principles and applications of the techniques. Contributors discuss how to use fluorescent, luminescent, and genetically encoded Ca2+ probes in conjunction with state-of-the-art imaging modalities to characterize Ca2+ signals. Electrophysiological measurements of Ca2+ channel activity are described, as are radioactive Ca2+ flux assays and methods to investigate signaling mediated by specific Ca2+-mobilizing messengers (IP3, cADPR, and NAADP). Techniques to modulate and suppress intra- and intercellular signals are also provided. Each protocol is complete with a list of required materials, detailed recipes for media and reagents, and troubleshooting advice.

Specific chapters are devoted to Ca2+ signaling techniques in non-mammalian systems, such as plants, yeast, zebrafish, and Xenopus. Methods for assessing Ca2+-binding kinetics and strategies for developing mathematical models of Ca2+ signaling are also included. Thus, this manual is a comprehensive laboratory resource for biochemists, cell and developmental biologists, and physiologists who are using or looking to expand their repertoire of Ca2+ techniques.

**2014, 608 pp., illus. (62 4C, 56 B&W), index**
**Hardcover $150 £96** **ISBN 978-1-621820-78-9**
**Paperback $95 £61** **ISBN 978-1-936113-58-3**

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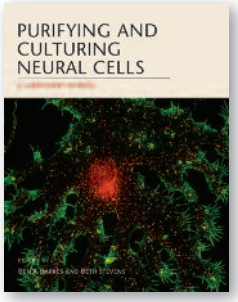
# Purifying and Culturing Neural Cells

## A Laboratory Manual




Edited by Ben A. Barres, *Stanford University School of Medicine* and
Beth Stevens, *Harvard Medical School*

Cell culture systems for specific neural cell types are essential for studies of their development and function.

This laboratory manual provides step-by-step protocols for isolating specific cell populations from rodent tissues and culturing them under conditions that closely resemble those *in vivo*. The contributors describe in detail how to dissect the brain, spinal cord, and other tissues; how to separate cells using mechanical and enzymatic tissue-dissociation strategies; the use of immunopanning and fluorescence-activated cell sorting (FACS) to enrich the target cell population; and the culture conditions that optimize cell viability and growth. Retinal ganglion cells, motor neurons, dorsal root ganglion cells, astrocytes, oligodendrocytes, and Schwann cells are covered, as are vascular cells such as pericytes and endothelial cells. Myelinating co-cultures of neurons and oligodendrocytes are also described.

The manual includes detailed recipes for media and reagents, tips for avoiding common pitfalls, and advice for designing new immunopanning protocols using tissues from other sources. Many of the protocols are accompanied by freely accessible online movies that demonstrate critical steps of the procedures. This is an essential laboratory companion for all neurobiologists, from the graduate student level upwards.

**2014, 205 pp., illus. (24 4C, 3 B&W), index**
**Hardcover $135 £87** **ISBN 978-1-621820-11-6**
**Paperback $89 £57** **ISBN 978-1-936113-99-6**

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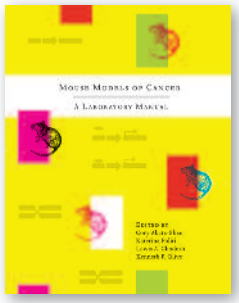
# Mouse Models of Cancer

## A Laboratory Manual



Edited by Cory Abate-Shen, *Herbert Irving Comprehensive Cancer Center, Columbia University College of Physicians and Surgeons, Columbia University Medical Center;* Katerina Politi, *Yale Cancer Center, Yale University School of Medicine;* Lewis Chodosh, *Perelman School of Medicine, University of Pennsylvania;* and Kenneth P. Olive, *Herbert Irving Comprehensive Cancer Center, Columbia University Medical Center*

The laboratory mouse is an important model for addressing questions in cancer biology. In recent years, the questions have become more refined, and mouse models are increasingly being used to develop and test cancer therapeutics. Thus, the need for more sophisticated and clinically relevant mouse models has grown, as has the need for innovative tools to analyze and validate them.

This laboratory manual provides cutting-edge methods for generating and characterizing mouse models that accurately recapitulate many features of human cancer. The contributors describe strategies for producing genetic models, including transgenic germline models, gene knockouts and knockins, and conditional and inducible systems, as well as models derived using transposon-based insertional mutagenesis, RNA interference, viral-mediated gene delivery, and chemical carcinogens. Tissue recombination, organ reconstitution, and transplantation methods to develop chimeric, allograft, and xenograft models are covered. Approaches to characterize tumor development, progression, and metastasis in these models using state-of-the-art imaging, histopathological, surgical, and other techniques are also included.

Other chapters cover the use of mouse models to test and optimize drugs in pre-, co-, and post-clinical trials. An appendix specifically addresses the use of mouse cancer models in translational studies and the integration of mouse and human clinical investigations. This manual is therefore an indispensable laboratory resource for all researchers, from the graduate level upwards, who study cancer and its treatment.

**Due December 2013, 521 pp., illus. (64 4C, 13 B&W), index**
**Hardcover $240 £150** **ISBN 978-1-621820-04-8**
**Paperback $165 £104** **ISBN 978-1-621820-03-1**

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# Molecular Cloning

## A Laboratory Manual, Fourth Edition

By Michael R. Green, *Howard Hughes Medical Institute, University of Massachusetts Medical School* and Joseph Sambrook, *Peter MacCallum Cancer Institute, Melbourne, Australia*

*Molecular Cloning: A Laboratory Manual* has always been the one indispensable molecular biology laboratory manual for protocols and techniques. The fourth edition of this classic manual preserves the detail and clarity of previous editions as well as the theoretical and historical underpinnings of the techniques presented. Ten original core chapters reflect developments and innovation in standard techniques and introduce new cutting-edge protocols. Twelve entirely new chapters are devoted to the most exciting current research strategies, including epigenetic analysis, RNA interference, genome sequencing, and bioinformatics. This manual is essential for both the inexperienced and the advanced user.

**2012, 2,028 pp., illus. (74 4C, 157 2C, and 50 B&W), appendices, index**
**Cloth (three-volume set) $395 £259** **ISBN 978-1-936113-41-5**
**Paperback (three-volume set) $365 £230** **ISBN 978-1-936113-42-2**

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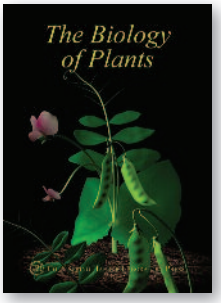
# The Biology of Plants

## Cold Spring Harbor Symposia on Quantitative Biology, Vol. LXXVII




Edited by Terri Grodzicker, *Cold Spring Harbor Laboratory;* Robert Martienssen, *Cold Spring Harbor Laboratory;* David Stewart, *Cold Spring Harbor Laboratory;* and Bruce Stillman, *Cold Spring Harbor Laboratory*

Plants are integral to human wellbeing, and many species have been domesticated for over ten thousand years. Evidence of plant scientific investigation and classification can be found in ancient texts from cultures around the world (Chinese, Indian, Greco-Roman, Muslim etc.), while early modern botany can be traced to the late 15th and early 16th centuries in Europe. During the past several decades plant biology has been revolutionized first by molecular biology and then by the genomic era. The model organism *Arabidopsis thaliana* has proved an invaluable tool for investigation into fundamental processes in plant biology, many of which share commonalities with animal biology. Plant-specific processes from reproduction to immunity and second messengers have also yielded to extensive investigation. With the genomes of more than thirty plant species now available and many more planned in the near future, the impact on our understanding of plant evolution and biology continues to grow. Our increased ability to engineer plant species to a variety of ends may provide novel solutions to ensure adequate and reliable food production and renewable energy even as climate change impacts our environment. The decision to focus the 2012 Symposium on plant science reflects the enormous research progress achieved in recent years, and is intended to provide a broad synthesis of the current state of the field, setting the stage for future discoveries and application. This is the first Symposium in this historic series focused exclusively on the botanical sciences.

**2013, 352 pp., illus., index**
**Hardcover $318 £201**
**Paperback $129 £82**

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**ISBN 978-1-621820-26-0**

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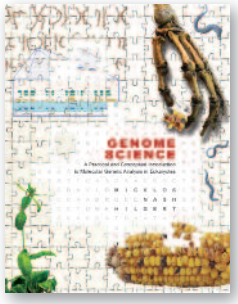
# Genome Science

## A Practical and Conceptual Introduction to Molecular Genetic Analysis in Eukaryotes



By David Micklos, *Cold Spring Harbor Laboratory;* Bruce Nash, *Cold Spring Harbor Laboratory;* and Uwe Hilgert, *University of Arizona*

*Genome Science* is a textbook and laboratory manual for advanced secondary and post-secondary education. It combines approachable narrative with extensively tested lab exercises that illustrate key concepts of genome biology in humans, invertebrates, and plants. Nineteen labs, organized into four chapters, engage students with both bioinformatics exercises and in vitro experiments. Each chapter also includes an extensive introduction that provides an historical and conceptual framework. This modular structure offers many options for enhancing existing courses, starting new courses, or supporting student research projects. The book is complete with advice for instructors, laboratory planning guidelines, recipes for solutions, and answers to student questions.

**2013, 704 pp., illus. (3 4C, 606 B&W), index**
**Hardcover $55 £38**
**ISBN 978-0-879698-59-1**

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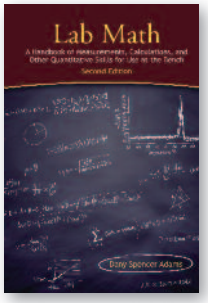
# Lab Math: A Handbook of Measurements, Calculations, and Other Quantitative Skills for Use at the Bench

## Second Edition




By Dany Spencer Adams, *The Tufts Center for Regenerative and Developmental Biology and Department of Biology, Tufts University*

*Lab Math,* Second Edition, collects in one place the numbers and equations you rely on for your experiments and use to report your data—what they mean and how to use them—as well as easy-to-follow shortcuts for making the math easier. Written in an accessible and informal style, Lab Math describes basic mathematical principles and various tasks involving numbers, including how to calibrate lab equipment, how to make solutions, and the numbers involved in various methods for quantifying DNA, RNA, and proteins, and an all-new section on quantitative polymerase chain reaction. Basic statistical ideas and methods and the proper reporting of uncertainty are described in simple-to-understand language. Also included are reference tables, charts and "plug-and-chug" equation blanks for specific experimental procedures. Since the publication of the first edition in 2003, *Lab Math* has become an essential math reference and teaching resource for both on-the-spot practical information and background for understanding numerical tasks. Important additions in this second edition make *Lab Math* an even more useful tool for every laboratory.

**2014, 332 pp., illus. (49 B&W), index**
**Concealed wire binding $59 £41**
**ISBN 978-1-936113-71-2**

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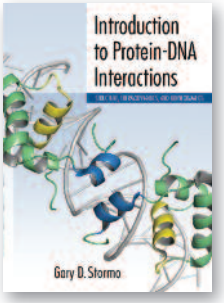
# Introduction to Protein-DNA Interactions

## Structure, Thermodynamics, and Bioinformatics




By Gary D. Stormo, Ph.D.

One of the foundations of molecular biology is how the interactions of proteins with DNA control many aspects of gene expression. Since the mid-20th century, from discoveries of the lac repressor and operator and the competition between the cI and cro proteins for the same segment of DNA, we have learned an enormous amount about the interactions of proteins with DNA and their control of fundamental processes in the cell. *Introduction to Protein–DNA Interactions: Structure, Thermodynamics, and Bioinformatics* describes what we know about protein–DNA interactions from the complementary perspectives of molecular and structural biology and bioinformatics and how each perspective informs the others. A particular emphasis is on how insights from experimental work can be translated into specific computational approaches to create a unified view of the field and a fuller understanding of protein–DNA interactions.

**2013, 208 pp., illus. (78 4C, 5 B&W), index**
**Hardcover $79 £50** **ISBN 978-1-936113-49-1**
**Paperback $45 £28** **ISBN 978-1-936113-50-7**

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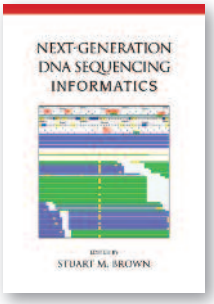
# Next-Generation DNA Sequencing Informatics




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

Next-generation DNA sequencing (NGS) technology has revolutionized biomedical research, making complete genome sequencing an affordable and frequently used tool for a wide variety of research applications. Bioinformatics methods to support DNA sequencing have become a critical bottleneck for many researchers and organizations wishing to make use of NGS technology. This book provides a thorough introduction to the necessary informatics methods and tools for operating NGS instruments and analyzing NGS data. The book also provides extensive reference to best-practice bioinformatic methods for the most commonly used NGS technologies and applications. The book also includes reference to, and guidance on, the setup and use of essential software for NGS data analysis. This is the first book of its kind to address the informatics needs of scientists who wish to take advantage of the explosion of research opportunities offered by new DNA sequencing technologies.

**2013, 241 pp., illus. (48 4C & 15 B&W), index**
**Hardcover $59 £41** **ISBN 978-1-936113-87-3**

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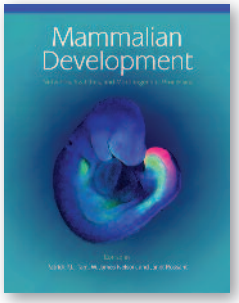
# Mammalian Development

## Networks, Switches, and Morphogenetic Processes




Edited by Patrick P.L. Tam, *Children's Medical Research Institute;* W. James Nelson, *Stanford University;* and Janet Rossant, *The Hospital for Sick Children*

During the last decade, research in developmental biology has undergone a dramatic change brought about by the availability of whole genome sequences from diverse organisms, the availability of transcriptomes and epigenomes, advanced imaging techniques and the increased understanding of the role of stem cells in organ and tissue development and regeneration. These advances have been integrated with traditional approaches of genetic manipulations and detailed phenotypic analyses in experimental model organisms such as the mouse.

This book provides a contemporary overview of the conceptual framework of molecular and cellular mechanisms of mammalian development, and a glimpse into future directions in mammalian developmental biology and its relevance to cellular and tissue therapy. Major areas of focus are transcriptional and epigenetic switches and the activity of genetic networks in cell differentiation, the role of signaling pathways, and tissue modeling and organ formation. Another major focus is on the translation of basic knowledge of developmental processes into stem cell biology, directed differentiation of pluripotent or lineage-biased progenitors, and the potential for regenerative medicine.

This book is aimed at senior undergraduates interested in the scope of modern developmental biology, graduate students and post-doctoral fellows who are beginning to explore the mouse as a model system for studying vertebrate development and its relevance to human diseases, and established scientists in fields outside the traditional areas of developmental biology who are looking to apply their knowledge and expertise in new ways.

**2013, 520 pp., illus. (120 4C, 21 B&W), index**
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## Networks, Switches, and Morphogenetic Processes


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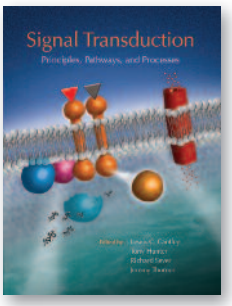
# Signal Transduction




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

Signal transduction pathways are molecular circuits that define how cells communicate with each other and respond to their environment. This new textbook for the first time provides a comprehensive view of the subject by covering both the basic mechanisms involved and the roles of signal transduction in fundamental biological processes. It starts by describing the basic players — signals, receptors, second messengers, and effectors — before comprehensively mapping the various different signaling pathways that operate in cells. It then goes on to provide detailed descriptions of how signal transduction functions in essential processes such as cell growth and division, metabolism, sensory perception, immunity, and reproduction.

**Due Spring 2014, 600 pp. (approx.), illus., index**
**Hardcover $165 £110**
**ISBN 978-0-879699-01-7**

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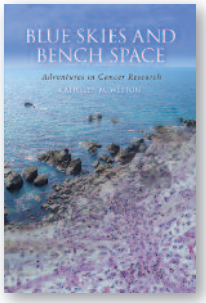


By Kathleen M. Weston, *London Research Institute*

London's Imperial Cancer Research Fund laboratories at Lincoln's Inn Fields and Clare Hall (renamed The London Research Institute in 2002) were world-famous for a century. This book, published with the assistance of the Institute, contains snapshots of the science done at the ICRF, a selection of discoveries with lasting impact on biological knowledge. The author, Kathy Weston, an experienced research investigator, also tells the human stories underlying the facts of discovery, revealing what really happened, and the personalities involved, behind the passive voice and dry logic of scientific reports. Science is an emotional journey, an art, a vocation, a complicated landscape of data in which, just sometimes, the trained and alert eye can detect the glint of gold. In this book, the gold is there but the all too human scientists stumbling towards its seductive glimmer are the real treasure.

**2014, 336 pp., illus., glossary, index**
**Hardcover $22 £14**
**ISBN 978-1-621820-77-2**

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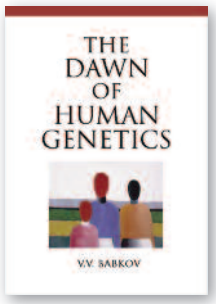
# The Dawn of Human Genetics




By V.V. Babkov
Edited by James Schwartz; Translated from the Russian by Victor Fet

In Russia, the initial euphoria of the Bolshevik leaders for a new socialist society ... combined with a commitment to a truly universal health care system, gave a huge boost to the emergence of both the eugenic and medical aspects of human genetics. The obstacles that proved so formidable to the successful launch of the field in the West—the lack of available data on the genealogy of diseases in families, the difficulty in getting a statistically significant number of identical twins to study, and the skepticism of the medical establishment—were all swept aside in the Soviet Union. In the 1920s ... the groundwork was laid for a uniquely Russian approach to medical genetics and (the foundation of) the world's leading center for the study of the genetic basis of many diseases and human genetics in general. The immense success of the movement, which is little known even to Russians, is brought to life in V.V. Babkov's *The Dawn of Human Genetics,* as is its dramatic and violent end, which resulted in the "liquidation" of many of the country's finest biologists, as well as a major setback to the development of world science. Like many other promising ideas and projects that were born in the Soviet Union, this one was abruptly truncated and then virtually eradicated.

**2013, 775 pp., illus. (91 B&W ), index**
**Hardcover $69 £44** **ISBN 978-1-936113-70-5**

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# The Dawn of Human Genetics

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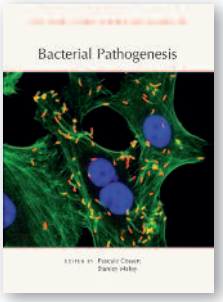
# Bacterial Pathogenesis




Edited by Pascale Cossart, *Institut Pasteur* and Stanley Maloy, *San Diego State University*

Bacterial pathogens cause numerous human diseases. This collection from *Cold Spring Harbor Perspectives in Medicine* surveys the spectrum of bacterial pathogens from *Salmonella* and *Shigella* to *Heliobacter pylori*. It examines the basic biology of these parasites, their virulence mechanisms and the host's response to infection. The effectiveness of antibiotics and vaccine strategies are also covered, along with the novel antimicrobial therapies that are being developed.

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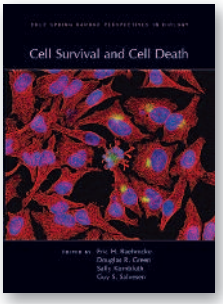
# Cell Survival and Cell Death




Edited by Eric H. Baehrecke, *University of Massachusetts*; Douglas R. Green, *St. Jude Children's Research Hospital*; Sally Kornbluth, *Duke University;* and Guy S. Salvesen, *Sanford-Burnham Medical Research Institute*

Billions of cells die every day in the human body. This is required for normal development and physiology, as well as the elimination of errant cells. Apoptosis and other cell death mechanisms are complex and carefully controlled. If cell death does not occur when it should, cancer and other diseases may develop.

Written and edited by experts in the field, this collection from *Cold Spring Harbor Perspectives in Biology* covers all aspects of apoptosis, autophagy, and necrosis. Contributors describe in detail the molecular mechanisms of cell death signaling, including death receptor-ligand systems, BCL-2 family proteins, mitochondrial permeabilization, the endocytic pathway, caspases, and signals that trigger the clearance of dying cells. Survival mechanisms and proteins such as IAPs that antagonize cell death are also described.

This volume includes discussion of tumor suppression, the altered metabolism of cancer cells, and the development of therapeutic drugs. It is an essential reference for cell and developmental biologists, cancer biologists, and all who want to understand when and how cell death is required for life.

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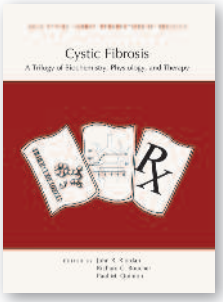
# Cystic Fibrosis

## A Trilogy of Biochemistry, Physiology, and Therapy




Edited by John R. Riordan, *The University of North Carolina at Chapel Hill*;
Richard C. Boucher, *The University of North Carolina at Chapel Hill;* and Paul M. Quinton,
*University of California, San Diego School of Medicine*

Cystic fibrosis is caused by mutations in the CFTR gene, which encodes an ion channel protein that regulates anion movement across the epithelial membranes of the lungs, pancreas, and other organs. In cystic fibrosis patients, anion transport is impeded, causing sticky, viscous mucus to build up and clog these vital organs.

Written and edited by experts in the field, this collection from *Cold Spring Harbor Perspectives in Medicine* provides an in-depth examination of cystic fibrosis biology and treatment strategies. Contributors examine the structure and dynamics of CFTR, its normal physiological roles in the airway and digestive epithelia, and how those operations are impaired in patients with cystic fibrosis. The numerous CFTR mutations and how they alter the expression, synthesis, processing, and function of CFTR in cystic fibrosis and other CFTR-related disorders are considered, as are disease-modifying genes that influence disease severity.

This volume includes discussions of therapy and treatment strategies for cystic fibrosis, ranging from airway clearance techniques and pancreatic enzyme replacements to the modulation of CFTR and related ion transport pathways. It will be an essential reference for molecular and cellular biologists, physiologists, and clinicians interested in understanding the biological basis of the disease and the search for effective therapies.

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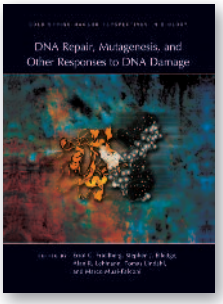
# DNA Repair, Mutagenesis, and Other Responses to DNA Damage




Edited by Errol C. Friedberg, *University of Texas Southwestern Medical Center;* Stephen J. Elledge, *Harvard Medical School;* Alan R. Lehmann, *University of Sussex;* Tomas Lindahl, *London Research Institute;* and Marco Muzi-Falconi, *Universita degli Studi di Milano*

Cellular DNA is constantly bombarded with environmental and chemical assaults that damage its molecular structure. In addition, the normal process of DNA replication is prone to error and may introduce mutations that can be passed to daughter cells. If left unrepaired, these DNA lesions can have serious consequences, such as cancer.

Written and edited by experts in the field, this collection from *Cold Spring Harbor Perspectives in Biology* reviews the mechanisms that cells use to recognize and repair various types of DNA damage. Contributors discuss base excision repair, nucleotide excision repair, mismatch repair, homologous recombination, nonhomologous end joining, the SOS response, and other pathways in prokaryotes and eukaryotes, and describe how these processes are linked to DNA replication, transcription, and cell cycle controls. The repair of telomeric and mitochondrial DNA is described, as is the influence of chromatin structure on DNA repair.

This volume also includes discussion of human genetic diseases that involve defects in DNA damage repair. It is an essential reference for molecular and cell biologists, medical geneticists, cancer biologists, and all who want to understand how cells maintain genomic integrity.

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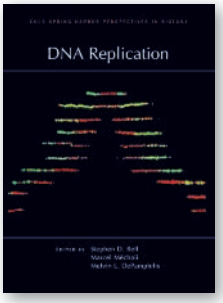
# DNA Replication




Edited by Stephen D. Bell, *Indiana University*; Marcel Méchali, *Institute of Human Genetics, CNRS*; and Melvin L. DePamphilis, *National Institute of Child Health & Human Development, NIH*

DNA replication is essential for the propagation of life on Earth. Cells in living organisms must be able to synthesize a complete copy of their DNA with extraordinary precision, so that they can pass this genetic material on to their descendants. DNA replication involves the coordinated interplay and regulation of many complex protein assemblies during the various stages of cell division. When these processes go awry, cancer and other diseases can ensue.

Written and edited by experts in the field, this collection from *Cold Spring Harbor Perspectives in Biology* covers all aspects of DNA replication and its control across all domains of life. The contributors examine the molecular machinery involved in the assembly of replication origin complexes, the establishment of replication forks, unzipping of the double helix, priming of DNA synthesis, and elongation of daughter strands. Chromatin organization and dynamics, lagging-strand maturation, telomere replication, and mechanisms to handle errors and damage in DNA are also discussed.

Including examination of the complex interactions between the core replication machinery and the regulatory circuits that drive cell cycle progression, this volume is an indispensable reference for not only biochemists and molecular biologists, but also cell biologists and all who want to understand this fundamental process of life.

**2013, 576 pp., illus. (88 4C, 33 B&W), appendices, index**
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# DNA Replication

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Table 1. Databases for identification of genes in different organisms

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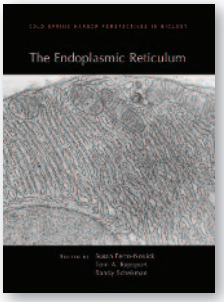
# The Endoplasmic Reticulum




Edited by Susan Ferro-Novick, *University of California, San Diego;* Tom A. Rapoport, *Harvard Medical School;* and Randy Schekman, *University of California at Berkeley*

The endoplasmic reticulum (ER) is an extensive network of membranes that folds, modifies, and transports proteins in eukaryotic cells. It also manufactures lipids and interacts extensively with other organelles, playing essential roles in cell growth and homeostasis.

Written and edited by experts in the field, this collection from *Cold Spring Harbor Perspectives in Biology* covers all aspects of ER morphology and function, as well as its interactions with the nucleus, Golgi, and mitochondria. Contributors examine how proteins translocate across the ER membrane, the processes that occur inside the ER lumen (e.g., folding, glycosylation, and disulfide bond formation), and how the proteins are packaged into vesicles and transported to the Golgi. They also review quality-control mechanisms that are employed by the ER to detect and eliminate misfolded or unassembled proteins. Lipid synthesis and transport are also discussed.

This volume covers not only the biochemistry and cell biology of the ER, but also ER stress, metabolism, and the role of the ER in viral replication. Thus, it is an essential reference for cell biologists, physiologists, and pathologists interested in understanding the numerous functions of the ER.

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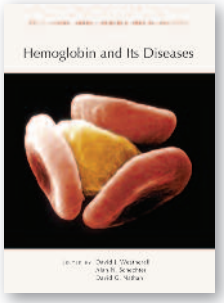
# Hemoglobin and Its Diseases




Edited by David Weatherall, *Weatherall Institute of Molecular Medicine;* Alan N. Schechter, *National Institutes of Diabetes and Digestive and Kidney Disease of the National Institutes of Health;* and David G. Nathan, *Dana-Farber Cancer Institute*

Hemoglobin is an iron-containing protein in red blood cells that transports oxygen to tissues throughout the body. The abundance, stability, and oxygen-carrying properties of hemoglobin can be altered by genetic mutations. More than one thousand hemoglobin disorders are known; hemoglobinopathies (e.g., sickle cell disease) and thalassemias are some of the most common human genetic diseases worldwide.

Written and edited by experts in the field, this collection from *Cold Spring Harbor Perspectives in Medicine* covers all aspects of hemoglobin and its diseases. Contributors examine the structure, expression, and evolution of the globin genes, the assembly of globin subunits into functional forms of hemoglobin, and the numerous variants that result from genetic alterations. The pathophysiological consequences of hemoglobin disorders (e.g., ineffective erythropoiesis and aberrant iron homeostasis), their clinical manifestations, and epidemiological trends are also described.

This volume includes discussions of management and treatment strategies for hemoglobin disorders, such as transfusions, iron-chelating agents, gene therapy, and stem cell transplantation. It is an indispensable reference for biochemists, geneticists, cell and developmental biologists, physiologists, and all who are interested in reducing the medical burden of these common genetic diseases.

**2013, 445 pp., illus. (66 4C, 19 B&W), index**
**Hardcover $135 £85**
**ISBN 978-1-936113-45-3**

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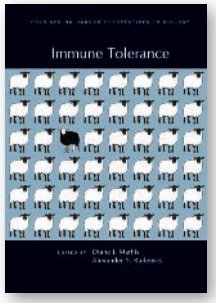
# Immune Tolerance




Edited by Diane J. Mathis, *Harvard Medical School* and Alexander Y. Rudensky, *Howard Hughes Medical Institute and Memorial Sloan-Kettering Cancer Center*

Immune tolerance ensures that the immune system responds to foreign molecules and not to self-molecules. When tolerance breaks down, severe, self-destructive diseases such as rheumatoid arthritis, lupus, and multiple sclerosis may develop. Understanding the mechanisms involved in establishing and maintaining immune tolerance is essential for effectively treating these autoimmune diseases.

Written and edited by experts in the field, this collection from *Cold Spring Harbor Perspectives in Biology* reviews how self-tolerant T- and B-cell populations are produced. The contributors discuss the elimination of autoreactive lymphocytes during their development in the thymus and bone marrow, the suppression of autoreactive cells by regulatory T cells in the periphery, and intrinsic mechanisms that produce clonal anergy. The roles of dendritic cells in antigen presentation and mechanisms that prevent autoreactivity in natural killer cells are also covered.

Including discussions of autoimmune diseases, their genetic bases, and therapeutic strategies, this volume is a valuable reference for all immunologists and clinicians wishing to understand or develop treatments for autoimmune diseases.

**2013, 168 pp., illus. (2 B&W, 20 4C), index**
**Hardcover $135 £85** **ISBN 978-0-879698-95-9**

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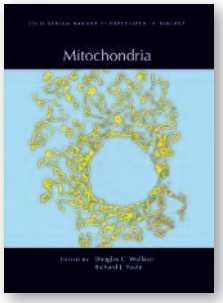
# Mitochondria




Edited by Douglas C. Wallace, *Children's Hospital of Philadelphia, University of Pennsylvania* and Richard J. Youle, *National Institute of Neurological Disorders and Strokes, Porter Neuroscience Research Center*

Mitochondria are subcellular organelles that function as 'power plants' for the cell, generating energy in the form of ATP from glucose, oxygen, and other molecules. Thought to have arisen about 2 billion years ago when an aerobic bacterium invaded the primitive eukaryotic cell, they have their own DNA, undergo fission and fusion independently, and play an important role in programmed cell death.

Written and edited by experts in the field, this collection from *Cold Spring Harbor Perspectives in Biology* discusses the evolution of mitochondria, their functions in cells, and the numerous diseases in which mitochondrial dysfunction is implicated. The contributors also examine mitochondrial biogenesis, the molecular mechanisms underlying fission and fusion, how proteins are imported from the cytoplasm, and the organization of the mitochondrial DNA.

This book includes chapters covering the involvement of mitochondria in Parkinson's disease, encephalopathies, tumorigenesis, muscular dystrophy, and other diseases, as well as aging. It is thus a vital reference for all cell and molecular biologists, as well as researchers working on muscle and neurodegenerative diseases, the role of metabolism in aging, and cancer.

**2014, 270 pp., illus. (29 4C, 9 B&W), index**
**Hardcover $135 £85**
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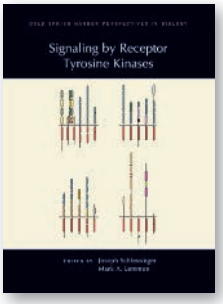


Edited by Joseph Schlessinger, *Yale University School of Medicine* and Mark A. Lemmon, *University of Pennsylvania School of Medicine*

Receptor tyrosine kinases are a large family of cell-surface receptors that respond to a variety of intercellular signals, including insulin, growth factors such as epidermal growth factor (EGF) and fibroblast growth factor (FGF), and molecules involved in neuronal guidance. Ligand binding stimulates the tyrosine kinase activity of the receptors, leading to recruitment of enzymes and adapter proteins that activate intracellular signaling pathways that control cell proliferation, differentiation, and numerous other biological processes.

Written and edited by experts in the field, this collection from *Cold Spring Harbor Perspectives in Biology* discusses the mechanisms underlying receptor tyrosine kinase signaling, including ligand processing, receptor dimerization, receptor trafficking, and the roles of adapters. The contributors also survey the specific functions of the different subfamilies of receptors and examine their many roles in development and normal physiology.

In addition, the authors review the important roles of these proteins in insulin resistance and cancer. This volume is thus a vital reference for cell and developmental biologists as well as those working on cancer biology, diabetes, and obesity.

**2014, 478 pp., illus. (86 4C, 15 B&W), index**
**Hardcover $135 £85**
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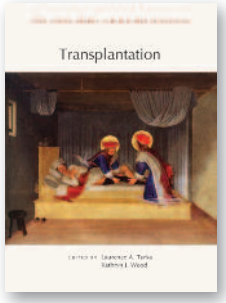


Edited by Laurence A. Turka, *Harvard Medical School* and Kathryn J. Wood, *University of Oxford*

The transplantation of organs such as the heart, kidney, and lungs is an important means of replacing seriously damaged or diseased body parts. However, a transplanted organ may fail if the recipient's immune system mounts a response to it. Transplant patients are usually prescribed a life-long course of immunosuppressive medication, but these drugs can have adverse effects, including increased risk of infection and cancer.

Written and edited by experts in the field, this collection from *Cold Spring Harbor Perspectives in Medicine* provides a current and comprehensive review of the molecular mechanisms behind graft rejection and how they may be overcome. Contributors discuss immunosuppressive drug therapies and tolerance induction strategies, including the use of regulatory T cells, mesenchymal stromal cells, and lymphodepletion. They describe how mouse and non-human primate models have been used to gain insight into the immunobiology of transplantation and to test therapeutic approaches. Clinical considerations, such as donor selection, organ preservation, surgery, and post-operative care, are also covered.

This volume includes discussion of the emerging field of regenerative medicine and the bioethical issues surrounding organ transplantation, and provides historical background to the field. It is an essential reference for immunologists, pharmacologists, clinicians, and all who are working to improve this remarkable medical procedure.

**Due December 2013, 429 pp., illus. (35 4C, 14 B&W), index**
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